Encyclopedia of MANAGEMENT

6th Edition

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Highlights

The 6th edition of the *Encyclopedia of Management (EoM)* presents a completely refreshed look at the vast and continually evolving field of management. Through 316 essays, readers will encounter thousands of terms, issues, and concepts such as:

- Angel Investors and Venture Capitalists
- Apprenticeship Programs
- Benchmarking
- Best Practices
- Coalition Building
- Consumer Behavior
- Corporate Social Responsibility
- Electronic Commerce
- Environmentalism and Sustainability
- Fuzzy Logic
- Globalization
- Hypothesis Testing
- Innovation
- Intellectual Property Rights
- International Management
- The Internet

- Lean Manufacturing and Just-in-Time Production
- Mission and Vision Statements
- Mobile Commerce
- New Product Development
- Organization Theory
- Outsourcing and Offshoring
- Pioneers of Management
- Privacy, Privacy Laws, and Workplace Privacy
- Project Management
- Quality of Work Life
- Social Networking
- Time-Based Competition
- Trends in Organizational Change
- Virtual Corporations
- Web 2.0
- Women and Minorities in Management

The *Encyclopedia of Management's* essays offer a unique starting point for individuals seeking comprehensive information that can't be adequately conveyed through brief dictionary-like definitions. Placed into context, and enhanced by background data as well as graphics and statistics, the topics covered in this volume are of both current and enduring interest.

ADDITIONAL FEATURES

- New to the 6th edition, a management glossary consisting of over 200 management terms
- Contents are arranged alphabetically from A to Z in one volume
- One comprehensive tiered index simplifies accessibility
- Cross-references abound to help readers locate information
- "Further Reading" sections provide source suggestions for further study
- Graphs, charts, and tables
- Math formulas illustrate concepts and models

Composed by business writers, *EoM* represents a substantial contribution to business and management reference. Students, scholars, and business practitioners alike will find a wealth of information in this fully revised source.

Contents

Preface and User's Guide

PREFACE

The *Encyclopedia of Management, 6th Edition* is an alphabetical reference book covering a comprehensive slate of management concepts. Last published in 2005, this fully revised work represents the latest management theories and practices. Each essay has been revised and new essays have been added to reflect the current state of management. The *Encyclopedia's* essays represent an authoritative treatment of the entire field of management, encompassing all the current theories and functional areas of this vast and growing discipline. For the management student, manager, business practitioner, reference librarian, or anyone interested in a better understanding of a business management term or concept, the *Encyclopedia* should be a first-stop for general information as well as a link to other management concepts, related terms, references, and electronic databases and information sources. It is designed to be a desk reference for everyday business management needs.

Still another use of the *Encyclopedia* is in a deeper understanding of one or more key functional areas of management. By using the book as a systematic or a programmed reading of entries in selected categories or cluster areas, the reader can obtain a more thorough, in-depth understanding of key functional areas of management. By reading all the essays for the terms under each heading in the "Guide to Functional Area Readings" (which is the entire list of essays in the volume), individuals with a limited business background, a specialty in another management functional area, or a liberal arts education background can have a broad, general familiarity with the entire scope of the management discipline today in one easy-to-use reference source.

The field of management is an extremely broad discipline that draws upon concepts and ideas from the physical and social sciences, particularly mathematics, philosophy, sociology, and psychology. Within business, the field of management includes terms and ideas also common to marketing, economics, finance, insurance, transportation, accounting, computer technologies, information systems, engineering, and business law.

Management has applications in a wide variety of settings and is not limited to business domains. Management tools, as well as the art and science of management, find applications wherever any effort must be planned, organized, or controlled on a significant scale. This includes applications in government, the cultural arts, sports, the military, medicine, education, scientific research, religion, not-for-profit agencies, and in the wide variety of

for-profit pursuits of service and manufacturing. Management takes appropriate advantage of technical developments in all the fields it serves.

The growth of the discipline of management has also led to specialization or compartmentalization of the field. These specialties of management make learning and study easier, but at the same time make broad understanding of management more difficult. It is particularly challenging to the entrepreneur and the small business owner to master the subject areas, yet this group is compelled to excel at all management functions to further their business's success. Management specialties have grown to such an extent it is difficult for any single manager to fully know what management is all about. So rapid have been the strides in recent years in such subjects as decision making, technology, the behavioral sciences, management information systems, and the like, to say nothing of proliferating legislative and governmental regulations affecting business, that constant study and education is required of all managers just to keep current on the latest trends and techniques. Thus, managers and executives need a comprehensive management desktop reference source to keep up-to-date. Having the management essays in one comprehensive encyclopedia saves valuable research time in locating the information.

In the growing age of specialists, there is a growing lack of generalists. Typically, a business manager spends a large percentage of their career developing a great familiarity and proficiency in a specialized field, such as sales, production, procurement, or accounting. The manager develops a very specialized knowledge in this area but may develop only a peripheral knowledge of advances in other areas of management. Yet as these individuals are promoted from a specialist-type position up the organizational chart to a more administrative or generalist supervisory or leadership position, the person with newly enlarged responsibilities suddenly finds that their horizon must extend beyond the given specialty. It must now include more than just a once-superficial understanding of all aspects of managing, including purchasing, manufacturing, advertising and selling, international management, quantitative techniques, human resources management, public relations, research and development, strategic planning, and management information systems. The need for broader management understanding and comprehension continues to increase as individuals are promoted.

The *Encyclopedia of Management* has had, as its goal, to bridge this gap in understanding and to offer every executive, executive-aspirant, management consultant, and educator and student of management, both comprehensive and authoritative information on all the theories, concepts, and techniques that directly impact the job of management. Building on the solid reputation established in prior editions, this thoroughly updated reference source strives to make specialists aware of the other functional areas of the management discipline and to give the top manager or administrator who occupies the general manager position new insights into the work of the specialists whom he or she must manage or draw upon in the successful management of others. In addition, the *Encyclopedia* proposes to make all practitioners aware of the advances in management science and in the behavioral sciences. These disciplines touch upon all areas of specialization because they concern the pervasive problems of decision-making and interpersonal relations.

USER'S GUIDE AND COMPILATION

Reference, Plus a Planned Reading Program. The information in the *Encyclopedia* is accessible in two forms. First, through the traditional A-to-Z compilation the reader readily has the quick answer to an immediate question or concise background information on any aspect of the field of management. As a handy desktop reference, the information is readily accessible. Second, and of more lasting importance, as a planned reading program for pursuit in depth of any of the functional areas of management—the reader's own M.B.A., if you will. This program is set forth in the **Guide to Functional-Area Readings** located at the end of the frontmatter.

Cross-referencing and Special Features. The arrangement of the essays on a strictly alphabetical basis, rather than by subject categories, makes for extremely rapid and convenient

information retrieval. At the same time, the extensive cross-referencing makes it easy to pursue a major area of interest in any depth of study desired. **"See-title"** cross-references serve to guide the reader directly toward the location of essays that may be recognized by more than one commonly used term. (For example, upon turning to "E-commerce" the see-title cross-reference would direct the reader to turn to "Electronic Commerce".)

Special features found within the essays include the following:

- **"See Also"** references, included at the end of many essays, refer the reader to further topics of closely related interest.

- **Charts, graphs, tables, and formulae** are included as illustrative examples whenever appropriate.

- **Further Reading** sections are included at the end of most entries. The bibliographic and URL citations point the reader toward a variety of suggested online and published sources for further study and research.

Glossary of Management Terms. This glossary defines over 200 management terms, including financial, governmental and general business terms. Cross-references and acronyms are also provided.

Index. Supporting the easy-to-use, extensive system of cross-references, is a comprehensive index at the back of the *Encyclopedia*. The **Index** contains alphabetical references to the following as mentioned in the essays: important or unusual terms; names of companies, institutions, organizations, and associations; key governmental agencies; specific legislation; relevant court cases; names of prominent or historical individuals; titles of groundbreaking literature; and significant studies.

Comprehensive Coverage and Compilation Method. Every effort has been made to achieve comprehensiveness in choice and coverage of subject matter. The 316 essays frequently go far beyond mere definitions and referrals to other sources. They are in-depth treatments, discussing background, subject areas, current applications, and schools of thought. In addition, information may be provided about the kinds of specialists who use the term in a given organization, the degree of current acceptance, and the possibilities for the future as the subject undergoes further development and refinement. Longer essays frequently provide charts, graphs, or examples to aid in understanding the topic.

The authors of all essays followed the editorial process specified for providing the reader an initial overview of the topic followed by information on the variety of management problems the information can be used to solve. Thus, if the reader has little knowledge of a term, after referring to the *Encyclopedia of Management, 6th Edition*, he or she will be in possession of the basics of the subject—objective, scope, implementation, current usage in practice, and expected future usage. With this information, the reader will then be in a position to ask the right kind of questions of specialists and technicians to make sure that the firm (or department, or unit, or agency, etc.) is taking full advantage of the opportunity the term presents.

Guide to Functional-Area Readings

XXIII

Glossary

Account statement: A record of transactions, including payments, new debt, and deposits, incurred during a defined period of time.

Accounting system: System capturing the costs of all employees and/or machinery included in business expenses.

Accounts payable: *See Trade credit*

Accounts receivable: Unpaid accounts which arise from unsettled claims and transactions from the sale of a company's products or services to its customers.

Advertising: A marketing tool used to capture public attention and influence purchasing decisions for a product or service. Utilizes various forms of media to generate consumer response, such as flyers, magazines, newspapers, radio, and television.

Age discrimination: The denial of the rights and privileges of employment based solely on the age of an individual.

Annual report: *(See also Securities and Exchange Commission)* Yearly financial report prepared by a business that adheres to the requirements set forth by the Securities and Exchange Commission (SEC).

Applied research: Scientific study targeted for use in a product or process.

Assets: Anything of value owned by a company.

Audit: The verification of accounting records and business procedures conducted by an outside accounting service.

Average cost: Total production costs divided by the quantity produced.

B2B: Business-to-business e-commerce.

B2C: Business-to-consumer e-commerce.

B2G: Business-to-government e-commerce.

Balance Sheet: A financial statement listing the total assets and liabilities of a company at a given time.

Bankruptcy: *(See also Chapter 7 of the 1978 Bankruptcy Act; Chapter 11 of the 1978 Bankruptcy Act)* The condition in which a business cannot meet its debt obligations and petitions a federal district court either for reorganization of its debts (Chapter 11) or for liquidation of its assets (Chapter 7).

Barriers to Entry: Obstacles that make it difficult for a new company to compete against companies already established in the industry. Examples of such obstatcles include patents, trademarks, copyrighted technology, and a dominant brand.

Basic research: Theoretical scientific exploration not targeted to application.

Benefit: Various services, such health care, flextime, day care, insurance, and vacation, offered to employees as part of a hiring package. Typically subsidized in whole or in part by the business.

Billing cycle: A system designed to evenly distribute customer billing throughout the month, preventing clerical backlogs.

Brainstorming: A group session where employees contribute their ideas for solving a problem or meeting a company objective without fear of retribution or ridicule.

Brand name: The part of a brand, trademark, or service mark that can be spoken. It can be a word, letter, or group of words or letters.

Budget: An estimate of the spending necessary to complete a project or offer a service in comparison to cash–on–

hand and expected earnings for the coming year, with an emphasis on cost control.

Business conditions: Outside factors that can affect the financial performance of a business.

Business cycle: A period of economic recession and recovery. These cycles vary in duration.

Business ethics: Moral values and principles espoused by members of the business community as a guide to fair and honest business practices.

Business license: A legal authorization issued by municipal and state governments and required for business operations.

Business name: *(See also Business license; Trademark)* Enterprises must register their business names with local governments usually on a "doing business as" (DBA) form. (This name is sometimes referred to as a "fictional name.") The procedure is part of the business licensing process and prevents any other business from using that same name for a similar business in the same locality.

Business plan: A document that spells out a company's expected course of action for a specified period, usually including a detailed listing and analysis of risks and uncertainties. For the small business, it should examine the proposed products, the market, the industry, the management policies, the marketing policies, production needs, and financial needs. Frequently, it is used as a prospectus for potential investors and lenders.

Capacity: Level of a firm's, industry's, or nation's output corresponding to full practical utilization of available resources.

Capital: Assets less liabilities, representing the ownership interest in a business. A stock of accumulated goods, especially at a specified time and in contrast to income received during a specified time period. Accumulated goods devoted to production. Accumulated possessions calculated to bring income.

Capital expenditure: Expenses incurred by a business for improvements that will depreciate over time.

Capital gain: The monetary difference between the purchase price and the selling price of capital.

Capital intensity: *(See also Debt capital; Equity midrisk venture capital; Informal capital; Internal capital; Owner's capital; Secondhand capital; Seed capital; Venture capital)* The relative importance of capital in the production process, usually expressed as the ratio of capital to labor but also sometimes as the ratio of capital to output.

Capital resource: The equipment, facilities and labor used to create products and services.

Cash flow: The movement of money into and out of a company. A positive cash flow is when more comes in than goes out. A negative cash flow is when more goes out than comes in.

Champion: An advocate for the development of an innovation.

Channel of distribution: The means used to transport merchandise from the manufacturer to the consumer.

Chapter 7 of the 1978 Bankruptcy Act: Provides for a court–appointed trustee who is responsible for liquidating a company's assets in order to settle outstanding debts.

Chapter 11 of the 1978 Bankruptcy Act: Allows the business owners to retain control of the company while working with their creditors to reorganize their finances and establish better business practices to prevent liquidation of assets.

Collateral: Securities, evidence of deposit, or other property pledged by a borrower to secure repayment of a loan.

Commercialization: The final stage of the innovation process, including production and distribution.

Common stock: The most frequently used instrument for purchasing ownership in private or public companies. Common stock generally carries the right to vote on certain corporate actions and may pay dividends, although it rarely does in venture investments. In liquidation, common stockholders are the last to share in the proceeds from the sale of a corporation's assets; bondholders and preferred shareholders have priority. Common stock is often used in first–round start–up financing.

Competitor: A business whose product or service is marketed for the same purpose/use and to the same consumer group as the product or service of another.

Continous Improvement Plan (CIP): A set of activities designed to bring gradual, but continual improvement to a process through constant review. One of the best known is The Shewhart Cycle.

Copyright: A legal form of protection available to creators and authors to safeguard their works from unlawful use or claim of ownership by others. Copyrights may be acquired for works of art, sculpture, music, and published or unpublished manuscripts. All copyrights should be registered at the Copyright Office of the Library of Congress.

Corporate financial ratios: *(See also Industry financial ratios).* The relationship between key figures found in a company's financial statement expressed as a numeric value. Used to evaluate risk and company performance. Also known as Financial averages, Operating ratios, and Business ratios.

Cost containment: Actions taken by employers and insurers to curtail rising health care costs; for example, increasing employee cost sharing, requiring second opinions, or preadmission screening.

Cross training: Training an employee in another activity that is related to their current work.

Customer service: Various techniques used to ensure the satisfaction of a customer.

Cyclical peak: The upper turning point in a business cycle.

Cyclical trough: The lower turning point in a business cycle.

Debt: *(See also Long–term debt; Mid–term debt; Securitized debt; Short–term debt)* Something owed by one person to another. Financing in which a company receives capital that must be repaid; no ownership is transferred.

Debt capital: Business financing that normally requires periodic interest payments and repayment of the principal within a specified time.

Deming Cycle: A set of activities (Plan, Do, Check, Act) designed to drive continuous improvement. Initially implemented in manufacturing, it also applies to business. It was first developed by Walter Shewhart, however is more commonly called the Deming Cycle in Japan where it was popularized by Edwards Deming.

Demographics: Statistics on various markets, including age, income, and education, used to target specific products or services to appropriate consumer groups.

Demonstration: Showing that a product or process has been modified sufficiently to meet the needs of users.

Deregulation: The lifting of government restrictions; for example, the lifting of government restrictions on the entry of new businesses, the expansion of services, and the setting of prices in particular industries.

Discrimination: The denial of the rights and privileges of employment based on factors such as age, race, religion, or gender.

Diseconomies of scale: The condition in which the costs of production increase faster than the volume of production.

Distribution: Delivering a product or process to the user.

Distributor: One who delivers merchandise to the user.

Diversified company: A company whose products and services are used by several different markets.

Dow Jones Industrial Average: An indicator of stock market performance.

Earnings Statement: A standard financial document that is a summary of a company's revenue and expenses for a specific period, usually one quarter of a fiscal year and the entire fiscal year.

EBITDA: Earnings before Interest, Tax, Depreciation and Amortization. It reports what the company would have earned during the period if it did not have to pay interest on its debt, didn't have to pay taxes, and had depreciated the full value of all assets at their acquisition. It is basically equivalent to the operating income line in the income statements.

Economic efficiency: The use of productive resources to the fullest practical extent in the provision of the set of goods and services that is most preferred by purchasers in the economy.

Economic indicators: Statistics used to express the state of the economy. These include the length of the average work week, the rate of unemployment, and stock prices.

Employer identification number: The business equivalent of a social security number. Assigned by the U.S. Internal Revenue Service.

Equal Employment Opportunity Commission (EEOC): A federal agency that ensures nondiscrimination in the hiring and firing practices of a business.

Equal opportunity employer: An employer who adheres to the standards set by the Equal Employment Opportunity Commission.

Equity: *(See also Common Stock; Equity midrisk venture capital)* The ownership interest. Financing in which partial or total ownership of a company is surrendered in exchange for capital. An investor's financial return comes from dividend payments and from growth in the net worth of the business.

Equity midrisk venture capital: An unsecured investment in a company. Usually a purchase of ownership interest in a company that occurs in the later stages of a company's development.

FASB: Financial Accounting Standards Board. The FASB was created in 1973, replacing the Accounting Principles Board and the Committee on Accounting Procedure of the American Institute of Certified Public Accountants.

Feasibility study: A study to determine the likelihood that a proposed product or development will fulfill the objectives of a particular investor.

Federal Trade Commission (FTC): Federal agency that promotes free enterprise and competition within the U.S.

Federal Trade Mark Act of 1946: *See Lanham Act.*

Financial analysis: The techniques used to determine money needs in a business. Techniques include ratio analysis, calculation of return on investment, guides for measuring profitability, and break–even analysis to determine ultimate success.

Financial statement: A written record of business finances, including balance sheets and profit and loss statements.

Fiscal year: Any twelve–month period used by businesses for accounting purposes.

Flexible benefit plan: A plan that offers a choice among cash and/or qualified benefits such as group term life

insurance, accident and health insurance, group legal services, dependent care assistance, and vacations.

Four Ps: Marketing terms: Product, Price, Place, and Promotion.

Free on board (FOB): A pricing term indicating that the quoted price includes the cost of loading goods into transport vessels at a specified place.

FTC: See Federal Trade Commission.

Fulfillment: The systems necessary for accurate delivery of an ordered item, including subscriptions and direct marketing.

Full–time workers: Generally, those who work a regular schedule of more than 35 hours per week.

GAAP: Generally Accepted Accounting Principles. A set of widely accepted accounting standards, set by the FASB, and used to standardize financial accounting of public companies.

Garment registration number: A number that must appear on every garment sold in the U.S. to indicate the manufacturer of the garment, which may or may not be the same as the label under which the garment is sold. The U.S. Federal Trade Commission assigns and regulates garment registration numbers.

GNP: *See Gross national product.*

Good Housekeeping Seal: Seal appearing on products that signifies the fulfillment of the standards set by the Good Housekeeping Institute to protect consumer interests.

Goods sector: All businesses producing tangible goods, including agriculture, mining, construction, and manufacturing businesses.

GPO: *See Gross product originating.*

Gross domestic product (GDP): The part of the nation's gross national product generated by private business using resources from within the country.

Gross national product (GNP): The most comprehensive single measure of aggregate economic output. Represents the market value of the total output of goods and services produced by a nation's economy.

Gross product originating (GPO): A measure of business output estimated from the income or production side using employee compensation, profit income, net interest, capital consumption, and indirect business taxes.

Health maintenance organization (HMO): Organization of physicians and other health care professionals that provides health services to subscribers and their dependents on a prepaid basis.

Health provider: An individual or institution that gives medical care. Under Medicare, an institutional provider is a hospital, skilled nursing facility, home health agency, or provider of certain physical therapy services.

Human Resources Management: A business program designed to oversee recruiting, pay, benefits, and other issues related to the company's work force, including planning to determine the optimal use of labor to increase production, thereby increasing profit.

Idea: An original concept for a new product or process.

Import: Products produced outside the country in which they are consumed.

Income: Money or its equivalent, earned or accrued, resulting from the sale of goods and services.

Income statement: A financial statement that lists the profits and losses of a company at a given time.

Industry financial ratios: *(See also Corporate financial ratios)* Corporate financial ratios averaged for a specified industry. These are used for comparison purposes and reveal industry trends and identify differences between the performance of a specific company and the performance of its industry. Also known as Industrial averages, Industry ratios, Financial averages, and Business or Industrial norms.

Inflation: Increases in volume of currency and credit, generally resulting in a sharp and continuing rise in price levels.

Informal capital: Financing from informal, unorganized sources; includes informal debt capital such as trade credit or loans from friends and relatives and equity capital from informal investors.

Initial public offering (IPO): A corporation's first offering of stock to the public.

Innovation: The introduction of a new idea into the marketplace in the form of a new product or service or an improvement in organization or process.

Intellectual property: Any idea/work that can be considered proprietary in nature and thus protected from infringement by others.

Internal capital: Debt or equity financing obtained from the owner or through retained business earnings.

Invention: The tangible form of a technological idea, which could include a laboratory prototype, drawings, formulas, etc.

Job description: The duties and responsibilities required in a particular position.

Job tenure: A period of time during which an individual is continuously employed in the same job.

Joint venture: Venture in which two or more people combine efforts in a particular business enterprise, usually a single transaction or a limited activity, and agree to share

the profits and losses jointly or in proportion to their contributions.

Keogh plan: Designed for self–employed persons and unincorporated businesses as a tax–deferred pension account.

Labor force: Civilians considered eligible for employment who are also willing and able to work.

Labor force participation rate: The civilian labor force as a percentage of the civilian population.

Labor intensity: *(See also Capital intensity)* The relative importance of labor in the production process, usually measured as the capital–labor ratio; i.e., the ratio of units of capital (typically, dollars of tangible assets) to the number of employees. The higher the capital–labor ratio exhibited by a firm or industry, the lower the capital intensity of that firm or industry is said to be.

Labor surplus area: An area in which there exists a high unemployment rate. In procurement, extra points are given to firms in counties that are designated a labor surplus area; this information is requested on procurement bid sheets.

Labor union: An organization of similarly–skilled workers who collectively bargain with management over the conditions of employment.

Lanham Act: Refers to the Federal Trade Mark Act of 1946. Protects registered trademarks, trade names, and other service marks used in commerce.

Large business–dominated industry: Industry in which a minimum of 60 percent of employment or sales is in firms with more than 500 workers.

Leader pricing: A reduction in the price of a good or service in order to generate more sales of that good or service.

Leveraged buy–out (LBO): The purchase of a business or a division of a corporation through a highly leveraged financing package.

License: A legal agreement granting to another the right to use a technological innovation.

Liability: An obligation or duty to perform a service or an act. Also defined as money owed.

Long–haul rates: Rates charged by a transporter in which the distance traveled is more than 800 miles.

Long–term debt: An obligation that matures in a period that exceeds five years.

Macro–efficiency: *(See also Economic efficiency)* Efficiency as it pertains to the operation of markets and market systems.

Market evaluation: The use of market information to determine the sales potential of a specific product or process.

Market failure: The situation in which the workings of a competitive market do not produce the best results from the point of view of the entire society.

Market information: Data of any type that can be used for market evaluation, which could include demographic data, technology forecasting, regulatory changes, etc.

Market research: A systematic collection, analysis, and reporting of data about the market and its preferences, opinions, trends, and plans; used for corporate decision–making.

Market share: In a particular market, the percentage of sales of a specific product.

Marketing: Promotion of goods or services through various media.

Matrix Management: A style of management where an employee has two reporting bosses – one functional and one operational.

Micro–efficiency: *(See also Economic efficiency)* Efficiency as it pertains to the operation of individual firms.

Mid–term debt: An obligation that matures within one to five years.

Minimum wage: The lowest hourly wage allowed by the federal government.

Multi–level marketing: A system of selling in which you sign up other people to assist you, and they, in turn, recruit others to help them. Some entrepreneurs have built successful companies on this concept because the main focus of their activities is their product and product sales.

NAFTA: *See North American Free Trade Agreement.*

NASDAQ: *See National Association of Securities Dealers Automated Quotations.*

National Association of Securities Dealers Automated Quotations: Provides price quotes on over–the–counter securities as well as securities listed on the New York Stock Exchange.

National income: Aggregate earnings of labor and property arising from the production of goods and services in a nation's economy.

Net assets: *See Net worth.*

Net income: The amount remaining from earnings and profits after all expenses and costs have been met or deducted. Also known as Net earnings.

Net profit: Money earned after production and overhead expenses have been deducted.

Net worth: *(See also Capital)* The difference between a company's total assets and its total liabilities.

New York Stock Exchange (NYSE): The oldest stock exchange in the U.S. Allows for trading in stocks, bonds, warrants, options, and rights that meet listing requirements.

Non-disclosure agreement: A legal contract that allows a company to share its intellectual property with others, whose input it needs, without jeopardizing that information.

North American Free Trade Agreement (NAFTA): Passed in 1993, NAFTA eliminates trade barriers among businesses in the U.S., Canada, and Mexico.

NYSE: *See New York Stock Exchange*

Occupational Safety & Health Administration (OSHA): Federal agency that regulates health and safety standards within the workplace.

Organizational chart: A hierarchical chart tracking the chain of command within an organization.

Overhead: Expenses, such as employee benefits and building utilities, incurred by a business that are unrelated to the actual product or service sold.

Owner's capital: Debt or equity funds provided by the owner(s) of a business; sources of owner's capital are personal savings, sales of assets, or loans from financial institutions.

Part–time workers: Normally, those who work less than 35 hours per week. The Tax Reform Act indicated that part–time workers who work less than 17.5 hours per week may be excluded from health plans for purposes of complying with federal nondiscrimination rules.

Part–year workers: Those who work less than 50 weeks per year.

Partnership: Two or more parties who enter into a legal relationship to conduct business for profit. Defined by the U.S. Internal Revenue Code as joint ventures, syndicates, groups, pools, and other associations of two or more persons organized for profit that are not specifically classified in the IRS code as corporations or proprietorships.

Patent: A grant by the government assuring an inventor the sole right to make, use, and sell an invention for a period of 17 years.

Pension: A series of payments made monthly, semiannually, annually, or at other specified intervals during the lifetime of the pensioner for distribution upon retirement. The term is sometimes used to denote the portion of the retirement allowance financed by the employer's contributions.

Pension fund: A fund established to provide for the payment of pension benefits; the collective contributions made by all of the parties to the pension plan.

Performance appraisal: An established set of objective criteria, based on job description and requirements, that is used to evaluate the performance of an employee in a specific job.

Private placement: A method of raising capital by offering for sale an investment or business to a small group of investors (generally avoiding registration with the Securities and Exchange Commission or state securities registration agencies). Also known as Private financing or Private offering.

Pro forma: The use of hypothetical figures in financial statements to represent future expenditures, debts, and other potential financial expenses.

Proactive: Taking the initiative to solve problems and anticipate future events before they happen, instead of reacting to an already existing problem or waiting for a difficult situation to occur.

Product development: The stage of the innovation process where research is translated into a product or process through evaluation, adaptation, and demonstration.

Production: The manufacture of a product.

Profit and loss statement (P & L): The summary of the incomes and costs of a company's operation during a specific period of time. Also known as Income and expense statement.

Prototype: A model that demonstrates the validity of the concept of an invention (laboratory prototype); a model that meets the needs of the manufacturing process and the user (production prototype).

Prudent investor rule or standard: A legal doctrine that requires fiduciaries to make investments using the prudence, diligence, and intelligence that would be used by a prudent person in making similar investments. Because fiduciaries make investments on behalf of third–party beneficiaries, the standard results in very conservative investments. Until recently, most state regulations required the fiduciary to apply this standard to each investment. Newer, more progressive regulations permit fiduciaries to apply this standard to the portfolio taken as a whole, thereby allowing a fiduciary to balance a portfolio with higher–yield, higher–risk investments. In states with more progressive regulations, practically every type of security is eligible for inclusion in the portfolio of investments made by a fiduciary, provided that the portfolio investments, in their totality, are those of a prudent person.

Public equity markets: Organized markets for trading in equity shares such as common stocks, preferred stocks, and warrants. Includes markets for both regularly traded and nonregularly traded securities.

Public offering: General solicitation for participation in an investment opportunity. Interstate public offerings are supervised by the U.S. Securities and Exchange Commission.

Quality control: The process by which a product is checked and tested to ensure consistent standards of high quality.

Rate of return: The yield obtained on a security or other investment based on its purchase price or its current market price.

Recession: Contraction of economic activity occurring between the peak and trough of a business cycle.

Regulated market: A market in which the government controls the forces of supply and demand, such as who may enter and what price may be charged.

Research: The initial stage of the innovation process, which includes idea generation and invention.

Research and development financing: A tax–advantaged partnership set up to finance product development for start–ups as well as more mature companies.

Resource realignment: The adjustment of productive resources to interindustry changes in demand.

Resources: The sources of support or help in the innovation process, including sources of financing, technical evaluation, market evaluation, management and business assistance, etc.

Retained business earnings: Business profits that are retained by the business rather than being distributed to the shareholders as dividends.

Revolving credit: An agreement with a lending institution for an amount of money, which cannot exceed a set maximum, over a specified period of time. Each time the borrower repays a portion of the loan, the amount of the repayment may be borrowed yet again.

Risk management: The act of identifying potential sources of financial loss and taking action to minimize their negative impact.

Routing: The sequence of steps necessary to complete a product during production.

Scale economies: The decline of the production cost per unit of output (average cost) as the volume of output increases.

Scale efficiency: The reduction in unit cost available to a firm when producing at a higher output volume.

Secondary market: A market established for the purchase and sale of outstanding securities following their initial distribution.

Secondhand capital: Previously used and subsequently resold capital equipment (e.g., buildings and machinery).

Securities and Exchange Commission (SEC): Federal agency charged with regulating the trade of securities to prevent unethical practices in the investor market.

Securitized debt: A marketing technique that converts long–term loans to marketable securities.

Seed capital: Venture financing provided in the early stages of the innovation process, usually during product development.

Service sector: Broadly defined, all U.S. industries that produce intangibles, including the five major industry divisions of transportation, communications, and utilities; wholesale trade; retail trade; finance, insurance, and real estate; and services.

Short–term debt: An obligation that matures in one year.

Standard Industrial Classification (SIC) codes: Four–digit codes established by the U.S. Federal Government to categorize businesses by type of economic activity; the first two digits correspond to major groups such as construction and manufacturing, while the last two digits correspond to subgroups such as home construction or highway construction.

SWOT: Strengths, Weaknesses, Opportunities, and Threats. These factors provide a reference which an organization can use to conduct an analysis of its operations.

Target market: The clients or customers sought for a business' product or service.

Tax number: *(See also Employer identification number)* A number assigned to a business by a state revenue department that enables the business to buy goods without paying sales tax.

Trade credit: Credit extended by suppliers of raw materials or finished products. In an accounting statement, trade credit is referred to as "accounts payable."

Trade secret: Competitive advantage gained by a business through the use of a unique manufacturing process or formula.

Trademark: A graphic symbol, device, or slogan that identifies a business. A business has property rights to its trademark from the inception of its use, but it is still prudent to register all trade marks with the Trademark Office of the U.S. Department of Commerce.

Trend: A statistical measurement used to track changes that occur over time.

Unfair competition: Refers to business practices, usually unethical, such as using unlicensed products, pirating merchandise, or misleading the public through false advertising, which give the offending business an unequitable advantage over others.

Uniform Commercial Code (UCC): A code of laws governing commercial transactions across the U.S., except Louisiana. Their purpose is to bring uniformity to financial transactions.

Uniform product code (UPC symbol): A computer–readable label comprised of ten digits and stripes that encodes what a product is and how much it costs. The first five

digits are assigned by the Uniform Produce Code Council, and the last five digits by the individual manufacturer.

Venture capital: *(See also Equity; Equity midrisk venture capital)* Money used to support new or unusual business ventures that exhibit above–average growth rates, significant potential for market expansion, and are in need of additional financing to sustain growth or further research and development; equity or equity–type financing traditionally provided at the commercialization stage, increasingly available prior to commercialization.

Withholding: Federal, state, social security, and unemployment taxes withheld by the employer from employees' wages; employers are liable for these taxes and the corporate umbrella and bankruptcy will not exonerate an employer from paying back payroll withholding. Employers should escrow these funds in a separate account and disperse them quarterly to withholding authorities.

Workers' compensation: A state–mandated form of insurance covering workers injured in job–related accidents. In some states, the state is the insurer; in other states, insurance must be acquired from commercial insurance firms. Insurance rates are based on a number of factors, including salaries, firm history, and risk of occupation.

Working capital: Refers to a firm's short–term investment of current assets, including cash, short–term securities, accounts receivable, and inventories.

Yield: *(See also Rate of return)* The rate of income returned on an investment, expressed as a percentage. Income yield is obtained by dividing the current dollar income by the current market price of the security. Net yield or yield to maturity is the current income yield minus any premium above par or plus any discount from par in purchase price, with the adjustment spread over the period from the date of purchase to the date of maturity.

A

ACQUISITIONS

ACTIVITY-BASED COSTING

To support compliance with financial reporting requirements, a company's traditional cost-accounting system is often articulated with its general ledger system. In essence, this linkage is grounded in cost allocation. Typically, costs are allocated for either valuation purposes (i.e., financial statements for external uses) or decision-making purposes (i.e., internal uses) or both. However, in certain instances, costs are also allocated for cost-reimbursement purposes (e.g., hospitals and defense contractors).

The traditional approach to cost-allocation consists of three basic steps: accumulate costs within a production or nonproduction department; allocate nonproduction department costs to production departments; and allocate the resulting (revised) production department costs to various products, services, or customers. Costs derived from this traditional allocation approach suffer from several defects that can result in distorted costs for decision-making purposes. For example, the traditional approach allocates the cost of idle capacity to products. Accordingly, such products are charged for resources that they did not use. Seeking to remedy such distortions, many companies have adopted a different cost-allocation approach called activity-based costing (ABC).

WHAT IS ACTIVITY-BASED COSTING?

In contrast to traditional cost-accounting systems, ABC systems first accumulate overhead costs for each organizational activity, and then assign the costs of the activities to the products, services, or customers (cost objects) causing that activity. As one might expect, the most critical aspect of ABC is activity analysis. Activity analysis is the processes of identifying appropriate output measures of activities and resources (cost drivers) and their effects on the costs of making a product or providing a service. Significantly, as discussed in the next section, activity analysis provides the foundation for remedying the distortions inherent in traditional cost-accounting systems.

TRADITIONAL COST-ACCOUNTING SYSTEMS VERSUS ABC

Geared toward compliance with financial reporting requirements, traditional cost-accounting systems often allocate costs based on single volume measures such as direct-labor hours, direct-labor costs, or machine hours. While using a single volume measure as an overall cost driver seldom meets the cause-and-effect criterion desired in cost allocation, it provides a relatively cheap and convenient means of complying with financial reporting requirements.

In contrast to traditional cost-accounting systems, ABC systems are not inherently constrained by the tenets of financial reporting requirements. Rather, ABC systems have the inherent flexibility to provide special reports to facilitate management decisions regarding the costs of activities undertaken to design, produce, sell, and deliver a company's products or services. At the heart of this

flexibility is the fact that ABC systems focus on accumulating costs via several key activities, whereas traditional cost allocation focuses on accumulating costs via organizational units. By focusing on specific activities, ABC systems provide superior cost allocation information—especially when costs are caused by non-volume-based cost drivers. Even so, traditional cost-accounting systems will continue to be used to satisfy conventional financial reporting requirements. ABC systems will continue to supplement, rather than replace, traditional cost-accounting systems.

IMPLEMENTATION

In most cases, a company's traditional cost-accounting system adequately measures the direct costs of products and services, such as material and labor. As a result, ABC implementation typically focuses on indirect costs, such as manufacturing overhead and selling, general, and administrative costs. Given this focus, the primary goal of ABC implementation is to reclassify most, if not all, indirect costs (as specified by the traditional cost-accounting system) as direct costs. As a result of these reclassifications, the accuracy of the costs is greatly increased.

According to Ray H. Garrison and Eric W. Noreen, there are six basic steps required to implement an ABC system:

1. Identify and define activities and activity pools

2. Trace costs directly to activities (to the extent feasible)

3. Assign costs to activity cost pools

4. Calculate activity rates

5. Assign costs to cost objects using the activity rates and activity measures previously determined

6. Prepare and distribute management reports

COSTS AND BENEFITS

While ABC systems are rather complex and costly to implement, Charles T. Horngren, Gary L. Sundem, and William O. Stratton suggest that many companies, in both manufacturing and nonmanufacturing industries, are adopting ABC systems for a variety of reasons:

1. Margin accuracy for individual products and services, as well as customer classifications, is becoming increasingly difficult to achieve given that direct labor is rapidly being replaced with automated equipment. Accordingly, a company's shared costs (i.e., indirect costs) are becoming the most significant portion of total cost.

2. Because the rapid pace of technological change continues to reduce product life cycles, companies do not have time to make price or cost adjustments once costing errors are detected.

3. Companies with inaccurate cost measurements tend to lose bids because of over-costed products, incur hidden losses because of under-costed products, and fail to detect activities that are not cost-effective.

4. Because computer technology costs are decreasing, the price of developing and operating ABC systems also has decreased.

In 2004 John Karolefski cited the following benefits realized by foodservice distributors and restaurants that have converted to activity-based costing practices:

1. Understanding the true costs and productivity of capital equipment

2. Understanding which products are most profitable and where to focus sales efforts

3. More accurate pricing and determination of minimum order size

4. Less time, money, and effort spent on the wrong products

Implementation costs are an obstacle to some, who feel that ABC is just a fad or will show little benefit. According to Karolefski, "ABC works better if it's kept simple" (2004, p. 18). Nevertheless, when implemented properly ABC yields benefits to the company, its business partners, and to consumers. Conversely, in 2007, a market review of ABC and other management systems found that it is poor implementation of the programs that often leads to failure. The report cites short cuts and mistakes as the reasons that ABC and related systems do not succeed.

ACTIVITY-BASED MANAGEMENT

To manage costs, a manager should focus on the activities that give rise to such costs. Accordingly, given the activity focus of ABC, managers should implement ABC systems to facilitate cost management. Using ABC systems to improve financial management is called activity-based management (ABM). The goal of ABM is to improve the value received by customers and, in doing so, to improve profits.

The key to ABM success is distinguishing between value-added costs and non-value-added costs. A value-added cost is the cost of an activity that cannot be eliminated without affecting a product's value to the customer. In contrast, a non-value-added cost is the cost of an activity that can be eliminated without diminishing value. Some value-added costs are always necessary, as long as the activity that drives such costs is performed efficiently. However, non-value-added costs should always be minimized because they are assumed to be unnecessary. Examples of non-valued-added activities include storing and handling inventories; transporting raw materials or partly finished products, such as work-in-process

inventory items, from one part of the plant to another; and redundancies in production-line configurations or other activities. Oftentimes, such non-value activities can be reduced or eliminated by careful redesign of the plant layout and the production process.

SEE ALSO *Cost Accounting; Inventory Management; Inventory Types; Process Management; Quality and Total Quality Management; Time-Based Competition*

BIBLIOGRAPHY
Actuate Corporation. "Scorecard Design and Implementation Best Practices" [Whitepaper] (June 2007).

Brimson, James A. *Activity Accounting: An Activity-Based Costing Approach.* New York: Wiley, 1997.

Cokins, Gary. "ABC Can Spell a Simpler, Coherent View of Costs." *Computing Canada* 24, no. 32 (1998): 34–35.

Cokins, Gary. "Why Is Traditional Accounting Failing Managers?" *Hospital Material Management Quarterly* 20, no. 2 (1998): 72–80.

Daly, John L. *Pricing for Profitability: Activity-Based Pricing for Competitive Advantage.* New York: Wiley, 2001.

Dolan, Pat, and Karen I. Schreiber. "Getting Started With ABC." *Supply House Times* 40, no. 4 (1997): 41–52.

Garrison, Ray H., and Eric W. Noreen. *Managerial Accounting.* 9th ed. Boston: Irwin McGraw-Hill, 1999.

Hicks, Douglas T. *Activity-Based Costing: Making It Work for Small and Mid-Sized Companies.* 2nd ed. New York: Wiley, 2002.

Horngren, Charles T., Gary L. Sundem, and William O. Stratton. *Introduction to Management Accounting.* 11th ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Karolefski, John. "Time Is Money: How Much Are Your Customers Costing You?" *Food Logistics* 18 (15 June 2004).

Lindahl, Frederick W. "Activity-Based Costing Implementation and Adaptation." *Human Resource Planning* 20, no. 2 (1997): 62–66.

AFFIRMATIVE ACTION

Affirmative action is a descriptive phrase for policies and programs designed to correct the effects of past discrimination and increase the representation of historically disadvantaged groups, including women and African Americans. Affirmative action plans exist in the private and public sectors and involve the hiring of job applicants, the selection of contractors for government projects, and the admission of students to undergraduate and graduate educational institutions. Some employers, educational institutions, and government agencies are legally required by executive order to have affirmative action plans. Others may be ordered to develop affirmative action plans as part of a court finding that they have discriminated against individuals or groups. Still others voluntarily develop such plans because they believe it is good public policy, or that it provides them with a competitive advantage.

ORIGINS AND DEVELOPMENT OF AFFIRMATIVE ACTION

Although the roots of affirmative action in the United States go back to the nineteenth century, modern affirmative action plans originated with executive orders issued by Presidents John F. Kennedy, Lyndon B. Johnson, and Richard M. Nixon in the 1960s. Executive Order 11246, signed by President Johnson in 1965, required government agencies, contractors, and subcontractors to undertake affirmative action to remedy past discrimination in education, training, and employment. In 1969 President Nixon further strengthened affirmative action through Executive Order 11478, which required government contractors to develop goals for increasing the representation of historically disadvantaged groups and timetables for achieving them.

As amended in subsequent years, these executive orders eventually required all government agencies and contractors with annual contracts of $10,000 or more to undertake affirmative action. They also required agencies and contractors with 50 employees and government business of $50,000 or more to have written affirmative action plans. These written plans must include a utilization analysis, which compares the composition of the entity's workforce to the proportion of women and minorities in the available labor market. If underutilization is found, the agency or contractor must set specific goals and timetables for remedying the "imbalance" and develop specific plans for how this will be done. The use of affirmative action plans expanded greatly in the twenty years after the executive orders. Because most educational institutions and large organizations receive money and/or do business with the government, affirmative action plans are very common.

TYPES OF AFFIRMATIVE ACTION

In the employment context, affirmative action plans should be distinguished from equal employment opportunity (EEO) programs. EEO efforts focus on the process involved in hiring and promoting employees and attempt to ensure that there is a level playing field for all involved. Conversely, affirmative action programs focus on the outcomes of recruiting, hiring, and promotion processes, and involve additional efforts to increase the proportion of women and minorities that are hired and promoted.

There are various types of affirmative action plans. Some plans simply try to increase the number of applicants from underrepresented groups. Such plans, which are sometimes called "pure" plans or "opportunity enhancement" plans, involve proactive efforts to locate and recruit a larger number of individuals from the affected groups. Other affirmative action plans can be termed "limited preference" or "tiebreak" plans. They go a step further than pure affirmative action plans by considering race or

gender as a "plus" factor when evaluating the qualifications of applicants who essentially are equally qualified. Finally, the most aggressive affirmative action plans are "strong preferential treatment" or "quota" plans. In these plans, qualified members of a disadvantaged group may be preferred to more highly qualified individuals who are not in the affected group. Generally speaking, the more aggressive the affirmative action strategy employed, the more likely it is to generate challenges and the more difficult it is to defend legally.

Affirmative action plans are quite controversial and have been the subject of hundreds of lawsuits, several of which have gone to the U.S. Supreme Court. Lawsuits filed by those who believe they have been unfairly treated by affirmative action plans usually are called "reverse discrimination" lawsuits. Although the courts generally have agreed that affirmative action is legal if it meets certain criteria, court decisions in the 1990s and early 2000s seemed to reflect a trend toward restricting the more aggressive types of affirmative action programs, which may include preferences based on race or gender.

MOVEMENT AWAY FROM AFFIRMATIVE ACTION

In 1996, Proposition 209 was passed into California state law. The ballot proposition amended the state Constitution to prohibit public institutions from taking into consideration race, sex, or ethnicity. The ballot was spearheaded by the California Civil Rights Campaign and led by University of California Regent Ward Connerly. Two years later a Washington State Initiative was passed to bar any public institution from giving preferential treatment on the premise of race, sex, color, ethnicity, or national origin in the operation of employment, education, or contracting. The Michigan Civil Rights Initiative or Proposal 2 was a similar ballot initiative passed into Michigan Constitutional law in 2006.

In a landmark decision of the U.S. Supreme Court in 2007, *Parents Involved in Community Schools v. Seattle School District No. 1*—together with *Meredith v. Jefferson County Board of Education*—prohibited placing students in public schools for the purpose of racial integration. Furthermore, the court refused to recognize racial balancing as a compelling state interest.

SEE ALSO *Discrimination; Diversity*

BIBLIOGRAPHY

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources.* 4th ed. Upper Saddle River, NJ: Pearson/Prentice Hall, 2004.

Heilman, M.E., W.F. McCullough, and D. Gilbert. "The Other Side of Affirmative Action: Reactions of Nonbeneficiaries to Sex-Based Preferential Selection." *Journal of Applied Psychology* 81, no. 4 (1996): 346–357.

Initiative 200 (WA, 1998)

Kovach, Kenneth A., David A. Kravitz, and Allen A. Hughes. "Affirmative Action: How Can We Be So Lost When We Don't Even Know Where We Are Going?" *Labor Law Journal* 55, no. 1 (2004): 53–62.

Meredith v. Jefferson County Board of Education 2006.

Naff, Katherine C. "From Bakke to Grutter and Gratz: The Supreme Court as a Policymaking Institution." *The Review of Policy Research* 21, no. 3 (2004): 405–427.

Office of Federal Contract Compliance Programs. U.S. Department of Labor, Employment Standards Administration, Office of Federal Contract Compliance Programs. Available from: http://www.dol.gov/esa/ofccp.

Parents Involved in Community Schools v. Seattle School District No. 1 2007.

Proposal 2 (MI, 2006)

Proposition 209 (CA, 1996)

AGGREGATE PLANNING

Aggregate planning is the process of developing, analyzing, and maintaining a preliminary, approximate schedule of the overall operations of an organization. The aggregate plan generally contains targeted sales forecasts, production levels, inventory levels, and customer backlogs. This schedule is intended to satisfy the demand forecast at a minimum cost. Properly done, aggregate planning should minimize the effects of shortsighted, day-to-day scheduling, in which an organization orders only small amounts of materials and must lay off workers one week, and the next week orders larger amounts and must rehire workers. This longer-term perspective on resource use can result in cost savings.

In simple terms, aggregate planning is an attempt to balance capacity and demand in such a way that costs are minimized. The term "aggregate" is used because planning at this level includes all resources "in the aggregate," for example, as a product line or family. Aggregate resources could be total number of workers, hours of machine time, or tons of raw materials. Aggregate units of output could include gallons, feet, pounds of output, as well as aggregate units appearing in service industries such as hours of service delivered, number of patients seen, etc.

Some contend that an aggregate process is superior in today's lean manufacturing and sales and operation (S&OP) environment, and that detailed long-term forecasts are no longer necessary. In 2007 Wallace and Stahl (of the firm Supply Chain Consultant) noted that detailed forecasts and plans are normally needed only within a specific time-frame, and beyond that, forecasting is a poor use of a company's resources.

Aggregate planning does not distinguish among sizes, colors, features, and so forth. For example, with automobile manufacturing, aggregate planning would consider

the total number of cars planned for, not the individual models, colors, or options. When units of aggregation are difficult to determine (for example, when the variation in output is extreme) equivalent units are usually determined. These equivalent units could be based on value, cost, worker hours, or some similar measure.

Aggregate planning is considered to be intermediate-term (as opposed to long- or short-term) in nature. Hence, most aggregate plans cover a period of three to eighteen months. Aggregate plans serve as a foundation for future short-range type planning, such as production scheduling, sequencing, and loading. The master production schedule (MPS) used in material requirements planning (MRP) has been described as the aggregate plan "disaggregated."

Steps taken to produce an aggregate plan begin with the determination of demand and the determination of current capacity. Capacity is expressed as total number of units per time period that can be produced (this requires that an average number of units be computed since the total may include a product mix utilizing distinctly different production times). Demand is expressed as total number of units needed. If the two are not in balance (equal), the firm must decide whether to increase or decrease capacity to meet demand, or increase or decrease demand to meet capacity. To accomplish this, a number of options are available.

Options for situations in which a firm needs to increase or decrease demand to match capacity include:

1. **Pricing.** To increase demand in periods when demand is less than peak, a firm can vary pricing, for example, by offering matinee prices for movie theaters, off-season rates for hotels, weekend rates for telephone service, and pricing for items that experience seasonal demand.

2. **Promotion.** Through advertising, direct marketing, and other forms of promotion, a firm can shift demand.

3. **Back-ordering.** By postponing delivery on current orders, demand is shifted to a period when capacity is not fully utilized. This is really just a form of smoothing demand. Service industries are able to smooth demand by taking reservations or by making appointments in an attempt to avoid walk-in customers. Some refer to this as "partitioning" demand.

4. **New demand creation.** A new, but complementary demand is created for a product or service. When restaurant customers have to wait, they are frequently diverted into a complementary (but not complimentary) service, the bar. Other examples include the addition of video arcades within movie theaters, and the expansion of services at convenience stores.

Options which can be used to increase or decrease capacity to match current demand include:

1. **Hire/lay off.** By hiring additional workers as needed or by laying off workers not currently required to meet demand, firms can maintain a balance between capacity and demand.

2. **Overtime.** By asking or requiring workers to work extra hours a day or an extra day per week, firms can create a temporary increase in capacity without the added expense of hiring additional workers.

3. **Part-time or casual labor.** By utilizing temporary workers or casual labor (workers who are considered permanent but only work when needed, on an on-call basis, and typically without the benefits given to full-time workers) firms can alter capacity to match fluctuations in demand.

4. **Inventory.** Finished-goods inventory can be built up in periods of slack demand and then used to fill demand during periods of high demand. In this way no new workers have to be hired, no temporary or casual labor is needed, and no overtime is incurred.

5. **Subcontracting.** Frequently firms choose to allow another manufacturer or service provider to provide the product or service to the subcontracting firm's customers. By subcontracting work to an alternative source, additional capacity is temporarily obtained.

6. **Cross-training.** Cross-trained employees may be able to perform tasks in several operations, creating some flexibility when scheduling capacity.

7. **Other methods.** While varying workforce size and utilization, inventory buildup/backlogging, and sub-contracting are well-known alternatives, there are other, more novel ways that find use in industry. Among these options are sharing employees with counter-cyclical companies and attempting to find interesting and meaningful projects for employees to do during slack times.

AGGREGATE PLANNING STRATEGIES

There are two pure planning strategies available to the aggregate planner: a level strategy and a chase strategy. Firms may choose to utilize one of the pure strategies in isolation, or they may opt for a strategy that combines the two.

Level Strategy. A level strategy seeks to produce an aggregate plan that maintains a steady production rate and/or a steady employment level. To satisfy changes in customer demand, the firm must raise or lower inventory levels in anticipation of increased or decreased levels of forecast demand. The firm maintains a level workforce and a steady rate of output when demand is somewhat low. This allows the firm to establish higher inventory levels than it currently needs. As demand increases, the firm is

able to continue a steady production rate/steady employment level, while allowing the inventory surplus to absorb the increased demand.

A second alternative would be to use a backlog or backorder. A backorder is simply a promise to deliver the product at a later date when it is more readily available, usually when capacity begins to catch up with diminishing demand. In essence, the backorder is a device for moving demand from one period to another, preferably one in which demand is lower, thereby smoothing demand requirements over time.

A level strategy allows a firm to maintain a constant level of output and still meet demand. This is desirable from an employee-relations standpoint. Negative results of the level strategy would include the cost of excess inventory, subcontracting or overtime costs, and back-order costs, which typically are the cost of expediting orders and the loss of customer goodwill.

Chase Strategy. A chase strategy implies matching demand and capacity period by period. This could result in a considerable amount of hiring, firing, or laying off of employees; insecure and unhappy employees; increased inventory carrying costs; problems with labor unions; and erratic utilization of plants and equipment. It also implies a great deal of flexibility on the firm's part. The major advantage of a chase strategy is that it allows inventory to be held to the lowest level possible, and for some firms this is a considerable savings. Most firms embracing the just-in-time production concept utilize a chase strategy approach to aggregate planning.

Most firms find it advantageous to utilize a combination of the level and chase strategies. A combination strategy (sometimes called a hybrid or mixed strategy) can be found to better meet organizational goals and policies and achieve lower costs than either of the pure strategies used independently.

TECHNIQUES FOR AGGREGATE PLANNING

Techniques for aggregate planning range from informal trial-and-error approaches, which usually utilize simple tables or graphs, to more formalized and advanced mathematical techniques. William Stevenson's textbook *Production/Operations Management* contains an informal but useful trial-and-error process for aggregate planning presented in outline form. This general procedure consists of the following steps:

1. Determine demand for each period.

2. Determine capacity for each period. This capacity should match demand, which means it may require the inclusion of overtime or subcontracting.

3. Identify company, departmental, or union policies that are pertinent, such as maintaining a certain safety stock level or maintaining a reasonably stable work-force. Other pertinent topics might include: backorder policies, overtime policies, inventory level policies, and other less explicit rules such as the nature of employment with the individual industry, the possibility of a bad image, and the loss of goodwill.

4. Determine unit costs for units produced. These costs typically include the basic production costs (fixed and variable costs as well as direct and indirect labor costs). Also included are the costs associated with making changes in capacity. Inventory holding costs must also be considered, as should storage, insurance, taxes, spoilage, and obsolescence costs. Finally, backorder costs must be computed. While difficult to measure, this generally includes expediting costs, loss of customer goodwill, and revenue loss from cancelled orders.

5. Develop alternative plans and compute the cost for each.

6. If satisfactory plans emerge, select the one that best satisfies objectives. Frequently, this is the plan with the least cost. Otherwise, return to step 5.

An example of a completed informal aggregate plan can be seen in Figure 1. It is an example of a plan determined by utilizing a level strategy. Notice that employment levels and output levels remain constant while inventory is allowed to build up in earlier periods only to be drawn back down in later periods as demand increases. Also, note that backorders are utilized in order to avoid overtime or subcontracting. The computed costs for the individual variables of the plan are as follows:

Output costs:
    Regular time = $5 per unit
    Overtime = $8 per unit
    Subcontracted = $12 per unit
Other costs:
    Inventory carrying cost = $3 per unit per period applied to average inventory
    Backorders = $10 per unit per period
Cost of aggregate plan utilizing a level strategy:
Output costs:
    Regular time = $5 × 1,500 = $7,500
    Overtime = $8 × 0 = 0
    Subcontracted = $10 × 0 = 0
Other costs:
    Inventory carrying cost = $3 × 850 = $2,400
    Backorders = $10 × 100 = $1,000
    Total Costs = $10,900

Figure 1

Period		1	2	3	4	5	6
Forecast		100	150	300	300	500	150
Output							
	Regular	250	250	250	250	250	250
	Overtime						
	Subcontract						
Output-forecast		150	100	-50	-50	-250	100
Inventory							
	Beginning	0	150	250	200	150	0
	Ending	150	250	200	150	0	100
	Average	75	200	225	175	75	50
Backlog	0	0	0	0	0	100	0

Cost of aggregate plan utilizing a level strategy:
Output:

Regular time	=	$5 X 1500	=	$7,500
Overtime	=	$8 X 0	=	0
Subcontracted	=	$10 X 0	=	0
Inventory carrying cost	=	$3 X 850	=	2,550
Backorders	=	$10 X 100	=	1000
Total Cost				$11,050

A second example, shown in Figure 2, presents the same scenario as in Figure 1 but demonstrates the use of a combination strategy (i.e., a combination of level and chase strategies) to meet demand and seek to minimize costs. For this example, let's assume that company policy prevents us from utilizing backorders and limits our plan to no more than 50 units of overtime per period. Notice that the regular output level is constant, implying a level workforce, while overtime and subcontracting are used to meet demand on a period-by-period basis (chase strategy). One will notice that the cost of the combination plan is slightly lower than the cost of the level plan.

Output costs:
Regular time = $5 × 1,200 = $6,000
Overtime = $8 × 100 = 800
Subcontracted = $12 × 250 = 3,000
Other costs:
Inventory carrying cost = $3 × 325 = 975
Backorders = $10 × 0 = 0
Total cost = $10,775

MATHEMATICAL APPROACHES TO AGGREGATE PLANNING

The following are some of the better known mathematical techniques that can be used in more complex aggregate planning applications.

Linear Programming. Linear programming is an optimization technique that allows the user to find a maximum profit or revenue or a minimum cost based on the availability of limited resources and certain limitations known as constraints. A special type of linear programming known as the Transportation Model can be used to obtain aggregate plans that would allow balanced capacity and demand and the minimization of costs. However, few real-world aggregate planning decisions are compatible with the linear assumptions of linear programming. *Supply Chain Management: Strategy, Planning and Operation*, by Sunil Chopra and Peter Meindl, provides an excellent example of the use of linear programming in aggregate planning.

Mixed-Integer Programming. For aggregate plans that are prepared on a product family basis, where the plan is essentially the summation of the plans for individual product lines, mixed-integer programming may prove to be useful. Mixed-integer programming can provide a method for determining the number of units to be produced in each product family.

Linear Decision Rule. Linear decision rule is another optimizing technique. It seeks to minimize total production costs (labor, overtime, hiring/lay off, inventory carrying cost) using a set of cost-approximating functions (three of which are quadratic) to obtain a single quadratic equation. Then, by using calculus, two linear equations

Figure 2

Period		1	2	3	4	5	6
Forecast		100	150	300	300	500	150
Output							
	Regular	200	200	200	200	200	200
	Overtime				50	50	
	Subcontract					250	
Output-forecast		100	50	-100	-50	0	50
Inventory							
	Beginning	0	100	150	50	0	0
	Ending	100	150	50	0	0	50
	Average	50	125	100	25	0	25
Backlog	0	0	0	0	0	0	0

```
Output:
        Regular time     =   $5  X  1200  =   $6,000
        Overtime         =   $8  X   100  =      800
        Subcontracted    =  $12  X   250  =    3,000
Inventory carrying cost  =   $3  X   325  =      975
Backorders               =  $10  X     0  =        0
Total Cost                                 $10,775
```

can be derived from the quadratic equation, one to be used to plan the output for each period and the other for planning the workforce for each period.

Management Coefficients Model. The management coefficients model, formulated by E.H. Bowman, is based on the suggestion that the production rate for any period would be set by this general decision rule:

$$P_t = aW_{t-1} - bI_{t-1} + cF_{t+1} + K, \text{ where}$$

P_t = the production rate set for period t
W_{t-1} = the workforce in the previous period
I_{t-1} = the ending inventory for the previous period
F_{t+1} = the forecast of demand for the next period
$a, b, c,$ and K are constants

It then uses regression analysis to estimate the values of $a, b, c,$ and K. The end result is a decision rule based on past managerial behavior without any explicit cost functions, the assumption being that managers know what is important, even if they cannot readily state explicit costs. Essentially, this method supplements the application of experienced judgment.

Search Decision Rule. The search decision rule methodology overcomes some of the limitations of the linear cost assumptions of linear programming. The search decision rule allows the user to state cost data inputs in very general terms. It requires that a computer program be constructed that will unambiguously evaluate any production plan's cost. It then searches among alternative plans for the one with the minimum cost. However, unlike linear programming, there is no assurance of optimality.

Simulation. A number of simulation models can be used for aggregate planning. By developing an aggregate plan within the environment of a simulation model, it can be tested under a variety of conditions to find acceptable plans for consideration. These models can also be incorporated into a decision support system, which can aid in planning and evaluating alternative control policies. These models can integrate the multiple conflicting objectives inherent in manufacturing strategy by using different quantitative measures of productivity, customer service, and flexibility.

Functional Objective Search Approach. The functional objective search (FOS) system is a computerized aggregate planning system that incorporates a broad range of actual planning conditions. It is capable of realistic, low-cost operating schedules that provide options for attaining different planning goals. The system works by comparing the planning load with available capacity. After management has chosen its desired actions and associated planning objectives for specific load conditions, the system

weights each planning goal to reflect the functional emphasis behind its achievement at a certain load condition. The computer then uses a computer search to output a plan that minimizes costs and meets delivery deadlines.

Aggregate Planning in Services. For manufacturing firms the luxury of building up inventories during periods of slack demand allows coverage of an anticipated time when demand will exceed capacity. Services cannot be stockpiled or inventoried so they do not have this option. Also, since services are considered "perishable," any capacity that goes unused is essentially wasted. An empty hotel room or an empty seat on a flight cannot be held and sold later, as can a manufactured item held in inventory.

Service capacity can also be very difficult to measure. When capacity is dictated somewhat by machine capability, reasonably accurate measures of capacity are not extremely difficult to develop. However, services generally have variable processing requirements that make it difficult to establish a suitable measure of capacity.

Historically, services are much more labor intensive than manufacturing, where labor averages 10 percent (or less) of total cost. This labor intensity can actually be an advantage because of the variety of service requirements an individual can handle. This can provide quite a degree of flexibility that can make aggregate planning easier for services than manufacturing.

Other Ideas in Aggregate Planning. Rudy Hung, in his *Production and Inventory Management Journal* article titled "Annualized Hours and Aggregate Planning," presents a useful concept called Annualized Hours (AH). Under AH, employees are contracted to work for a certain number of hours (say 1,800 hours) per year, for a certain sum of money. Employees can be asked to put in more hours during busy periods and fewer hours in slow periods. Typically, employees receive equal monthly or weekly payments so that hourly workers in effect have gained salaried status. Overtime is paid only when employees have worked beyond their annual hours.

AH is also known as flexiyear, as it can be seen as an extension of flextime, in which employees can vary their work hours within limits. This concept is used almost exclusively in Europe, particularly in the United Kingdom. The Scandinavian pulp and paper industries pioneered AH in the mid-1970s. Around that time, some West German firms, particularly those in the retail industry, also used AH.

AH gives employers much flexibility. AH serves to cut labor costs by offering employees an annual sum less than their previous annual earnings with overtime. Even though their total earnings may fall, their average earnings per hour would remain the same or even rise. Effective earnings could rise even more if the employer is unable to consume all contracted hours. Employees have greater income security with no worries about layoffs. There is also increased morale because blue-collar workers are now salaried. In a 2007 publication, authors Lusa, Corominas and Pastor offer a practical approach to balancing AH workers' time, given their varied skill levels. Their publication, "An exact procedure for planning holidays and working time under annualized hours considering cross-trained workers with different efficiencies" attempts to bridge the gap between academic and realistic conversations about AH.

Another development affecting aggregate planning is postponement. This refers to delaying the "finish" of a product until the moment of sale. Firms that rely on the postponement strategy, such as PC-maker Dell, Inc., or clothing franchise Benetton Group Sp.A., depend upon the availability of aggregate inventories of components that can be assembled to order shortly after, or even immediately, as an order is taken. Dell's process also illustrates a subcategory of postponement known as tailored business streams, in which similar items are segregated into parallel tracks. In a tailored business stream, the manufacturer identifies common elements that unite a bulk of its output. The easier, more predictable processes can be managed with the least expensive management approach, while unpredictable elements are managed with a more structured—and thus more expensive—infrastructure. By keeping the processes separate, the company ensures that resources are used efficiently. This process also includes an element of monitoring so that as pricing or market conditions change, the company can ensure that the processes remain efficient.

SEE ALSO *Capacity Planning; Planning; Simulation*

BIBLIOGRAPHY

Bliss, Christoph, Ronald Haddock, and Kaj Grichnik. "China's Shifting Competitive Equation." *Strategy+Business* 18 March 2008. Available from: http://www.strategy-business.com/li/leadingideas/li00067?pg=0.

Chopra, Sunil and Peter Meindl. *Supply Chain Management: Strategy, Planning, and Operation.* Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Dejonckheere, J., S.M. Disney, M. Lambrecht, and D.R. Towill. "The Dynamics of Aggregate Planning." *Production Planning & Control* 14, no. 6 (2003): 497–516.

Finch, Byron J. *Operations Now.* Boston: McGraw-Hill Irwin, 2004.

Hung, Rudy. "Annualized Hours and Aggregate Planning." *Production and Inventory Management Journal* 38, no. 4 (1997).

Iyer, Ananth V., Vinayak Deshpande, and Zhengping Wu. "A Postponement Model for Demand Management." *Management Science* 49, no. 8 (2003): 983–1002.

Lusa, Amaia, Albert Corominas, and Rafael Pastor. "An exact procedure for planning holidays and working time under annualized hours considering cross-trained workers with different efficiencies." *International Journal of Production Research* 46, no. 8 (2008): 2123–2142.

Moeller, Leslie, Matthew Egol, and Karla Martin. "Smart Customization: Profitable Growth Through Tailored Business Streams". *Strategy+Business.* November 2003. Available from: http://www.strategy-business.com/resiliencereport/resilience/rr00001?pg=0.

Stahl, Bob, and Tom Wallace. "Forecast Less and Get Better Results". September, 2007. Available from: http://www.supplychain.com/downloads/Forecast_Less_and_Get_Better_Results.pdf.

Stevenson, William J. *Production Operations Management.* Boston: McGraw-Hill Irwin, 2004.

ANGEL INVESTORS AND VENTURE CAPITALISTS

Angel investors and venture capitalists (VCs) are two sources of funding for businesses. Both angels and VCs invest in entrepreneurial firms in exchange for an equity share in the business. An angel is a high-net-worth individual who invests his or her own capital in a company, where a venture capitalist manages a fund of pooled money from other sources (such as pension funds and insurance companies). Angel investors tend to inject start-up capital into a company's seed round of investment, where VCs generally invest in later-stage companies. Typically, VCs invest $2,000,000 or more in a financing round and angels invest amounts in the $5,000 to $100,000 range. The Angel Capital Report by the Center for Venture Research found that venture capitalists invested $29.4 billion in 3,814 companies in 2007. By comparison, angels invested $26 billion in 57,120 companies.

ANGEL INVESTORS

Typically, angel investors are former entrepreneurs who have retired on profit they earned from starting up successful businesses. Angels tend to seek active involvement in the companies they fund. Angel investments are usually very high risk because many are lost when start-up companies fail—in 2007, 27 percent of angel investment exits were accounted for by bankruptcies. Thus, businesses funded by angels must have the potential to return ten or more times the original investment within five years through an exit strategy such as a sale or an initial public offering (IPO). In 2007, mergers and acquisitions accounted for 65 percent of angel exits and IPOs represented 4 percent.

Angel investment is the largest source of seed capital available in the United States. In 2007, 39 percent of investments made by angels were in the start-up stage.

According to the Center for Venture Research, market conditions and the capital gap between the upper range of angel investment and the lower end of VC financing have required angels to invest in later-stage businesses. In 2007, 35 percent of angel funding was given to businesses in the expansion stage.

ANGEL GROUPS

Angel Groups are formed when a number of private investors wish to pool their resources to invest collectively in companies. These groups meet to review proposals from businesses seeking funding and conduct "due diligence" to decide whether to invest in a firm. Angel groups are usually made up of 10 to 150 accredited investors. As of 2008, there are over 300 of these groups.

VENTURE CAPITALISTS

Venture capital is a form of private equity invested in companies in exchange for convertible debt of ownership equity with the intention of taking the business public. Venture capitalists are fund managers who invest capital pooled from third-party investors in high-risk companies with the potential for high returns. The third-party investors are made up of wealthy investors and financial institutions. VCs tend to fund enterprises that are too risky for bank loans or the standard capital markets. For this reason, many new companies with a limited operating history seek venture capital, because they cannot obtain funding through a debt issue. One disadvantage for entrepreneurs who are funded by venture capital is the VCs usually get a say in company decisions.

BIBLIOGRAPHY

"For Entrepreneurs." *Angel Capital Education Foundation* March, 2007. Available from: http://www.angelcapitaleducation.org/dir_resources/for_entrepreneurs.aspx.

Sohl, Jeffrey. "2007 Angel Market Analysis." Center for Venture Research. Available from: http://www.wsbe.unh.edu/files/2007%20Media%20Release%20-%20Lori%20Wright.pdf.

U.S. Small Business Administration. "Finance Start-up." *Small Business Planner* April, 2008. Available from: http://www.sba.gov/smallbusinessplanner/start/financestartup/SBA_INVPROG.html.

"Venture Capital Performance Outpaced the Public Markets Across Most Time Horizons in Fourth Quarter 2007." *National Venture Capital Association and Thomson Reuters* April, 2008. Available from: http://www.nvca.org/pdf/Q407PerformanceReleaseFINAL.pdf.

THE ART AND SCIENCE OF MANAGEMENT

One of the enduring questions in the field of management is whether management is an art or a science. Webster's College Dictionary defines an art as "skill in

conducting any human activity" and science as "any skill or technique that reflects a precise application of facts or a principle." Reflected in the differences in these definitions is the use of precision in science, in that there is a particular, prescribed way in which a manager should act. Thus, management as a science would indicate that in practice, managers use a specific body of information and facts to guide their behaviors, but that management as an art requires no specific body of knowledge, only skill.

Conversely, those who believe management is an art are likely to believe that there is no specific way to teach or understand management, and that it is a skill borne of personality and ability. Those who believe in management as an art are likely to believe that certain people are more predisposed to be effective managers than are others, and that some people cannot be taught to be effective managers. That is, even with an understanding of management research and an education in management, some people will not be capable of being effective practicing managers.

FOUNDATIONS OF THE MANAGEMENT AS A SCIENCE PERSPECTIVE

Practicing managers who believe in management as a science are likely to believe that there are ideal managerial practices for certain situations. That is, when faced with a managerial dilemma, the manager who believes in the scientific foundation of his or her craft will expect that there is a rational and objective way to determine the correct course of action.

This manager is likely to follow general principles and theories and also by creating and testing hypotheses. For instance, if a manager has a problem with an employee's poor work performance, the manager will look to specific means of performance improvement, expecting that certain principles will work in most situations. He or she may rely on concepts learned in business school or through a company training program when determining a course of action, perhaps paying less attention to political and social factors involved in the situation.

Many early management researchers subscribed to the vision of managers as scientists. The scientific management movement was the primary driver of this perspective. Scientific management, pioneered by Frederick W. Taylor, Frank and Lillian Gilbreth, and others, attempted to discover "the one best way" to perform jobs. They used scientific processes to evaluate and organize work so that it became more efficient and effective. Scientific management's emphasis on both reducing inefficiencies and on understanding the psychology of workers changed manager and employee attitudes towards the practice of management. See Exhibit 1 for a summary of the principles of scientific management.

Exhibit 1

Frederick W. Taylor's Principles of Scientific Management

1. Managers must study the way that workers perform their tasks and understand the job knowledge (formal and informal) that workers have, then find ways to improve how tasks are performed.

2. Managers must codify new methods of performing tasks into written work rules and standard operating procedures.

3. Managers should hire workers who have skills and abilities needed for the tasks to be completed, and should train them to perform the tasks according to the established procedures.

4. Managers must establish a level of performance for the task that is acceptable and fair and should link it to a pay system that rewards workers who perform above the acceptable level.

FOUNDATIONS OF MANAGEMENT AS AN ART PERSPECTIVE

Practicing managers who believe in management as an art are unlikely to believe that scientific principles and theories will be able to be implemented in actual managerial situations. Instead, these managers are likely to rely on the social and political environment surrounding the managerial issue, using their own knowledge of a situation rather than generic rules to determine a course of action.

For example, as a contrast to the example given previously, a manager who has a problem with an employee's poor work performance is likely to rely on his or her own experiences and judgment when addressing this issue. Rather than having a standard response to such a problem, this manager is likely to consider a broad range of social and political factors and is likely to take different actions depending on the context of the problem.

Henry Mintzberg is probably the most well-known and prominent advocate of the school of thought that management is an art. Mintzberg is an academic researcher whose work capturing the actual daily tasks of real managers was groundbreaking research for its time. Mintzberg, through his observation of actual managers in their daily work, determined that managers did not sit at their desks, thinking, evaluating, and deciding all day long, working for long, uninterrupted time periods. Rather, Mintzberg determined that managers engaged in very fragmented work, with constant interruptions and rare opportunities to quietly consider managerial issues. Thus, Mintzberg revolutionized thinking about managers at the time that his work was published, challenging the prior notion that managers behaved rationally and methodically. This was in line with the perspective of management as an art, because it indicated that managers did not necessarily have routine behaviors throughout their days, but instead used their own social and political skills to solve problems that arose throughout the course of work.

Another scholar that promoted the notion of management as an art was David E. Lilienthal, who in 1967 had his series of lectures titled *Management: A Humanist Art* published. In this set of published lectures, Lilienthal argues that management requires more than a mastery of techniques and skills; instead, it also requires that managers understand individuals and their motivations and help them achieve their goals. Lilienthal believed that combining management and leadership into practice not only by getting work done but by understanding the meaning behind the work, as effective managerial behavior. Thus, he promoted the idea of the manager as a motivator and facilitator of others. This manager as an artist was likely to respond differently to each employee and situation, rather than use a prescribed set of responses dictated by a set of known guidelines.

Another proponent of the management as art school of thought is Peter Drucker, famed management scholar who is best known for developing ideas related to total quality management. Drucker terms management "a liberal art," claiming that it is such because it deals with the fundamentals of knowledge, wisdom, and leadership, but because it is also concerned with practice and application. Drucker argues that the discipline (i.e., the science) of management attempts to create a paradigm for managers in which facts are established and exceptions to these facts are ignored as anomalies. He is critical of the assumptions that make up the management paradigm, because these assumptions change over time as society and the business environment change. Thus, management is more of an art, because scientific "facts" do not remain stable over time.

ART AND SCIENCE IN MANAGEMENT RESEARCH

Noted researcher Thomas Kuhn, in his book *The Structure of Scientific Revolutions,* addresses issues associated with the state of current scientific research and the opportunities for scientific discovery. Kuhn, in previous editions of this text, drew distinctions between mature and immature fields of study.

In mature fields of study, many of the central questions of that field have been answered, and strong consensus exists among researchers regarding the fundamental assumptions of that field. Conversely, in immature fields of study, there is still a great deal of debate on major questions in the field, and gains in knowledge come sporadically.

In many ways, management is an immature science. While its foundations in psychology, sociology, and other related areas give it a long and rich history, the nature of the areas of study renders it immature. That is, due to the difficulties of studying human behavior in a number of disparate settings, the study of management is still very young when compared to other fields of research (e.g., in the physical sciences). In fact, many scholars have argued that the social sciences (e.g., management research) suffer from envy of the physical sciences, in which "truths" are able to be determined through research. As such, social sciences researchers may strive to create a more "scientific" approach to their fields in order to grant them more legitimacy.

Despite its relative immaturity, some consistent answers have been developed in the field of management. In many ways this is due to the increased sophistication of management research. However, there are still a number of research gaps in management; despite our increased knowledge in some areas, there is still a great deal of disagreement and confusion in other areas. In these circumstances, the practice of management is likely to be dictated by the perspective of management as an art. Because there are no hard and fast rules in certain circumstances, individual managers' experiences and skills must guide them.

In the twenty-first century, much of the management research conducted in academic institutions blends the notion of management as an art and as a science. Some of these trends in management research that have pushed the field in either direction—namely increased statistical sophistication and the emphasis on contextual influences—are described below.

Increased Statistical Sophistication. As computer technology continues to improve, the ability of management researchers to conduct sophisticated statistical analyses has also been enhanced. Powerful statistical computing packages are now readily available for desktop computers, allowing for high-speed analysis of complex statistical models. Additionally, new statistical modeling techniques, such as structural equations modeling, have gained footing in management research. Thus, management researchers are now better able to empirically test more complex research hypotheses, and management as a science is perpetuated.

The improvement in researchers' ability to analyze statistics more quickly has resulted in an increase in information about theories of management. Practicing managers may now know of certain relationships that have received strong support through decades of empirical research. Such "truths" may become guiding principles that practicing managers see as ideal solutions to a variety of situations.

For instance, numerous empirical studies over several recent decades have supported the relationship between appropriate goal setting and higher work performance. This relationship has been tested in a variety of situations, with a number of contextual influences present, yet

the statistical relationship holds in nearly all of them. Thus, a practicing manager may see this body of empirical research and, in a work situation, see the benefits of goal setting on performance as a scientific ideal. He or she may then implement goal setting in a number of practical situations, bolstered by the confidence afforded by decades of research supporting such actions.

Meta-analysis, in particular, is a methodological procedure that has contributed significantly to the study of management. Meta-analysis is a statistical technique that allows a researcher to combine findings from multiple studies, correct for errors in study design, and determine an "average" statistical relationship among variables.

Meta-analysis first gained a foothold in management research in studies of the validity of selection techniques for different jobs in different organizations. Before the application of meta-analysis to research the validity of different selection techniques, there was a belief in the situational specificity of these selection methods. That is, studies of the accuracy of selection techniques in predicting subsequent job performance had such disparate results that academics concluded that validity of a standardized test, for example, would differ dramatically in each selection situation (e.g., with different job applicants, in different organizations, in different geographic regions). This myth was dispelled, however, with the application of meta-analysis to the results of the collected body of research on the validity of selection methods. The use of meta-analysis established that the differences in findings were due primarily to limitations of research design, such as small sample size, unreliability of measures, and other correctable problems. When meta-analysis was applied to this group of studies, they were combined to determine that validates of selection techniques were general across jobs and organizations. Thus, the use of meta-analysis helped to establish that cognitive ability tests and structured interviews were highly valid selection methods in nearly every job.

Meta-analysis has now been applied to many different areas of management research, including training, recruitment, fairness, and other topics. Additionally, there have been a number of refinements to the statistical corrections used in meta-analysis.

The increased acceptance and use of meta-analysis in management research supports the notion of management as a science. Meta-analysis provides for "truths" in management—relationships between variables that hold strong regardless of the people or situation involved.

For instance, one consistent finding is that structured selection interviews (ones in which applicants are asked the same set of predetermined questions, and in which responses are evaluated using the same criteria) are a more valid predictor of future job performance than are unstructured interviews (in which applicants are asked different questions and responses are evaluated using different criteria). Meta-analysis has been used to establish this finding, and thus a practicing manager may use this information as a scientific "fact" when conducting selection interviews.

Contextual Influences. While improvements in management researchers' ability to conduct statistical analysis in their studies has promoted the notion of management as a science, in some ways it has also promoted management as an art. Because of the capability to statistically analyze and interpret larger, more complex models of behavior, researchers are now testing models with this increased complexity.

In particular, there is an increased emphasis on contextual influences. That is, rather than focusing solely on how behaviors are linked to outcomes, many researchers now include individual, social, and political variables in research models to have a richer understanding of behavior. Thus, there are more complex recommendations that can be made from recent research, rather than basic truths.

For example, one of the most prominent areas of contextual research in recent years is in person-organization fit (p-o fit). The p-o fit model is a part of the attraction-selection-attrition model that suggests that certain types of individuals are attracted to particular organizations, selected by those organizations, and either adapt to become an effective part of the organization, or leave if they do not fit with the organization. The p-o fit model is the notion that the particular skills, attitudes, values, and preferences of an individual employee should fit with those of the organization in order for that employee to have high job satisfaction and performance. The model also indicates that this fit is likely to be as important as an assessment of applicants' abilities when hiring.

Previous models of selection emphasized a strict interpretation of applicant skills, with the use of valid selection tests as most important. However, the p-o fit model indicates that, even if skills and abilities have been appropriately measured, that hiring the applicant with the best skills is not always the best course of action, but that hiring an individual who fits into the culture of the organization could be more advantageous.

This move towards including contextual influences in management research models promotes the notion of management as an art. Rather than indicating that there are specific principles and guidelines that can guide management practice, it suggests that managerial behavior should change based on the social and political context of the situation.

ART AND SCIENCE IN MANAGEMENT EDUCATION AND DEVELOPMENT

Management education and development, which attempts to prepare today's managers for organizational challenges, are guided by both the notion of management as an art and as a science. The approach to management education and development is likely to differ dramatically depending on the belief one has as to the nature of the practice of management. The perspective of management as an art assumes to some extent that a manager has a disposition or experiences that guide him or her in managerial decisions and activities. Thus, with this perspective, many managers may be successful without any formal education or training in management. The perspective of management as a science, however, would indicate that management skills can be taught through an understanding of theory and principles of management. Many of today's educational institutions and workplaces blend the notion of management as a science and an art in their approach to preparing employees for management.

Management education in today's universities primarily emphasizes management as a science. Textbooks used in management courses emphasize many of the consistent findings of many decades of management research. And, as these degrees increase in popularity, it is likely that more practicing managers will have a set of established management ideals with which they operate.

While formal management education may promote management as a science, many development efforts support the notion of management as an art. To cultivate management talent, organizations offer mentoring, overseas experiences, and job rotation. These activities allow managers to gain greater social and political insight and thus rely on their own judgment and abilities to improve their management style. Much of mentoring involves behavior modeling, in which a protégé may learn nuances of managerial behavior rather than a set of specific guidelines for managing. Overseas experiences are likely to involve a great deal of manager adaptation, and the general rules by which a manager might operate in one culture are likely to change when managing workers in other countries. Finally, job rotation is a technique that requires a manager to work in a variety of settings. Again, this encourages a manager to be flexible and adaptive, and likely rely more on his or her personal skill in managing.

The foundations of management as an art and management as a science are evident in today's educational institutions and work organizations. Management as a science was primarily influenced by researchers in the area of scientific management, such as Frederick Taylor, and continues today in much of the empirical research on management issues. Management as an art has been influenced by scholars such as Henry Mintzberg and Peter Drucker, and is often evident in complex theories of management. Many scholars and practitioners blend art and science to more effectively cultivate managerial talent. This is evident in recent theories of management, research in workplaces, and education and development of managers.

Future Issues in Management Education. The Association to Advance Collegiate Schools of Business (AACSB) task force on management and education and other management theorists have identified challenges facing the future of the field of management. Among these challenges are making both the art and science of management accessible to students in the field. At the same time, managers must prepare to face the challenges of globalization. In meeting this challenge, management educators can bring a new focus to the managers who will lead in the next generation of businesses.

SEE ALSO *Management Science; Management Thought; Organizational Behavior; Research Methods and Processes; Statistics*

BIBLIOGRAPHY

Appley, Lawrence A. *Management in Action: The Art of Getting Things Done through People.* American Management Association, 1956.

The Association to Advance Collegiate Schools of Business. "Business and Business Schools: A Partnership for the Future." Report of the AACSB International Alliance for Management Education Task Force. 2006. Available from: http://www.aacsb.edu/publications/default.asp.

Bennis, W. G. & O'Toole, J. (2005). How business schools lost their way. Harvard Business Review, 83(5), 96–104.

DuBrin, Andrew J. *Essentials of Management.* 6th ed. Peterborough, Ontario: Thomson South-Western, 2003.

Drucker, Peter F. *The Essential Drucker.* New York, NY: Harper Collins Publishers, 2001.

Gatignon, Hubert. *Statistical Analysis of Management Data.* New York: Springer-Verlag, 2003.

Jones, Gareth R., and Jennifer M. George. *Contemporary Management.* 4th ed. New York, NY: McGraw-Hill Irwin, 2006.

Kuhn, Thomas S. *The Structure of Scientific Revolutions.* 3rd ed. Chicago, IL: The University of Chicago Press, 1996.

Lilienthal, David E. *Management: A Humanist Art.* New York, NY: Colombia University Press, 1967.

Mintzberg, Henry. "The Manager's Job: Folklore and Fact." *Harvard Business Review,* July-August 1975, 56—62.

———. *The Nature of Managerial Work.* New York: Harper & Row, 1973.

Rue, Leslie W., and Lloyd L. Byars. *Management: Skills and Applications.* 10th ed. New York, NY: McGraw-Hill Irwin, 2003.

Williams, Chuck. *Management.* Cincinnati, OH: South-Western College Publishing, 2000.

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) refers to computer software that exhibits intelligent behavior. The term "intelligence" is difficult to define and has been the subject of heated debate by philosophers, educators, and psychologists for ages. Nevertheless, it is possible to enumerate many important characteristics of intelligent behavior. Intelligence includes the capacity to learn, maintain a large storehouse of knowledge, utilize commonsense reasoning, apply analytical abilities, discern relationships between facts, communicate ideas to others and understand communications from others, and perceive and make sense of the world around us. Thus, artificial intelligence systems are computer programs that exhibit one or more of these behaviors.

AI systems can be divided into two broad categories: knowledge representation systems and machine learning systems. Knowledge representation systems, also known as expert systems, provide a structure for capturing and encoding the knowledge of a human expert in a particular domain. For example, the knowledge of medical doctors might be captured in a computerized model that can be used to help diagnose patient illnesses.

MACHINE LEARNING SYSTEMS

The second category of AI, machine learning systems, creates new knowledge by finding previously unknown patterns in data. In contrast to knowledge representation approaches, which model the problem-solving structure of human experts, machine learning systems derive solutions by "learning" patterns in data, with little or no intervention by an expert. There are three main machine learning techniques: neural networks, induction algorithms, and genetic algorithms.

Neural Networks. Neural networks simulate the human nervous system. The concepts that guide neural network research and practice stem from studies of biological systems. These systems model the interaction between nerve cells. Components of a neural network include neurons (sometimes called "processing elements"), input lines to the neurons (called dendrites), and output lines from the neurons (called axons).

Neural networks are composed of richly connected sets of neurons forming layers. The neural network architecture consists of an input layer, which inputs data to the network; an output layer, which produces the resulting guess of the network; and a series of one or more hidden layers, which assist in propagating. This is illustrated in Figure 1.

During processing, each neuron performs a weighted sum of inputs from the neurons connecting to it; this is called activation. The neuron chooses to fire if the sum of inputs exceeds some previously set threshold value; this is called transfer.

Inputs with high weights tend to give greater activation to a neuron than inputs with low weights. The weight of an input is analogous to the strength of a synapse in a biological system. In biological systems, learning occurs by strengthening or weakening the synaptic connections between nerve cells. An artificial neural network simulates synaptic connection strength by increasing or decreasing the weight of input lines into neurons.

Neural networks are trained with a series of data points. The networks guess which response should be given, and the guess is compared against the correct answer for each data point. If errors occur, the weights into the neurons are adjusted and the process repeats itself. This learning approach is called backpropagation and is similar to statistical regression.

Neural networks are used in a wide variety of business problems, including optical character recognition, financial forecasting, market demographics trend assessment, and various robotics applications.

Induction Algorithms. Induction algorithms form another approach to machine learning. In contrast to neural networks (which are highly mathematical in nature), induction approaches tend to involve symbolic data. As the name implies, these algorithms work by implementing inductive reasoning approaches. Induction is a reasoning method that can be characterized as "learning by example." Unlike rule-based deduction, induction begins with a set of observations and constructs rules to account for these observations. Inductive reasoning attempts to find general patterns that can fully explain the observations. The system is presented with a large set of data consisting of several input variables and one decision variable. The system constructs a decision tree by recursively partitioning data sets based on the variables that best distinguish between the data elements. That is, it attempts to partition the data so that each partition contains data with the same value for a decision variable. It does this by selecting the input variables that do the best job of dividing the data set into homogeneous partitions. For example, consider Figure 2, which contains the data set pertaining to decisions that were made on credit loan applications.

An induction algorithm would infer the rules in Figure 3 to explain this data.

As this example illustrates, an induction algorithm is able to induce rules that identify the general patterns in data. In doing so, these algorithms can prune out irrelevant or unnecessary attributes. In the example above, salary was irrelevant in terms of explaining the loan decision of the data set.

Figure 1

Figure 1

and return to the origin. For such a problem there are $(n - 1)!$ possible solutions, or $(n - 1)$ factorial. For six cities, this would mean $5 \times 4 \times 3 \times 2 \times 1 = 120$ possible solutions. Suppose that the salesman must travel to 100 cities. This would involve $99!$ possible solutions, an astronomically high number.
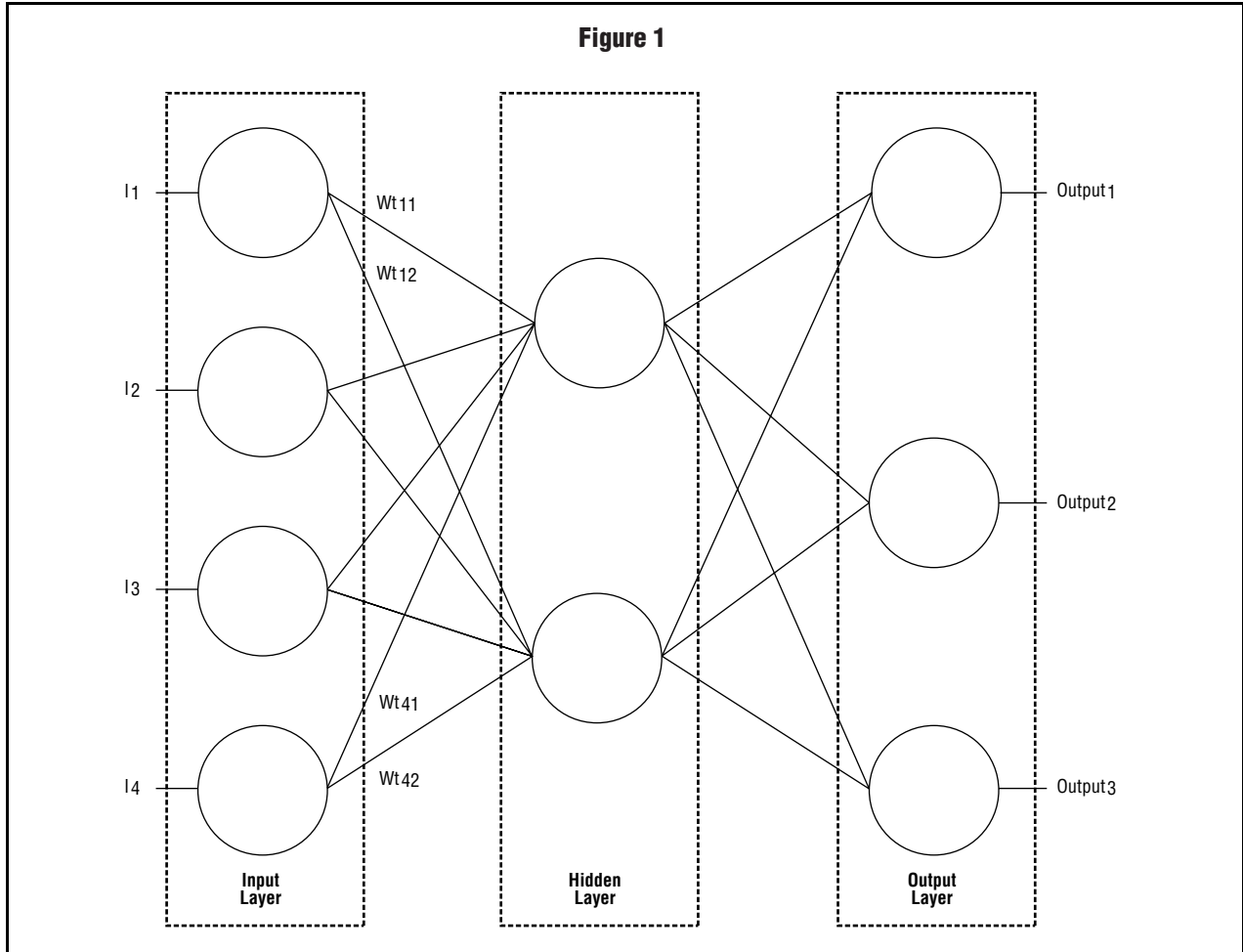
Induction algorithms are often used for data mining applications, such as marketing problems that help companies decide on the best market strategies for new product lines. Data mining is a common service included in data warehouses, which are frequently used as decision support tools.

Genetic Algorithms. Genetic algorithms use an evolutionary approach to solve optimization problems. These are based on Darwin's theory of evolution, and in particular the notion of survival of the fittest. Concepts such as reproduction, natural selection, mutation, chromosome, and gene are all included in the genetic algorithm approach.

Genetic algorithms are useful in optimization problems that must select from a very large number of possible solutions to a problem. A classic example of this is the traveling salesperson problem. Consider a salesman who must visit n cities. The salesperson's problem is to find the shortest route by which to visit each of these n cities exactly once, so that the salesman will tour all the cities

Figure 2
Artificial Intelligence & Expert Systems

	Salary	Credit History	Current Assets	Loan Decision
a)	High	Poor	High	Accept
b)	High	Poor	Low	Reject
c)	Low	Poor	Low	Reject
d)	Low	Good	Low	Accept
e)	Low	Good	High	Accept
f)	High	Good	Low	Accept

Obviously, for this type of problem, a brute strength method of exhaustively comparing all possible solutions

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Figure 3

If the credit history is good, then accept the loan application

If the credit history is poor and current assets are high, then accept the loan application

If the credit history is poor and current assets are low, then reject the loan application

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will not work. This requires the use of heuristic methods, of which the genetic algorithm is a prime example. For the traveling salesperson problem, a chromosome would be one possible route through the cities, and a gene would be a city in a particular sequence on the chromosome. The genetic algorithm would start with an initial population of chromosomes (routes) and measure each according to a fitness function (the total distance traveled in the route). Those with the best fitness functions would be selected and those with the worst would be discarded. Then random pairs of surviving chromosomes would mate, a process called crossover. This involves swapping city positions between the pair of chromosomes, resulting in a pair of child chromosomes. In addition, some random subset of the population would be mutated, such that some portion of the sequence of cities would be altered. The process of selection, crossover, and mutation results in a new population for the next generation. This procedure is repeated through as many generations as necessary in order to obtain an optimal solution.

Genetic algorithms are very effective at finding good solutions to optimization problems. Scheduling, configuration, and routing problems are good candidates for a genetic algorithm approach. Although genetic algorithms do not guarantee the absolute best solution, they do consistently arrive at very good solutions in a relatively short period of time.

AI IN THE TWENTY-FIRST CENTURY

Artificial intelligence systems provide a key component in many computer applications that serve the world of business. In fact, AI is so prevalent that many people encounter such applications on a daily basis without even being aware of it.

One of the most ubiquitous uses of AI can be found in network servers that route electronic mail and in email spam-filtering devices. Expert systems are routinely utilized in the medical field, where they take the place of doctors to assess the results of tests like mammograms or electrocardiograms; credit card companies, banks, and insurance firms commonly use neural networks to help detect fraud. These AI systems can, for example, monitor consumer-spending habits, detect patterns in the data, and alert the company when uncharacteristic patterns

arise. Genetic algorithms serve logistics planning functions in airports, factories, and even military operations, where they are used to help solve incredibly complex resource-allocation problems. And perhaps most familiar, many companies employ AI systems to help monitor calls in their customer service call centers. These systems can analyze the emotional tones of callers' voices or listen for specific words, and route those calls to human supervisors for follow-up attention.

Artificial Intelligence is routinely used by enterprises in supply chain management through the use of a set of intelligent software agents that are responsible for one or more aspects of the supply chain. These agents interact with one another in the planning and execution of their tasks. For instance, a logistics agent is responsible for coordinating the factories, suppliers, and distribution centers. This agent provides inputs to the transportation agent, which is responsible for assignment and scheduling transportation resources. The agents coordinate their activities with the optimization of the supply chain as the common goal.

Customer Relationship Management uses artificial intelligence to connect product offers and promotions with consumer desires. AI software profiles customer behavior by finding patterns in transaction data. The software generates algorithms for evaluating different data characteristics, such as what products are frequently bought together or the time of year a product sells the most. Thus, the software is able to use historical data to predict customer behavior in the future.

Artificial intelligence is also used on Wall Street in the selection of stocks. Analysts use AI software to discover trading patterns. For instance, an algorithm could find that the price movements of two stocks are similar; when the stocks diverge a trader might buy one stock and sell the other on the assumption that their prices will return to the historical norm. As the use of trading algorithms becomes more commonplace, there is less potential for profit.

Although computer scientists have thus far failed to create machines that can function with the complex intelligence of human beings, they have succeeded in creating a wide range of AI applications that make people's lives simpler and more convenient.

SEE ALSO *Expert Systems*

BIBLIOGRAPHY

Chokshi, Kaustubh. "Artificial Intelligence Enters the Mainstream." *Domainb* April, 2007. Available from: http://www.domainb.com/infotech/itfeature/20070430_Intelligence.htm.

Dhar, V., and R. Stein. *Seven Methods for Transforming Corporate Data into Business Intelligence.* Upper Saddle River, NJ: Prentice Hall, 1997.

Duhigg, Charles. "Artificial Intelligence Applied Heavily to Picking Stocks." *International Herald Tribune* 23, November 2006. Available from: www.iht.com/articles/2006/11/23/business/trading.php.

"Hot Topics: Artificial Intelligence." BBC Online. Available from: http://www.bbc.co.uk/science/hottopics/ai/.

Kahn, Jennifer. "It's Alive! From Airport Tarmacs to Online Job Banks to Medical Labs, Artificial Intelligence Is Everywhere." *Wired* March 2002. Available from: http://www.wired.com/wired/archive/10.03/everywhere.html.

Menzies, Tim. "21st Century AI: Proud, Not Smug." *IEEE Intelligent Systems* May/June 2003.

Norvig, P., and S. Russell. *Artificial Intelligence: A Modern Approach.* Upper Saddle River, NJ: Prentice Hall, 2002.

Rigby, Darrell. *Management Tools and Trends.* Boston: Bain & Company, 2007.

Sabariraian, A. "Scope of Artificial Intelligence in Business." *International Herald Tribune* September 2008. Available from: http://www.articlesbase.com/management-articles/scope-of-artificial-intelligence-in-business328608.html.

Van, Jon. "Computers Gain Power, But It's Not What You Think." *Chicago Tribune* 20 March 2005.

ASSESSMENT CENTERS

An assessment center is a process used to make personnel decisions in which participants engage in a variety of exercises and have their performance evaluated by multiple assessors. The goal of an assessment center is to simulate job tasks so that an applicant can demonstrate skills or characteristics that would be effective on the job.

According to the International Task Force on Assessment Center Guidelines, assessment centers:

- Conduct job analyses of relevant behaviors

- Classify participants' behaviors into meaningful and relevant categories

- Use techniques that are designed to provide information for evaluating the dimensions previously determined by the job analysis

- Involve multiple assessment techniques, such as tests, interviews, questionnaires, sociometric devices, and simulations

- Include a sufficient number of job-related simulations, allowing opportunities to observe the candidate's behavior related to each competency/dimension being assessed

- Utilize several assessors to evaluate each participant

- Employ thoroughly trained assessors

- Provide a means for assessors to record their observations of participants' behavior as it occurs

- Involve the preparation of an assessor's report

- Base the integration of behaviors on the pooling of assessors' information, or upon a statistical integration process validated in accordance with professionally accepted standards

Behavioral dimensions that are frequently measured in assessment centers include planning and organizing, leadership, oral communication, tolerance for stress, and initiative. Participants have their performance on these and similar dimensions evaluated while engaging in two or more of the following activities over a one- or two-day period:

- In-basket exercises, in which participants respond to a series of administrative problems that simulate typical managerial tasks

- Leaderless group discussions, in which a group of participants without an assigned leader must arrive at a group solution to a specified problem within a given time period

- Role-plays, in which participants are involved in a simulation of a situation that could occur on the job

- Interviews, in which participants typically are questioned about how they have handled particular work situations in the past and how they would respond to specific work situations in the future

- Management games, in which participants must work cooperatively to meet mental or physical challenges

Evaluations of assessment center participants can be used for employee selection decisions (hiring and promotion) and to help identify training and development needs. The most common use of assessment centers is to evaluate participants' management potential. When used for selection or promotion decisions, the emphasis is on identifying participants who do well on essential job performance dimensions. When used for training and development purposes, the focus is on identifying participant deficiencies on critical job dimensions. The feedback and employee-development suggestions that result from an assessment form the basis for training programs that are designed to correct performance problems. For organizations, assessment centers can serve as needs assessment programs that identify employee development and hiring needs.

Early versions of assessment centers were used by the military in the 1940s. The first use of an assessment center in an industrial setting was in the 1950s, when AT&T used the process in an attempt to evaluate participants' potential for managerial success. The results of this early assessment center application were encouraging, and assessment center use increased following AT&T's apparent success. According to one study by Gaugler, Rosenthal, Thornton, and Bentson, by 1987 more than 2,000

organizations, including Pepsico, IBM, Rubbermaid, and the FBI, used assessment centers to select and promote managers.

As the use of assessment centers increased during the 1960s and 1970s, researchers identified several ways in which their utility as a personnel selection tool could be improved. In 1973, Bender suggested that companies should undertake validation studies to ensure that assessment centers actually predicted managerial success. He also pointed out that assessors should be more thoroughly trained before they evaluated assessment center participants.

In an attempt to encourage uniformity and professionalism in assessment center practices, the Task Force on Assessment Center Guidelines published *Guidelines and Ethical Considerations for Assessment Center Operations* in 1989. These guidelines were updated in 2000 and endorsed by the International Congress on Assessment Center Methods. They spell out the essential elements of assessment centers and provide recommendations regarding the content of assessor training, information participants should receive before beginning the assessment center, data usage, and validation methods. In addition, these guidelines provide a standard for judging assessment center practices employed by organizations. In 2004, the International Congress on Assessment Center Methods formed a task force to address the growing trend towards globalization. A draft of the guidelines was presented at the organization's annual conference in 2006. The document still exists in draft form at time of this writing.

The preponderance of research evidence indicates that, when designed and conducted in a manner consistent with professional guidelines, assessment centers are valid predictors of future promotions and job performance. Additional research suggests that assessment centers have less adverse impact on women and minorities than many other commonly used selection tools, and courts generally have upheld the use of properly designed assessment centers. Again, there are factors that must be considered as companies become increasingly multinational.

The primary criticism of assessment centers is that they are very expensive in terms of both development and implementation, which makes their use infeasible for many small organizations. Other researchers question the convergent and discriminant validity of the measurement of behavioral dimensions in assessment centers. One method used to overcome the expense problem is to videotape the candidates' performance and have the assessors evaluate them later. This avoids costs and problems related to the logistics of assembling candidates and assessors. Another technique is to use "situational judgment tests" or written simulation tests. Candidates either choose the best course of action from a selection of choices or provide a written course of action. Research indicates that situational judgment tests are good predictors of job performance.

SEE ALSO *Employee Evaluation and Performance Appraisals; Employee Recruitment Planning; Employee Screening and Selection*

BIBLIOGRAPHY

Beagrie, Scott. "How to Cut It at Assessment Centres." *Personnel Today.* 5 October 2004. Available from: http://www.personneltoday.com/articles/2004/10/05/25913/assessment-centres-how-to-cut-it-at-assessment-centres.html.

Bender, J.M. "What Is 'Typical' of Assessment Centers?" *Personnel* 50, no. 4 (1973): 50–57.

Gatewood, Robert D., and Hubert S. Field. *Human Resource Selection.* 6th ed. Mason, OH: South-Western College Publishing, 2004.

Gaugler, B.B., D.B. Rosenthal, G.C. Thornton, III, and C. Bentson. "Meta-Analysis of Assessment Center Validity." *Journal of Applied Psychology* 72 (1987): 493–511.

The International Congress on Assessment Center Methods. Available from: http://www.assessmentcenters.org.

The International Congress on Assessment Center Methods. "Professional Guidelines for Global Assessment Centers. The 2006 Extension to the Guidelines" (Draft Version). Available from: files.unistel.co.za/general/acguidelines2006.pdf.

Joiner, D.A. "Assessment Centers: What's New?" *Public Personnel Management* 31, no. 2 (2002): 179–185.

———. "Guidelines and Ethical Considerations for Assessment Center Operations: International Task Force on Assessment Center Guidelines." *Public Personnel Management* 29, no. 3 (2000): 315–331.

Lievens, F., and R.J. Klimoski. "Understanding the Assessment Center Process: Where Are We Now?" In *International Review of Industrial and Organizational Psychology.* ed. C.L. Cooper and I.T. Robertson. Chichester, United Kingdom: John Wiley & Sons, Ltd.

McDaniel, M.A., F.P. Morgeson, E.B. Finnegan, M.A. Campion, and E.P. Braverman. "Use of Situational Judgment Tests to Predict Job Performance: A Clarification of the Literature." *Journal of Applied Psychology* 86 (2001): 730–740.

Spychalski, A.C., M.A. Quiñones, B.B. Gaugler, and K. Pohley. "A Survey of Assessment Center Practices in Organizations in the United States." *Personnel Psychology* 50 (1997): 71–90.

Woehr, D.J. and W. Arthur, Jr. "The Construct-Related Validity of Assessment Center Ratings: A Review and Meta-Analysis of the Role of Methodological Factors." *Journal of Management* 29, no. 2 (2003): 231–258.

AUTONOMY

Autonomy is the degree to which a job provides an employee with the discretion and independence to schedule his or her work and determine how it is to be done. Higher levels of autonomy on the job have been shown to increase job satisfaction, and in some cases, motivation to

perform the job. In traditional organizations, only those employees at higher levels had autonomy. However, new organizational structures, such as flatter organizations, have resulted in increased autonomy at lower levels. Additionally, many companies now make use of autonomous work teams. Autonomy in the workplace can have benefits for employees, teams, managers, and the company as a whole, but it also may have drawbacks. Information regarding both the pros and cons of autonomy for these groups is discussed below.

EMPLOYEE AUTONOMY

According to job design theories, increased autonomy should make employees feel a greater responsibility for the outcomes of their work, and therefore have increased work motivation. Research indicates that when employees have greater levels of autonomy, their personality traits (specifically conscientiousness and extroversion) have a stronger impact on job performance. Thus, by giving employees more autonomy, they are better able to use their personal attributes to contribute to job performance. Additionally, human resource research has shown that greater autonomy in the workplace leads to a broader self-definition held by workers. The same study found that this broader definition of role makes it more likely that workers will integrate more tasks into their role.

Unfortunately, too much autonomy can lead to employee dissatisfaction. Each individual has a different level of need for autonomy in his or her job. Some workers prefer more direction from a manager and feel uncomfortable with autonomy; they may not want to exert effort or take the responsibility of having their name solely associated with a task, project, or product. Additionally, if employees are not well-equipped—either in training or in personality—to exercise autonomy, it may result in workplace tension and poor performance. Finally, when given autonomy, workers may believe that they have authority somewhat equal to that of their direct supervisor. This may cause them to resent the extra responsibility or feel that their pay should be increased. A related concern is that managers may feel marginalized when employee autonomy increases, particularly when there is a change to a traditional work environment. Managers may feel that by giving employees autonomy, they no longer contribute as much to the organization or that their jobs may be at stake.

MANAGERIAL AUTONOMY

Managers tend to have increased autonomy in organizations that are more decentralized. In such organizations, managers have more latitude to make decisions regarding the work of employees and even personnel decisions. For example, managers with increased autonomy may be able to assign merit raises to the employees in their unit at their discretion. As with employee autonomy, this freedom can result in feelings of motivation and satisfaction for the manager, who may be in a better position to reward and motivate employees. However, as with employee autonomy, managers who have autonomy may not be equipped to handle it. If managers make poor decisions, this may be harmful to employees and the organization as a whole. Using the example of autonomy in deciding pay raises, a manager may give merit pay increases that are significantly higher than those in other work units, which may cause problems across the organization.

TEAM AUTONOMY

In recent years, many organizations have made use of teams in the workplace, many of which operate autonomously. Self-managed work teams are those in which a supervisor gives little direction to the team, and the team members manage themselves. The success of such teams depends greatly on the team members, including their professional capabilities and their ability to work together. Oftentimes, such autonomous teams can greatly enhance an organization's ability to be creative, flexible, and innovative. However, as with individuals, too much autonomy in a team can reduce productivity. When individuals work too independently, their lack of communication and monitoring of one another may result in poor team performance. Additionally, without supervision the team may pursue goals that are different from those of the organization. Thus, periodic meetings and supervision from a manager may be necessary to avoid problems associated with too much autonomy.

AUTONOMY AND THE ORGANIZATION

The autonomy of employees and managers is often dictated by an organization's structure and culture; traditional, bureaucratic organizations often have little autonomy, but newer, more organic structures rely on autonomy, empowerment, and participation to succeed. Employee autonomy is believed to have minimized some of the relational barriers between superiors and subordinates. Therefore, autonomy may improve workplace functions through the ideas and suggestions of employees, and foster relationships with a greater degree of trust between management and employees. However, increased autonomy in the organization also may create disparity among units through different work practices and rules. In the worst case, increased autonomy may allow some employees to engage in unethical behavior. Thus, a certain amount of oversight is necessary in

organizations to prevent wrongdoing that may go unnoticed when there are high levels of autonomy.

Autonomy generally is a positive attribute for employees, managers, teams, and organizations as a whole. Employees typically desire autonomy, and its introduction can increase motivation, overall job performance, and satisfaction. However, organizations should be careful when increasing autonomy, because too much autonomy can have organizational drawbacks.

SEE ALSO *Empowerment*

BIBLIOGRAPHY

Gómez-Mejía, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources.* 4th ed. Upper Saddle River, NJ: Prentice Hall, 2004.

Hackman, J. Richard, and Greg R. Oldham. "Motivation through the Design of Work: Test of a Theory." *Organizational Behavior and Human Performance* 16 (1976): 250–279.

Morgeson, Frederick, Kelly Delaney-Klinger, and Monica Hemingway. "The Importance of Job Autonomy, Cognitive Ability, and Job-Related Skill for Predicting Role Breadth and Job Performance." *Journal of Applied Psychology.* 90, No. 2 (2005): 399–406.

B

B2B

B2B (business to business) companies make their primary profits by selling products or services to other businesses. Such companies often have an important place in the supply chain, channeling resources to manufacturing companies or handling distribution needs for retailers. The communication abilities that have arisen with widespread Internet service and Web-based applications have encouraged the growth of many different kinds of B2B companies that trade and market online.

Since B2B markets concern only businesses, product sales and contracts can often be streamlined, including much larger amounts and longer terms of service than result from selling only to consumers. Certain kinds of markets can be designed specifically for this type of transaction. Online B2B businesses typically use several different Web applications to reach other companies and establish relationships with them, including:

1. **Company Web sites.** Large B2B firms can set up their own Web sites to market services and promote their products. Interested companies can visit the Web site at any time to inspect the available good or service. The Web site can offer either a connection to a more private online structure available to contracted businesses, or can sell products directly from the site.

2. **Supply and procurement exchanges.** These are online markets designed specifically so that company agents can view available goods and services, and in many cases make bids for B2B contracts. This can include auctions, in which buyers vie to purchase from one

seller, and reverse auctions, in which many sellers lower their prices until a buyer accepts a contract. Some procurement sites focus on particular industries and the businesses exchanging services within them.

3. **Brokering sites.** These sites are a type of B2B company themselves, acting as a go-between for companies searching for a particular good or service and other companies that are able to offer those goods and services.

4. **Information sites, or Infomediary.** These Web sites offer a collection of information concerning specific industries. This information can include required legal standards, available businesses that provide needed products and services, and advice concerning purchasing prices and markets. Many information sites function as elaborate search engines on particular topics.

COMMON B2B COMPANY STRUCTURES

There are many types of B2B structures and marketing methods. Many strategies focus on relationship marketing—building a strong, long-lasting connection with a certain number of businesses based on high quality service and trust. Others work with complementary partners that can refer each other to buyers, thereby expanding the customer base via the partnership. Online marketing methods include mass e-mails, selective and effective telemarketing, and search engine optimization (SEO) techniques that create a significant Internet presence to buyers searching online for B2B supply and service solutions.

The type of products B2B businesses offer usually fall into three categories, based on the buyer's needs and expectations:

- **Commodities.** These types of products are readily available and can be immediately shipped to the businesses upon sales conclusion. These are usually simple goods that can be readily packaged and include few features. If the commodity is a service, then it is usually a standardized, simple process.

- **Customized goods.** These products are changed in some way to meet the buyer's specifications. These customizations are usually standard and often included in the marketing information advertised by the seller. Changes in color or style are types of customization common in B2B goods. This can slow down delivery, but such a delay is usually considered acceptable by the buyer.

- **Designed goods.** These products are built or engineered directly to buyer specifications, requiring a great deal of independent work to tailor them to company needs. Machine parts that need to work for a particular production system is one example. Designed services include advertising services applied to a specific good.

BIBLIOGRAPHY

Coe, John. *The Fundamentals of Business to Business Sales & Marketing.* New York: McGraw-Hill Professional, 2003.

Jones, Paula. "B2B." *SearchCIO.com,* 2008. Available from: http://searchcio.techtarget.com/sDefinition/0,,sid182_gci214411,00.html.

McIntosh, M.H. "8 Powerful B2B Sales Lead Generation Techniques." *WorkZ,* 2007. Available from: http://www.workz.com/content/view_content.html?section_id=557&content_id=7086.

B2E MANAGEMENT (BUSINESS TO EMPLOYEE)

Many businesses exert effort to sell outside of the company, whether to other businesses, individual consumers, public organizations, or governments. However, there is another type of selling that companies are beginning to find more attractive, especially large companies, and this is B2E, or business-to-employee selling. This involves selling products and services within the company, advertising to employees through such in-company applications as intranets and e-mail. Often, special discounts or deals are extended to employees to encourage them to buy from the company. B2E enterprise can also refer to the spread of information and helpful services among employees to encourage overall company growth.

COMMON FORMS OF B2E

In the nonprofit services category, B2E initiatives usually fall into two groups that function as online applications over the company's intranet or Internet interface. The first group is mostly concerned with human resource (HR) functions, offering employees many types of opportunities and information. Updates concerning health care possibilities, payroll, and other types of compensation are included in this group, along with all types of online corporate training. The spread of company-wide messages or announcements also belong to the first set. The second group includes more extended types of employee benefits, such as travel reservations, compensation for certain types of employee expenses, credit services, and insurance management.

A separate type of nonprofit B2E services allows employees to access specialized portals containing necessary information for them and their tasks. This can include data, data mining operations, and certain searches that are available only to specific employees. There can also be meta-services that allow analysts to collect data on which employees use B2E services, which opportunities are most selected by the employees, and which services are the most successful.

ADVANTAGES TO B2E

There are many benefits for employees and organizations resulting from B2E practices. Employees—through participation and awareness—often increase their efficiency and overall ability to collaborate; they prove more willing to invest in the company and offer creative solutions for problems their business may encounter. B2E initiatives often lead to a logical increase in loyalty and satisfaction among the workforce, a movement directly related to awareness and availability of company services. The companies will benefit from B2E actions by saving on costs associated with interruption of data and a paper-oriented communication structure. Since B2E depends on online interaction, copying and distributing flyers, updates, or files is rarely necessary. B2E is also associated with a number of intranet networking applications, such as virtual teams and company wikis.

B2E portals and applications offer employees many of the same advantages online customers have, but are applied to their benefits at work. For instance, an important B2E tool can be a home page designed specifically for an employee. The employee can use their homepage to: access sites, files, and resources meant specifically for them; manage their health care options; explore other types of insurance the company offers; apply for expense

compensation; and review other features tailored to fit their needs. Such sites and applications may also include products or services of the company, made available at reduced cost for the employee. Any other data can be included in the employee portal to aid employees in collaboration and decisions.

BIBLIOGRAPHY

Ahonen, Tommy T, and Joe Barrett. *Services for UMTS.* West Sussex, UK: John Wiley and Sons, 2002.

Dunford, Ian. "B2E: The Future Looks Rosy." *Infomatics.* October 23, 2002.

Polgar, Jana, Robert Mark Bram, and Anton Polgar. *Building and Managing Enterprise-Wide Portals.* Hershey, PA: Idea Group Publishing, 2005.

Rahim, Mahbubur. "Understanding Adoption and Impact of B2E E-Business Systems: Lessons Learned from the Experience of an Australian University." *Monash University,* 2006. Available from: http://www.collecter2006.unisa.edu.au/ Paper%202%20Md%20Mahbubur%20Rahim.pdf.

Simon, Alan R., and Steven L. Shaffer. *Data Warehousing and Business Intelligence for E-commerce.* San Francisco, CA: Morgan Kaufmann, 2001.

BALANCE SHEETS

The balance sheet, also known as the statement of financial position, is a snapshot of a company's financial condition at a single point in time. It presents a summary listing of a company's assets, liabilities, and owners' equity. The balance sheet is prepared as of the last day of the business year. Therefore, it corresponds to the end of the time period covered by the income statement.

One must examine several accounting concepts to understand the balance sheet, its purpose, and its contents. First of all, the balance sheet represents the *accounting equation* for a company. The accounting equation is a mathematical expression that states the following:

<p align="center">Assets = Liabilities + Owners' Equity</p>

Stated more fully, this means that the dollar total of the assets equals the dollar total of the liabilities plus the dollar total of the owners' equity. The balance sheet presents a company's resources (e.g., assets, or anything the company owns that has monetary value) and the origin or source of these resources (i.e., through borrowing or through the contributions of the owners). Expressing the same dollar amount twice (once as the dollar total of the assets, then as the dollar total of where the assets came from or who has an equity interest in them) shows that the two amounts must be equal or balance at any given point in time.

An interesting observation about the balance sheet is the valuation at which assets are presented. The average

Table 1
Sample Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets	600,000	Current liabilities	280,000
Fixed assets	90,000	Long-term debt	500,000
Property	800,000	Owners' equity	900,000
Intangible assets	50,000		
Other assets	140,000		
Total Assets	**1,680,000**	**Total Liabilities and Owners' Equity**	**1,680,000**

person would assume that the assets listed on the balance sheet would be shown at their current market values. In actuality, generally accepted accounting principles require that most assets be recorded and disclosed at their historical cost, or the original amount that the company paid to obtain ownership or control of the assets. As time passes, however, the current value of certain assets will drift further and further away from their historical cost. In an attempt to present useful information, financial statements show some assets (for which there is a definite market value) at their current market value. When there is no specific market value, historical values are used.

A simple example of a balance sheet appears in Table 1.

ASSETS

As a category, assets include current assets, fixed or long-term assets, property, intangible assets, and other assets.

Current Assets. Assets can be viewed as company-owned or controlled resources from which the organization expects to gain a future benefit. Examples of assets for a typical company include cash, receivables from customers, inventory to be sold, land, and buildings. To make the balance sheet more readable, assets are grouped together based on similar characteristics and presented in totals, rather than as a long list of minor component parts.

The first grouping of assets is current assets. *Current assets* consist of cash, as well as other assets that will probably be converted to cash or used up within one year. The one-year horizon is the crucial issue in classifying assets as current. The concern is to present assets that will provide liquidity in the near future. Current assets should be listed on the balance sheet in the order of most liquid to least liquid. Therefore, the list of current assets begins with cash. Cash includes monies available in checking accounts and any cash on-hand at the business that can be used immediately as needed. Any cash funds or temporary investments that have restrictions on their

withdrawals, or that have been set up to be spent beyond one year, should not be included in current assets.

Temporary investments known as trading securities are short-term investments that a company intends to trade actively for profit. These types of investments—common to the financial statements of insurance companies and banks—are shown on the balance sheet at their current market value as of the date of the balance sheet. Any increase or decrease in market value since the previous balance sheet is included in the calculation of net income on the income statement.

The next category on the list of current assets is *accounts receivable,* which includes funds that are to be collected within one year from the balance sheet date. Accounts receivable represents the historical amounts owed to the company by customers as a result of regular business operations. Many companies are unable to collect all of the receivables due from customers. In order to disclose the amount of the total receivables estimated to be collectible, companies deduct what is known as a *contra account.* A contra account has the opposite balance of the account from which it is subtracted. The specific account title might be "allowance for uncollectible accounts" or "allowance for bad debts", and its balance represents the portion of the total receivables that will probably not be collected. The expense related to this is shown on the income statement as *bad debt expense.* The net amount of accounts receivable shown is referred to as the *book value.* Other receivables commonly included on the balance sheet are notes receivable (due within one year) and interest receivable.

Inventory is shown next in the current asset section of the balance sheet. If the company is a retailer or wholesaler, this asset represents goods that a company has purchased for resale to its customers. If the company is a manufacturer, it will have as many as three different inventory accounts depending on the extent to which the goods have been completed.

Inventory classified as *raw materials* represents the basic components that enter into the manufacture of the finished product. For a tractor manufacturer, raw materials would include the engine, frame, tires, and other major parts that are directly traceable to the finished product. The second type of inventory for a manufacturer would be *goods in process.* This category represents products that have been started but are not fully completed.

After the goods are completed, they are included in the final inventory classification known as *finished goods.* The value assigned to inventory is either its current market price or its cost to the manufacturer, whichever is lower. This is a conservative attempt to show inventory at its original cost, or at its lower market value if it has declined in value since it was purchased or manufactured.

The final group in the current assets section of the balance sheet is *prepaid expenses.* This group includes prepayments for such items as office supplies, postage, and insurance for the upcoming year. The total for these items is shown at historical cost.

Fixed or Long-Term Assets. These assets differ from those listed under current assets because they are not intended for sale during the year following the balance sheet date; that is, they will be held for more than one year into the future. Such asset investments are classified under the headings of *held to maturity* for investments in debt instruments such as corporate or government bonds, and *available for sale* for investments in equity (stock) instruments of other companies or debt securities that will not be held to maturity.

Held-to-maturity investments are disclosed in the balance sheet at their *carrying value.* The carrying value is initially equal to the historical cost of the investment; this amount is adjusted each accounting period so that, when the investment matures, its carrying value will then be equal to its maturity value. These adjustments are included in the calculation of income for each accounting period.

Available-for-sale investments are adjusted to market value at the end of each accounting period, and these adjustments are included in the calculation of owners' equity.

Property. Sometimes listed under the expanded heading "property, plant, and equipment," this section of the balance sheet includes long-term, tangible assets that are used in the operation of the business. These assets have a long-term life and include such things as land, buildings, factory and office equipment, and computers. Land is listed first because it has an unlimited life and is shown at its historical cost. The other assets, such as buildings and equipment, are shown at book value. Book value is the original cost of the asset reduced by its total depreciation since being placed into service by a company. This net amount is frequently called net book value, and it represents the remaining cost of the asset to be depreciated over the remaining useful life of the asset.

Several methods are used to calculate depreciation (e.g., straight-line and accelerated), and each uses a mathematical formula to determine the portion of the original cost of the asset that is associated with the current year's operations. Note that depreciation is not an attempt to reduce a long-lived asset to its market value. Accountants use market value on the balance sheet when it is readily available and required for use by generally accepted accounting principles. However, in the case of many property items an unbiased estimate of market value

may not be available. As a result, accountants use the asset's historical cost reduced by the depreciation taken to date to indicate its remaining useful service potential.

Intangible Assets. Some long-lived assets of a company represent legal rights or intellectual property protections that are intangible by nature. Examples of this type of asset include a company's patents, copyrights, and trademarks. Each of these assets has a legally specified life and expires at the end of that period, although a few can be renewed. Accountants attempt to measure this decline in usefulness by amortizing the historical costs of these assets. This concept is the same as recording depreciation for items of tangible property discussed above.

One special type of intangible asset is known as *goodwill*. Goodwill is acquired when one company purchases another company and pays more than the estimated market value of the net assets held by the purchased company. The buying company might do this for a number of reasons, but it is often necessary in order to encourage the previous owners to sell and to guarantee that the acquisition is successful. The difference between the purchase price and the market value of the assets also can be attributed to intangible factors in the purchased company's success, such as proprietary processes or customer relationships. Like other intangible assets, the historical cost of goodwill is amortized over its future years. Historically, accounting rules set a maximum life of forty years for goodwill, but in the twenty-first century twenty years is often used as the maximum amount of time.

Other Assets. This final section covering the disclosure of assets on the balance sheet is a miscellaneous category that includes any long-lived asset that does not fit in any of the categories defined above. This category might include such assets as long-lived receivables (from customers or related companies) and long-lived prepaid insurance premiums (those paid for coverage beyond the next year from the balance sheet date). Another example is a deferred charge (such as a deferred tax asset), or an amount that has been prepaid based on generally accepted accounting principles and holds future benefit for the company.

LIABILITIES
Liabilities include current liabilities and long-term debt.

Current Liabilities. Current liabilities are debts that come due within one year following the balance sheet date. These debts usually require cash payments to another entity. They often have the word "payable" as part of their name. *Accounts payable* are amounts owed to suppliers by a company that has purchased inventory or supplies on a credit basis. *Interest payable* represents interest that has accrued on notes payable or other interest-bearing payables since the last payment was made by a company; this type of payable might be included in a general group known as accrued expenses. Other current liabilities include estimated warranty payments, taxes payable, and the current year's portion of long-term debt that is coming due within one year from the balance sheet date.

Long-Term Debt. Long-term debts are those that come due more than one year following the balance sheet date. They include bonds payable, mortgage payable, and long-term notes payable, all of which have a specific maturity date. *Deferred income taxes payable* might also be disclosed in this category. The latter item is rather technical and controversial; it arises when accounting rules used in preparing the financial statements for reporting to owners differ from rules used on income tax returns for income tax authorities. Deferred income taxes payable typically result from an item being deducted on the income tax return (as allowed by tax rules) before it is reported as an expense on the income statement (as allowed by generally accepted accounting principles). When these timing differences reverse in future years, the deferred income taxes payable category is removed as the actual payment to tax authorities is made.

OWNERS' EQUITY
This final section of the balance sheet is one of the most difficult to comprehend. It is known as stockholders' equity for a corporation and consists of several possible subdivisions: paid-in capital, adjustments for changes in value of certain investments in stocks of other companies, and retained earnings.

Paid-in capital discloses the investment made in the corporation by the stockholder-owners. It will include the amount paid into the corporation by the stockholders for different types of equity instruments that have been issued by the corporation, such as preferred stock equity and common stock equity. Paid-in capital usually is separated into two parts—the par value of the stock and the amount paid in excess of the par value—as required by generally accepted accounting principles.

The *adjustments for market value changes in available-for-sale investments in other companies* section is shown as a component of owners' equity. These adjustments also are reported in comprehensive income because they reflect a change in owners' equity that is not a part of net income. Changes in the value of trading securities, which are short-term investments, are included in the calculation of net income, whereas changes in value of available-for-sale securities are reported only in owners' equity and the statement of comprehensive income.

The last category usually found under the heading of owners' equity is *retained earnings.* This amount represents any earnings (or the difference between total net income and net loss) since the inception of the business that have not been paid out to stockholders as dividends.

Returning to the aforementioned accounting equation, a user of financial statements can better understand that owners' equity is the balancing amount. If assets are considered a company's resources, they must equal the "sources" from which they came. The sources for assets are a company's creditors (as seen in the total of the liabilities) and its owners (as seen in the total for owners' equity). As such, the retained earnings section does not represent a fund of cash; instead it represents the portion of each asset that is owned by the stockholders. The remaining portion of each asset is owed to creditors in the form of liabilities.

BALANCE SHEET SUMMARY

It is important to keep in mind that the balance sheet does not present a company's market value. Whereas some assets are presented at market value, others cannot be disclosed at market value because no such specific market value exists. The changes in the value of the assets that are required to be adjusted to market value for each balance sheet are included in either net income or comprehensive income, depending on the nature of the asset and the purpose for which management chose to acquire it.

Another important consideration about the balance sheet is the manner in which both assets and liabilities are separated into current and noncurrent groups. Not all companies will have all of the classifications discussed above, but all will have both current and noncurrent items. The user of the balance sheet studies this separation to compare a company's current liquidity needs and resources to its long-term solvency status.

In the early 2000s Enron and a number of other companies took advantage of *off-balance-sheet accounting* to appear stronger financially. Using off-balance-sheet accounting, a company does not have to include certain assets and liabilities in its balance sheet. These assets were "off-sheet" and thus, not considered part of the financial statements. In some types of off-balance-sheet accounting, companies move debt to a company called a special purpose entity (SPE)—as was the case with Enron—or a variable interest entity (VIE). Companies rarely use this practice anymore due to a requirement from the Financial Accounting Standards Board stipulating that companies must list SPEs on their balance sheets. This law as spelled out in Section 401(a) of the Sarbanes-Oxley Act (2002), which states that annual and quarterly financial reports must disclose all material off-balance-sheet transactions, arrangements, and obligations. While Sarbanes-Oxley has led to greater transparency in balance sheets, it is not a panacea; during the subprime mortgage crisis of 2007-2008, many banks interpreted the rules in such a way that risky loans were kept off their balance sheets.

Balance sheets are an important tool to help managers, lenders, and investors analyze a company's financial status and capabilities. They are particularly useful in helping to identify trends in the areas of payables and receivables. However, it is vital to remember that the document only presents a company's financial situation at a given point in time. It does not provide any information about the past decisions that helped the company to arrive at that point, or about the company's future direction or potential for success. For this reason, the balance sheet should be considered along with other required financial statements, as well as historical data, when evaluating a company's performance.

SEE ALSO *Cash Flow Analysis and Statement; Financial Issues for Managers; Financial Ratios; Income Statements*

BIBLIOGRAPHY

"Balance Sheets." *Business Owner's Toolkit.* 2005. CCH Tax and Accounting. Available from: http://www.toolkit.cch.com/text/P06_7035.asp.

"Basic Accounting: Balance Sheets." *BusinessTown.com.* Available from: http://www.businesstown.com/accounting/basic-sheets.asp.

Byrnes, Nanette. "The Downside of Disclosure: Too Much Data Can Be a Bad Thing. It's Quality of Information That Counts, Not Quantity." *Business Week,* 26 Aug. 2002, 100.

Davenport, Todd. "The Uneven Evolution of Accounting Standards." *American Banker,* 28 July 2004.

Moehrle, Stephen R and Jennifer A. Reynolds-Moehrle. "Say Good-Bye to Pooling and Goodwill Amortization." *Journal of Accountancy Online.* Available from: http://www.aicpa.org/pubs/jofa/sept2001/moehrle.htm

Norris, Floyd. "Off-the-Balance-Sheet Mysteries." *International Herald Tribune* 28 February 2008. Available from: http://www.iht.com/articles/2008/02/28/business/norris29.php

Obringer, Lee Ann. "How Cooking the Books Works." *HowStuffWorks.com.* Available from: http://money.howstuffworks.com/cooking-books3.htm

BALANCED SCORECARD

The balanced scorecard is a performance measurement tool developed in 1992 by Harvard Business School professor Robert S. Kaplan and management consultant David P. Norton. Kaplan and Norton's research led them to believe that traditional financial measures, like return on investment, could not provide an accurate picture of a company's performance in the innovative business

environment of the 1990s. Rather than forcing managers to choose between "hard" financial measures and "soft" operational measures—such as customer retention, product development cycle times, or employee satisfaction—they developed a method that would allow managers to consider both types of measures in a balanced way. "The balanced scorecard includes financial measures that tell the results of actions already taken," Kaplan and Norton explained in the seminal 1992 *Harvard Business Review* article that launched the balanced scorecard methodology. "And it complements the financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities—operational measures that are the drivers of future financial performance."

The balanced scorecard provides a framework for managers to use in linking the different types of measurements together. Kaplan and Norton recommend looking at the business from four perspectives: the customer's perspective, an internal business perspective, an innovation and learning perspective, and the financial (or shareholder's) perspective. Using the overall corporate strategy as a guide, managers derive three to five goals related to each perspective, and then develop specific measures to support each goal. Ideally, the scorecard helps managers to clarify their vision for the organization and translate that vision into measurable actions that employees can understand. It also enables managers to balance the concerns of various stakeholders in order to improve the company's overall performance. "The balanced scorecard is a powerful concept based on a simple principle: managers need a balanced set of performance indicators to run an organization well," Paul McCunn wrote in *Management Accounting*. "The indicators should measure performance against the critical success factors of the business, and the "balance" is the balancing tension between the traditional financial and nonfinancial operational, leading and lagging, and action-oriented and monitoring measures."

The popularity of the balanced scorecard has declined over the past few years. According to the *Financial Times*, it was adopted by 80 percent of large U.S. companies as of 2004, making it the nation's most popular management tool for increasing performance. However, the 2007 Management Tools and Trends survey by Bain & Company found that only 66 percent of executives used a balanced scorecard, and its satisfaction rating was significantly below average.

Even so, some companies have enjoyed considerable success using the balanced scorecard. Since Minneapolis-based electronics retailer Best Buy Co., Inc. implemented the balanced scorecard in 2003, its revenue, stock price, and dividends have risen dramatically. CFO Darren Jackson found that the company's performance culture has improved since they began linking their strategy with metrics, publishing the information and rewarding progress. Even CEO Brad Anderson's bonus is tied to customer-loyalty scores, employee-turnover improvement, and a metric called "customer centricity store revenue." According to Jackson, the balanced scorecard approach reinforces positive strategic outcomes.

Table 1
Balanced Scorecard

Financial Perspective

(How does the company appear to shareholders?)

Internal Business Perspective

(What are the critical business processes at which we must excel?)

Customer Perspective

(How does the company appear to customers?)

Innovation & Learning Perspective

(How can we continue to improve and create value?)
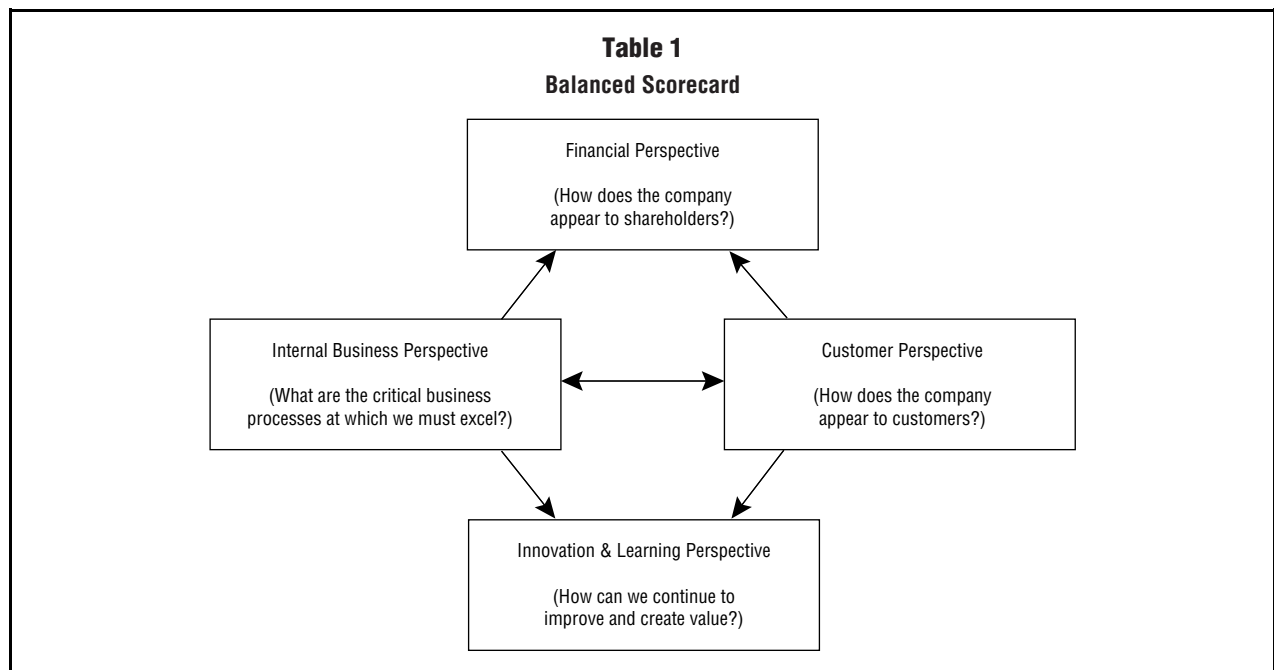
HISTORY OF THE BALANCED SCORECARD APPROACH

In 1990 Robert S. Kaplan, a professor of accounting at the Harvard Business School, and David P. Norton, co-founder of a Massachusetts-based strategy consulting firm called Renaissance Worldwide Inc., conducted a year-long research project involving twelve large companies. The original idea behind the study, as Anita van de Vliet explained in her 1997 article in *Management Today*, was that "relying primarily on financial accounting measures was leading to short-term decision-making, over-investment in easily valued assets (through mergers and acquisitions) with readily measurable returns, and under-investment in intangible assets, such as product and process innovation, employee skills, or customer satisfaction, whose short-term returns are more difficult to measure."

Kaplan and Norton looked at the way these companies used performance measurements to control the behavior of managers and employees. They used their findings to devise a new performance measurement system that would provide businesses with a balanced view of financial and operational measures. Kaplan and Norton laid out their balanced scorecard approach to performance measurement in three *Harvard Business Review* articles beginning in 1992. Before long, the balanced scorecard had become one of the hottest topics at management conferences around the world. In fact, the *Harvard Business Review* called it one of the most important and influential management ideas of the past 75 years. In 1996 Kaplan and Norton expanded upon their original concept in a book titled *The Balanced Scorecard: Translating Strategy into Action.* They followed up with two other books that further developed the approach: *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment* (2001) and *Strategy Maps: Converting Intangible Assets into Tangible Outcomes* (2004).

THE FOUR PERSPECTIVES

Kaplan and Norton's basic balanced scorecard asks managers to view their business from four different perspectives: the customer perspective, an internal business perspective, an innovation and learning perspective, and the financial or shareholder perspective. These perspectives are relevant to all types of businesses. However, additional perspectives also may be important in certain types of businesses. For example, a company in the oil industry might wish to incorporate an environmental regulation perspective. In this way, the balanced scorecard maintains some flexibility for companies with special needs to add other perspectives.

Customer Perspective. According to Kaplan and Norton, viewing a business from the customer perspective involves asking the question: "How do customers see us?" They contend that many companies in a wide range of industries have made customer service a priority. The balanced scorecard allows managers to translate this broad goal into specific measures that reflect the issues that are most important to customers. For example, Kaplan and Norton mention four main areas of customer concern: time, quality, cost, and performance. They recommend that companies establish a goal for each of these areas and then translate each goal into one or more specific measurements. Kaplan and Norton note that some possible measures, like percent of sales from new products, can be determined from inside the company. Other measures, like on-time delivery, will depend on the requirements of each customer. To incorporate such measures into the balanced scorecard, managers will need to obtain outside information through customer evaluations or benchmarking. Collecting data from outside the company is a valuable exercise because it forces managers to view their company from the customers' perspective.

Internal Business Perspective. The internal business perspective is closely related to the customer perspective. "After all, excellent customer performance derives from processes, decisions, and actions occurring throughout an organization," Kaplan and Norton wrote. "Managers need to focus on those critical internal operations that enable them to satisfy customer needs." Viewing a company from the internal business perspective involves asking the question, "What must we excel at?" Kaplan and Norton recommend focusing first on the internal processes that impact customer satisfaction, such as quality, productivity, cycle time, and employee skills. Using these critical processes as a base, managers should develop goals that will help the company to meet its customers' expectations. These goals should then be translated into measures that can be influenced by employee actions. It is important that internal goals and measures are broken down at the local level in order to provide a link between top management goals and individual employee actions. "This linkage ensures that employees at lower levels in the organization have clear targets for actions, decisions, and improvement activities that will contribute to the company's overall mission," the authors explained.

Innovation and Learning Perspective. In including the innovation and learning perspective in their balanced scorecard, Kaplan and Norton recognized that modern companies must make continual improvements in order to succeed in an intensely competitive global business environment. "A company's ability to innovate, improve, and learn ties directly to the company's value," they noted. That is, only through the ability to launch new products, create more value for customers, and improve operating

efficiencies continually can a company penetrate new markets and increase revenues and margins—in short, grow and thereby increase shareholder value. Accordingly, viewing a business from the innovation and learning perspective involves asking the question, "How can we continue to improve and create value?" Managers should establish goals related to innovation and learning, and then translate the goals into specific measures—such as increasing the percentage of the company's sales derived from new products.

Financial Perspective. Kaplan and Norton developed the balanced scorecard at a time when financial measures were increasingly coming under attack from management experts. Critics claimed that judging performance by financial measures encouraged companies to focus on short-term results and avoid taking actions that would create value over the long term. They also argued that financial measures looked backward at past actions rather than forward at future possibilities. Some experts told managers to focus solely on operational improvements and allow the financial performance to improve on its own.

Although these arguments convinced Kaplan and Norton to conduct their study of performance measurement, they found that financial controls are an important part of the puzzle. They claim that managers need to know whether or not their operational improvements are reflected in the bottom line. If not, it may mean that management needs to reevaluate its strategy for the business. "Measures of customer satisfaction, internal business performance, and innovation and improvement are derived from the company's particular view of the world and its perspective on key success factors. But that view is not necessarily correct," Kaplan and Norton wrote. "Periodic financial statements remind executives that improved quality, response time, productivity, or new products benefit the company only when they are translated into improved sales and market share, reduced operating expenses, or higher asset turnover."

Thus, the fourth perspective in the balanced scorecard asks the question: "How do we look to shareholders?" Some of the goals a company might set in this area involve profitability, growth, and shareholder value. The measures attached to these goals might include traditional financial performance measures, such as return on assets or earnings per share. Although these measures can prove misleading when taken alone, when incorporated into a balanced scorecard they can provide managers with valuable information about whether the strategy has contributed to bottom-line improvement. According to Kaplan and Norton, a common mistake for managers making large-scale operational improvements is failing to follow up with additional actions. For example, a company might undertake a quality improvement initiative which, when implemented successfully, creates excess capacity or makes certain employees redundant. Financial measurements will point out the need to make further changes.

DEVELOPING A BALANCED SCORECARD

Development of a balanced scorecard begins with the company's overall strategy or vision. It is important to consult with top management, rather than line managers, to obtain a clear picture of where the company wants to be in three to five years. The next step is to appoint a "scorecard architect" to establish the framework and methodology for designing the scorecard. With this framework in mind, the organization must define a linked set of strategic objectives that will lead the company toward top management's vision. These objectives should be true drivers of performance for the business as a whole, rather than a list of separate goals for business units or departments. It may be helpful to begin with the four perspectives included in the balanced scorecard model and then add more if needed, depending on the industry.

At this point, most companies will begin to involve line managers and staff members—and perhaps even customers—in establishing goals or objectives. The involvement might take the form of an executive workshop at which participants review and discuss the goals and appropriate measures. This approach builds consensus around the balanced scorecard and reduces the potential for unrealistic goals to be handed down from the top.

The strategic objectives provide a framework for managers to use in developing specific performance measures. "Most of the measures we use are not new, but they had been held in different silos, different boxes, in the organization," Rick Anderson, a performance analyst at BP Chemicals, told van de Vliet. "The [balanced scorecard] approach has brought existing measures onto one piece of paper, so everybody can relate to one area." The goals and measures in an organization's balanced scorecard can be broken down to provide custom scorecards for all business levels, even down to individual employees. These custom scorecards show how an employee's work activities link to the business's overall strategy. For incentive and compensation purposes, it is possible to assign weights to each measure based on its importance to the company and the individual's ability to affect it.

Once the balanced scorecard is in place, the next step is to collect and analyze the data for performance measurements. This data will enable the organization to see its strong performance areas, as well as areas for potential improvement. It is important to supply the performance data to employees, and to empower employees to find ways to sustain high performance and improve poor performance. Managers also must realize that the balanced scorecard is not set in stone. Experience in using the scorecard

may point out areas that should be modified or adapted. In addition, managers may find ways to tie the scorecard into other areas, such as budgets, resource allocation, compensation, succession planning, and employee development.

AVOIDING POTENTIAL PITFALLS

Numerous organizations have implemented some version of the balanced scorecard since its introduction in 1992. However, professor Claude Lewy of the Free University of Amsterdam found that 70 percent of scorecard implementations failed. Many companies are attracted by the power and simplicity of the balanced scorecard concept, but then find implementation to be extremely time-consuming and expensive. Lewy admits that the balanced scorecard can be an effective way of translating an overall strategy to the many parts of an organization. However, he stresses that organizations must have a clear idea of what they want to accomplish, and be willing to commit the necessary resources in order to successfully implement the balanced scorecard. Along with Lex Du Mee of KPMG Management Consulting, Lewy conducted a study of seven European companies and came up with what he called the Ten Commandments of Balanced Scorecard Implementation.

To ensure an effective balanced scorecard implementation, Lewy and Du Mee recommended that organizations obtain the commitment of a top-level sponsor, as well as relevant line managers. The balanced scorecard initiative must be the organization's top priority if implementation is to succeed. They also emphasized the importance of putting strategic goals in place before implementing the scorecard. Otherwise, the goals and measures included in the scorecard are likely to drive the wrong behavior. Lewy and Du Mee also suggested that organizations try a pilot program before moving on to full-scale implementation. Testing the balanced scorecard in a few key business areas enables managers to make necessary changes and increase support for the initiative before involving the entire company. It also is important to provide information and training to employees prior to an organization-wide rollout.

Lewy and Du Mee also warn managers against using the balanced scorecard as a way to achieve extra top-down control. Employees are unlikely to support the goals and measures if the scorecard is used as a "gotcha" by management. Another potential pitfall, according to the researchers, is trying to use a standardized scorecard. Instead, they stress that each organization must devote the time and resources to develop its own customized program. Lewy and Du Mee found that balanced scorecard implementation was more likely to fail when companies underestimated the amount of training and communication required during the introductory phase, or the extra workload and costs involved with periodic reporting later on. Even though the balanced scorecard appears to be a simple idea, implementing it is likely to mean huge changes in an organization.

SOFTWARE AND SUPPORT

Once the balanced scorecard has been implemented successfully, the next significant task involves collecting and analyzing measurement data. A "dashboard" is an executive information system user interface that collects data from numerous different computer systems throughout the organization and presents it in an easily readable format. A dashboard can obtain information from the local operating system in a computer, from one or more applications, and from one or more sites on the Web. Business dashboards are used to track corporate functions such as recruiting, human resource, sales, operations, and security. The content of a digital dashboard project might include key performance indicators and sales performance figures.

SEE ALSO *Performance Measurement; Strategy Formulation*

BIBLIOGRAPHY

————. *The Balanced Scorecard: Translating Strategy into Action.* Boston: Harvard Business School Press, 1996.

Cameron, Preston. "The Balancing Act: Even in Today's Volatile Economic Climate, Many Organizations Are Turning to the Balanced Scorecard to Help Steer Their Organization in the Right Direction." *CMA Management* 75, no. 10 (2002).

Fox, Justin. "Are Today's CFOs Batting a Thousand?" *Fortune* October 2006. Available from: http://money.cnn.com/magazines/fortune/fortune_archive/2006/10/30/8391732/index.htm.

"Giving the Boss the Big Picture." *BusinessWeek Magazine* February 2006. Available from: http://www.businessweek.com/magazine/content/06_07/b3971083.htm.

Kaplan, Robert S., and David P. Norton. "The Balanced Scorecard—Measures That Drive Performance." *Harvard Business Review* 70, no. 1 (1992): 71.

————. "Putting the Balanced Scorecard to Work." *Harvard Business Review* 71, no. 5 (1993).

————. *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment.* Boston: Harvard Business School Press, 2001.

————. *Strategy Maps: Converting Intangible Assets into Tangible Outcomes.* Boston: Harvard Business School Press, 2004.

————. "Using the Balanced Scorecard as a Strategic Management System" *Harvard Business Review* 74, no. 1 (1996): 75.

Lester, Tom. "Measure for Measure: The Balanced Scorecard Remains a Widely Used Management Tool, but Great Care Must Be Taken to Select Appropriate and Relevant Metrics." *The Financial Times* 6 October 2004.

Lewy, Claude, and Lex Du Mee. "The Ten Commandments of Balanced Scorecard Implementation." *Management Control and Accounting* April 1998.

McCunn, Paul. "The Balanced Scorecard...the Eleventh Commandment." *Management Accounting* 76, no. 11 (1998): 34.

Rigby, Darrell. *Management Tools and Trends* Boston: Bain & Company, 2007. Available from: http://www.bain.com/

management_tools/Management_Tools_and_Trends_2007.pdf.

van de Vliet, Anita. "The New Balancing Act." *Management Today* July 1997, 78.

Williams, Kathy. "What Constitutes a Successful Balanced Scorecard?" *Strategic Finance* 86, no. 5 (2004).

BANDWIDTH

Bandwidth deals with how information passes through electronic systems. Since today's business world relies heavily on online communication, Internet research, and intranet resources, bandwidth is a primary concern in emerging technologies. When technicians speak of gaining or needing bandwidth, they are referring to the ability to transmit more information through the online connections. Many measurements involving bandwidth are also important to companies, such as how much data is transmitted in a continuous flow and how much data can be transmitted over a particular time.

FACTORS AFFECTING BANDWIDTH

Bandwidth can be used in a very broad definition; in this manner, it often refers to any need for more time, information, and space. In a connotative sense, bandwidth can mean the number of employees in a given department or the time constraints on a particular project. The narrow meaning of the word bandwidth is the electrical capacity, either analog or digital. In analog channels the rate is defined in hertz, the difference between higher and lower frequencies. In digital channels, the rate is defined by bits per second.

Company bandwidth, no matter how it is received, can be limited by several different factors, most notably the relationship between what online applications the company is using and the services and technology cable and DSL (digital subscriber line) providers offer. There are several important terms used in describing bandwidth space and a company's use of it:

- *Bottleneck link bandwidth*. This is the maximum rate data can travel in a given online system, from the source to the end receiver. This definition assumes that the data is traveling on the slowest possible path between its destinations.

- *Surplus available bandwidth*. This is the amount of bandwidth left over after the company has used all of its available bandwidth in the bottleneck link scenario. Businesses often deal with this concept since they have multiple applications and have usually purchased a large amount of bandwidth from their provider.

- *Fair-share available bandwidth*. A company rarely reaches and surpasses this level of use, unless it is pursuing aggressive or inappropriate bandwidth usage that drowns out other users and creates a state of congestion along the provider's line. Fair-share bandwidth is the maximum amount any business should plan on using, an amount that neither interferes with online communication traffic nor consumes too much space for company usage.

- *Protocol-dependent available bandwidth*. Based on what applications it is using, this is the amount of bandwidth a company should expect to take. This number may be produced by an agreement with the server or as a natural result of business expectations. The protocol-dependent bandwidth is how much bandwidth the company needs to run, and it lies somewhere between surplus bandwidth and fair-share bandwidth.

GENERAL GUIDELINES ABOUT BANDWIDTH USAGE

Despite the increasing availability of high-speed Internet connections and new ways of transferring data, bandwidth consumption remains a concern for many Internet providers, and businesses should be careful when purchasing and using their bandwidth so that they are not subject to penalties or sudden price adjustments. Consumption should be carefully monitored; this can be done with a simple program that can be bought or downloaded for free from certain Web sites. Bandwidth use should also be plotted over time so that companies can see if there are any sudden changes and where those changes may have come from. It is possible that employees, attracted by the high-speed connection offered by their company, will use company bandwidth for personal downloads, which can use a large amount of available space. There are bandwidth-management systems that can be put into place to automatically regulate Internet usage and help undo such problems.

Some business analysts have concerns, which are summed up by Tim Wu in a 2008 article, "OPEC 2.0." In this piece, Wu theorizes that bandwidth may become another scarce, necessary commodity, in the same way that oil is today. Wu points to the control of bandwidth in the hands of only a few companies, and the growing need for bandwidth to run information-driven societies, as signs of this trend. However, current bandwidth rates are neither high enough or consequential enough to prove this theory, and although most businesses depend on online interaction of some type, restrictions regarding the flow of information have not yet hampered overall productivity.

BIBLIOGRAPHY

"Bandwidth." *Techweb,* 2008. Available from: http://www.techweb.com/encyclopedia/defineterm.jhtml?term=BandWidth.

Polinksy, Sue. "Bandwidth Throttling and Small Businesses." *Download Squad.* 2008. Available from: http://www.downloadsquad.com/2008/06/02/bandwidth-throttling-and-small-business/.

Pujolle, G., Harry Perros, and Serge Fdida. *Networking 2000.* New York: Springer Publishing, 2000.

Wu, Tim. "OPEC 2.0." *New York Times.* 30 July 2008.

BAR CODING AND RADIO FREQUENCY IDENTIFICATION

A bar code is a series of parallel black bars and white spaces, both of varying widths. Bars and spaces together are called *elements.* Different combinations of the bars and spaces represent different characters, such as numbers or letters. Each combination or sequence of bars and spaces is a code that can be translated into information such as price, product type, place of manufacture, or origin of shipment.

Bar codes are simple to use, accurate, and quick. Almost everyone is familiar with their use in retail establishments. They also often are used in warehouses and manufacturing for selecting items from storage, receiving goods, and shipping.

In the 1950s, two men, Bernard Silver and Norman Woodland, took out a patent on the bar-code concept. In the 1960s Kroger attempted the use of bar codes in its retail stores. Though they first envisioned a classification system based on a mark of concentric circles, the standard bar code system—developed in 1970—used the lines and spaces people are most familiar with today. This system was known as UGPIC, the Universal Grocery Products Identification Code. Through the 1970s and 1980s, bar codes became more and more common, adopted by both industries and government.

Few bar-code uses are regulated. However, according to requirements established by the FDA in 2004, "certain human drug and biological product labels" must include a specific amount of information, often placed on the container but at times micro-stamped onto the medication itself. This code must include the drug's National Drug Code (NDC). This is mostly to prevent theft and mistake at hospitals. Such bar-code requirements issued by government departments are currently established for the safety of the public.

HOW BAR CODING WORKS

The bar code itself does not actually contain detailed information. The bar code simply provides a reference number that cues a computer to access information. A bar-code reader is required to read a bar code. Bar-code readers may be fixed, portable batch, or portable RF. Fixed readers are attached to a host computer and terminal, and transmit one item at a time as the data is scanned. Battery-powered portable batch readers store data into memory for batch transfer into a host computer at a later time. The portable RF reader can transmit data in real-time, online.

Scanners and Decoders. The basic reader consists of a scanner and a decoder. Scanners capture the image of the bar code, and the decoder takes the digitized bar space patterns, decodes them, and transmits the decoded data to the computer.

There are several types of scanners. Laser scanners use a single spot of light to sweep across the bar code in a linear fashion. CCD scanners use an LED array with thousands of light detectors; the entire bar-code image is captured and then transmitted. Automatic scanners are in a fixed position and read bar codes as they go by on a conveyor. Handheld scanners, such as wands, are portable and may be carried from place to place, as in a warehouse.

When a scanner is passed over the bar code, the dark bars absorb the scanner's light while the light spaces reflect it. A photocell detector receives the reflected light and converts it into an electrical signal. A low electrical signal is created for the reflected light and a high electrical signal is created for the dark bars. The width of the element determines the duration of the electrical signal. The decoder then decodes the signal into the characters represented by the bar code and passes it to a computer in traditional data format.

TYPES OF BAR CODES

There are different types of bar codes. Some bar codes are entirely numeric, whereas others have numeric and alphabetic characters. The type used is dependent upon the implementation, the data that needs to be encoded, and how the bar code is to be printed. There are several bar code standards, called symbologies, each serving a different purpose. Each standard defines the printed symbol and how the scanner reads and decodes the printed symbol.

While America used the Uniform Product Code (UPC) during most of its bar-code history, this code has been replaced in recent years by the EAN/UCC-13 code, which is becoming the international standard for bar coding. The EAN/UCC-13 code is comprised of three different parts: a company prefix, a supplier number, and a check digit. Together, these equal thirteen numbers, although when transferred to older formats such as GTIN (Global Trade Item Number), a zero is presumed at the beginning of the code. This standardized code has been an important step in business globalization.

In certain industries dominated by their own classification systems, the use of EAN/UCC-13 has lead to some internal modifications. An excellent example of this

would be the publishing industry, which uses ISBN codes that can be scanned as bar codes. At the beginning of 2007, ISBN codes began to be transferred over to ISBN-13s. If UPC codes are still active in such industries, they are treated as the new 13-series code.

RFID

Radio frequency identification (RFID) could become the most far-reaching wireless technology since the cell phone. RFID is a method of remotely storing and retrieving data using a small object attached to or incorporated into a product. Its purpose is to enable data to be transmitted via a portable device called a tag, read by a reader, and processed according to the needs of the particular application.

Transmitted data may provide information about product location, or specifics such as color, price, or purchase date. In some systems, a return receipt can be generated. RFID tags contain far more detailed information than can be placed on a bar code. Some tags hold enough information to provide routing information for shipping containers, as well as a detailed inventory of what is inside the container.

It is said the origins of RFID technology began with the use of radar in World War II, when armies began searching for ways to identify incoming vessels as friend or enemy. According to the 2008 RFID Journal, the first patents for true RFID technology were taken out in the 1970s, most notably by Mario Cardullo. At the same time, the government was working on radio identification technology to guard high-level security sites and to mark livestock for the agriculture department. In the 1990s, RFID systems developed by IBM and Intermec began to be used commercially, though the expense kept many companies from entering the field.

An RFID system consists of tags, tag readers, tag programming stations, circulation readers, sorting equipment, and tag inventory wands. The tag is the key component. Data can be printed or etched on an electronic substrate and then embedded in a plastic or laminated paper tag.

Tags are classified according to their radio frequency: low-frequency, high-frequency, UHF, and microwave. Low-frequency tags are commonly used in automobile antitheft systems and animal identification. High-frequency tags are used in library books, pallet tracking, building access, airline baggage tracking, and apparel tracking. Low- and high-frequency tags can be used without a license. UHF tags are used to track pallets, containers, trucks, and trailers. UHF cannot be used globally as there is no one global standard. Microwave tags are used in long-range access, such as General Motors' OnStar system.

While most RFID tags are write-once/read-only, there are some that offer read/write capability. These tags would allow tag data to be rewritten if need be.

Tags may either be passive or active. Passive tags do not have their own power supply; their power comes from a minute electrical current induced by an incoming radio-frequency scan. In contrast, active tags have their own power source. The lack of a power source makes the passive tag much less expensive to manufacture and much smaller (thinner than a sheet of paper) than an active tag. As a result, the vast majority of RFID tags are passive. However, the response of a passive tag is typically just an ID number. Active tags have longer ranges, the ability to store more information, and they are more accurate and reliable.

The tag contains a transponder with a digital memory chip with a unique electronic product code. A stationary or handheld device called an interrogator, consisting of an antenna, transceiver, and decoder, emits a signal creating an electromagnetic zone. When a tag comes within the range of a reader, it detects an activation signal that causes the tag to "wake up" and start sending data. The reader captures the data encoded in the tag's integrated circuit, decodes it, and sends it over a network to a host computer for processing.

THE ADVANTAGES OF RFID OVER BARCODING

RFID tags can contain far more detailed information than bar codes. Bar codes require a clear line of sight between the scanner and the bar code, a need that is absent from the RFID. Also, it is possible to scan only one bar code at a time. Within the field of a reader, hundreds of RFID tags can be read within seconds. RFID codes are long enough that every RFID tag may have a unique code, allowing an individual item to be tracked as it changes location. Bar codes are limited to a single code for all stages of movement of a particular product.

The foremost problem with widespread RFID use is cost. Many companies cannot afford the expenses associated with RFID technology, and would not see a large enough gain in efficiency to implement the system. According to David Gulbransen at *InformIT*, a single RFID scanner costs anywhere from several hundred to several thousand dollars, and multiple scanners would be needed for many companies. The tags themselves range in usability. As of 2008, active ID tags cost anywhere from $0.75 to $3.00, and the cheaper, more common, passive tags can cost $0.25 to $0.50, though the technology is improving. Some experts contend that costs for the tags will need to reach an estimated $0.10 per tag before RFID use can spread much further.

Some companies hope to achieve greater profits and a better return on investment (ROI) immediately after switching from bar-coding to RFID technology. However, a 2006 study by RFID Solutions and Strategy of the Manhattan Associates showed that this is not necessarily the case. Organizations that already have an efficient system of bar codes may actually lose some of their efficiency when

transferring to the new protocols required by RFID systems. Only in companies where manual scanning takes time and manpower would RFID systems make a noticeable difference. As Greg Gilbert, Director of RFID Solutions and Strategy, points out, merely analyzing the possible savings of RFID technology allows companies to find alternative methods to save time and increase ROI, such as the elimination of costly paper trails or the conservation of manufacturing space.

RFID USES

Once established, RFID technology began to be picked up by a myriad of different industries. According to Das and Harrop, in their 2008 analysis and forecast of RFID technology, 2008 should see some 325 million RFID tags in use. Das and Harrop divide the uses of RFID into the two separate tags, passive and active.

The uses for passive tags include:

- Drugs
- Other healthcare
- Retail apparel
- Consumer goods
- Tires
- Postal
- Books
- Manufacturing parts, tools
- Archiving
- Military
- Retail CPG pallet/cases
- Smart cards, smart tickets, etc.
- Air baggage
- Animals
- Vehicles
- People

The uses for active RFID Tags include:

- Pharmacy
- Cold retail supply Chain
- Consumer goods
- Postal
- Shelf edge labels
- Conveyances/rollcages
- Vehicles
- People
- Car clickers

More specific examples include using RFID tags at toll booths for electronic toll collection, using cash cards imbedded with RFID technology, putting RFID tags on prisoners (as is done in the Ohio Dept. of Rehabilitation and Correction), using RFID to monitor expirable foods, and using RFID technology to create paper money to stop counterfeiting, as is done in some parts of Europe.

The *RFID Journal* gives examples of several companies that have used RFID systems to transform they way they do business. The BHP Billiton Mitsubishi Alliance, for instance, uses radio tags to track miners and mining equipment during work hours, to better ensure the safety of their employees. A Seattle sushi chain, Blue C, is using RFID technology to ensure the constant freshness of their sushi dishes. Nordam, which creates airplane parts, uses RFID tags to track its precision molds during the manufacturing process. Stafford Tower Crane tags all of its cranes to make sure the right equipment is at the right job site The list grows each day as more and more companies find new and cost-saving ways to use RFID technology.

CONTROVERSY OVER RFID USE

The use of RFID has caused some concern for privacy advocates. They feel that it may be a privacy violation for a consumer unaware of the presence of an RFID tracking tag, or if they are unable to remove or deactivate it. Other concerns revolve around the ability to fraudulently or surreptitiously read a tag from a distance, and the ability to identify a purchaser through the use of a credit card or a loyalty card.

In Seattle, a University of Washington team is carrying out an experiment designed to analyze the possible negative effects of RFID use. Begun in 2008, the project involves various students and faculty wearing radio tags that can be monitored to see where they go, who they meet with, and how long they stay in particular areas. The idea is to see where RFID technology proves useful in tracking social interaction, and where the system breaks down in dangerous ways. While such technology can be used to monitor employee performance, it can also be unnecessarily invasive and—according to *Seattle Times* reporter Kristi Helm—"a bit like Big Brother."

RFID advocates, however, feel that opposition will lessen as RFID use becomes more widespread and its use across a wide range of industries becomes apparent.

A more active field of concern for RFID technology is patent infringement. As more industries attempt to create or use radio tagging, more targets are created for lawsuits. In 2004 a lawsuit battle began between Intermec, one of the first RFID suppliers, and Matrics, another RFID company. After a series of counter lawsuits these two companies eventually settled. In 2005 Intermec sued another company, Alien Technology, for multiple patent

infringements, which again led to prolonged litigation involving more than one company. Many suppliers of RFID technology wait for a series of standards and trends to be set regarding RFID distribution and application that will bring an end to such problems.

SEE ALSO *Distribution and Distribution Requirements Planning; Logistics and Transportation; Reverse Supply Chain Logistics; Supply Chain Management; Warehousing and Warehouse Management*

BIBLIOGRAPHY
"Avery Dennison Corporation vs. Alien Technology Corporation." *RFC Express.* Available from:www.rfcexpress.com/lawsuit.asp?id=34974, 2008.

"Bar-coding for Beginners & Bar Code FAQ." IDAutomation.com, Inc. Available from: http://www.idautomation.com/barcoding4beginners.html.

"Bar Code 1." *Adams Communication,* 2007. Available from: http://www.adams1.com/.

Brewin, Bob. "Radio Frequency Identification." *ComputerWorld,* 16 December 2002.

Center for Biologics Evaluation and Research. "Guidance for Industry: Bar Code Label Requirement—Questions and Answers." *U.S. Food and Drug Administration,* Available from: http://www.fda.gov/CbER/gdlns/barcode.htm.

Corcoran, Cate T. "Wal-Mart's Mandate: The Retailer's RFID Initiative Generates Mixed Signals." *Women's Wear Daily* 189, no. 8 (2005): 16B.

Coyle, John J., Edward J. Bardi, and C. John Langley, Jr. *The Management of Business Logistics.* Mason, OH: Thomson South-Western, 2003.

Das, Raghu, and Dr. Peter Harrop. "RFID Forecasts, Players & Opportunities 2008-2018." *ID TechEx* Available from: http://www.idtechex.com/products/en/view.asp?productcategoryid=151.

"EAN/UCC-13." *Swing Labels.* Available from: http://www.swinglabels.com/barcodes/eanucc13.asp.

Forcinio, Hallie. "Prepare for Barcoding." *Pharmaceutical Technology* 28, no. 5 (2004): 38–43.

Gilbert, Greg. "Reality Check: Debunking the 10 Biggest Myths of RFID." *Microsoft Corporation.* Available from:www.microsoft.com/industry/retail/businessvalue/rsdebunkingrfidmyths1.mspx.

Glover, Tony. "RFID Tags Could Be the Saviour of Supply Chain Management." *MicroScope,* 11 October 2004, 12.

Gulbransen, David. "RFIDs: Technology Friend or Foe?" *informIT* Available from: http://www.informit.com/articles/article.aspx?p=378140.

Helm, Krisit. "UW team researches a future filled with RFID chips." *Seattle Times: Business and Technology* http://seattletimes.nwsource.com/html/businesstechnology/2004316708_rfid31.html. March 31 2008.

In-Stat. "RFID Tag Market to Approach $3 Billion in 2009." Available from: http://www.instat.com/newmk.asp?ID=1206.

"The ISBN-13 and the Transition to EAN/UCC-13." *Book Industry Study Group.* Available from:www.bisg.org/news/news_isbn_what.html.

Mayfield, Kendra. "Radio ID Tags: Beyond Barcodes." *Wired News,* 20 May 2002.

"Market Research into RFID." *Printing World,* 3 March 2005, 46.

"Organic RFID Tags." *R&D* 47, no. 2 (2005): 17.

Power, Denise. "RFID Eyed to Thwart Counterfeiting." *Women's Wear Daily* 189, no. 49 (2005): 16B.

RFID Journal. "The History of RFID Technology." *RFID Journal: The World's RFID Authroity.* Available from: http://www.rfidjournal.com/article/articleview/1338/2/129/.

"RFID Report." *Supply Chain Management Review* 9, no. 2 (2005): 60.

Spiegel, Robert. "Barcoding: An Extra Digit for Logistics." *Logistics Management* 442, no. 6: 44.

Worth Data. "Bar Code Basics." Available from: http://www.Barcodehq.com/primer.htm.

BARRIERS TO ENTRY

Barriers to entry are any hindrance (market, technological, legislative, or competitive) that can block an entrepreneurial business from entering the business world and finding customers. Some barriers to entry are natural to their markets, while others can develop in certain economies or business environments.

BARRIERS AND E-COMMERCE

Many barriers to entry have changed in the current business world, where electronic communication has altered the way companies can reach customers and each other. This makes online business a very important part of the market, as e-commerce can eliminate many barriers to entry and let even small companies enter markets that would not be available to them otherwise. However, some markets—especially those not connected to Internet applications—are still traditionally difficult to enter. A small company, for instance, cannot establish a brick-and-mortar financial company at an elite city block; such a company would still be hampered by availability, cost, and materials. Even if they were able to establish such an office, they might have trouble finding customers with a new business that has no prestige. Online, however, such a business would be able to establish the same sort of financial services by creating a professional Web site offering tailored assistance, and they could potentially perform successfully at far less cost.

However, the rise of online business has raised other barriers to entry even as it brings down older ones. As social networking and other Web 2.0 applications become increasingly important to successful e-retailing, e-marketing, and online services, new barriers are being set into place. Internet businesses must have an understanding of online applications to become successful, and these applications are growing in number and complexity. The concept of relational businesses applies to the online world as well, and the more companies that enter into e-commerce,

the more necessary it becomes to develop relationships with other online companies.

TYPES OF BARRIERS TO ENTRY

Barriers to entry can be divided into different categories based on their source and effects. These categories include:

- **Economies of scale**. The larger a company becomes, the more easily it can produce and manufacture while saving costs. Large businesses can buy in bulk and receive discounts, produce in bulk at less cost, and access suppliers or distributors that smaller businesses would not be able to reach.

- **Capital requirements**. A new business will probably be low on funding, and capitalists will be less willing to invest in entrepreneurial endeavors than in established and successful companies. Raising enough capital to properly start a business is one of the first and most daunting barriers to entry.

- **Access to suppliers**. Relationships with suppliers are usually set up via contract, which is preceded by negotiations. Large and reliable suppliers are more likely to sign with dependable businesses that have proven their stability, rather than starting companies. Finding a supplier may cost extra time and money, and many suppliers will not be able to offer their discounts and deals to smaller organizations.

- **Access to customers**. Customers, like suppliers, prefer to use a business that has been around for a while and can prove its success and stability. In a well-established market, customers need good reasons to switch from current companies to someone new.

- **Product perception**. Brand loyalty will keep some customers depending on the old suppliers. New companies must market their products and create their own brand loyalty in order to succeed in competitive markets.

- **Government legislation**. Official regulation and requirements can make it difficult to enter some markets, especially those in which there is little competition or those that have strict standards, such as health industries.

- **Asset specificity**. This refers to special skills or technology that is needed to succeed in a particular market. A business must learn these skills and buy this technology in order to enter the market.

- **Patents**. Some markets are dependent on patents to secure technology and protect privacy. If a new business does not have any innovative procedures or products, they may struggle.

Despite such difficulties, there are always entrepreneurs and start-up companies that are able to harness new technologies or invent innovative business practices as a way to circumvent the barriers to entry that exist in a particular market.

BIBLIOGRAPHY

"Barriers to Entry," *CBR.* 2008. Available from: http://www.computerbusinessreview.com/article_cbr.asp?guid=D5E49397-E357-472E-B2C2-F90AC603B1F2.

Brodsky, Norm. "Barriers to Entry." *Inc.com,* 2008. Available from: http://www.inc.com/magazine/20011001/23475.html.

Heslop, Andrew. *How to Value and Sell Your Business.* London: Kogan Page Publishers, 2008.

Steffan, Belinda. *Essential Management Accounting.* London: Kogan Page Publishers, 2008.

BASES OF POWER

SEE *Leadership Styles and Bases of Power*

BENCHMARKING

Benchmarking is the process through which a company measures its products, services, and practices against its competitors, or those companies recognized as leaders in its industry. Benchmarking is a management tool for determining whether the company is performing particular functions and activities efficiently, whether its costs are in line with those of competitors, and whether its internal activities and business processes need improvement. The objective of benchmarking is for management to identify the practices that are most successful in the marketplace and to incorporate those techniques into the operation of their business.

Benchmarking focuses on company-to-company comparisons of how well basic functions and processes are performed. Among many possibilities, it may look at how materials are purchased, suppliers are paid, inventories are managed, employees are trained, or payrolls are processed; at how fast the company can get new products to market; at how the quality control function is performed; at how customer orders are filled and shipped; and at how maintenance is performed.

Benchmarking enables managers to determine what the best practice is, to prioritize opportunities for improvement, to enhance performance relative to customer expectations, and to leapfrog the traditional cycle of change. It also helps managers to understand the most accurate and efficient means of performing an activity, to learn how lower costs are achieved, and to take action to improve a company's cost competitiveness.

Companies usually undertake benchmarking to obtain a competitive advantage by reducing labor cost, streamlining the work flow through reengineered business processes and common administrative systems, improving data center operations through consolidation and downsizing, implementing new technology, outsourcing some assignments and functions and redesigning the development and support processes.

BENCHMARKING BASICS

The goal of benchmarking is to identify the weaknesses within an organization and improve upon them, with the idea of becoming the "best-in-class." The benchmarking process helps managers to find gaps in performance and turn them into opportunities for improvement. Benchmarking enables companies to identify the most successful strategies used by other companies of comparable size, type, or regional location, and then adopt relevant measures to make their own programs more efficient. Most companies apply benchmarking as part of a broad strategic process. For example, companies use benchmarking in order to find breakthrough ideas for improving processes, to support quality improvement programs, to motivate staffs to improve performance, and to satisfy management's need for competitive assessments.

Benchmarking targets roles, processes, and critical success factors. Roles are what define the job or function that a person fulfills. Processes are what consume a company's resources. Critical success factors are issues that a company must address for success over the long-term in order to gain a competitive advantage. Benchmarking focuses on these things in order to point out inefficiencies and potential areas for improvement.

There are many motivators that drive the different types of benchmarking. Application benchmarking and infrastructure benchmarking, for example, use such motivators as cost, quality, competition, and goal setting. An advantage of benchmarking is that it facilitates the process of change, clearly laying out the types of solutions external organizations have used and providing a global perspective on how part of the company affects the whole. It further helps focus improvement in the areas where actual gains can be made, which translate into value added to the company as well as its employees.

Benchmarking can be used at any time, but is usually performed in response to needs that arise within a company. According to C.J. McNair and Kathleen H.J. Leibfried in their book *Benchmarking: A Tool for Continuous Improvement*, some potential "triggers" for the benchmarking process include:

- Quality programs
- Cost reduction/budget process
- Operations improvement efforts

- Management change
- New operations/new ventures
- Rethinking existing strategies
- Competitive assaults/crises

Methodology. Benchmarking involves selecting a product, process, or service to benchmark, and then identifying the key performance metrics for that particular function. A metric is a quantitative measure that is used as a reference point for comparisons. The analysis can take the form of vertical or horizontal benchmarking. Vertical benchmarking is where the focus is placed on specific departments or functions, while horizontal benchmarking is where the focus is placed on a specific process or activity.

There are four main approaches to benchmarking, including strategic benchmarking, functional benchmarking, best practices benchmarking, and product benchmarking. Strategic benchmarking compares different companies' strategies with particular reference to process capability, technology portfolio, and product line. Functional benchmarking analyzes the performance of core business functions, whereas best practices benchmarking breaks the function down into discrete targets for comparison with the industry leaders. It is a more focused study than functional benchmarking in that it assesses business processes and the management techniques behind them. Finally, product benchmarking, also known as reverse engineering or competitive product analysis, assesses competitor costs, product concepts, and alternative designs by dissecting competitors' products.

After isolating the aspect of the company to be benchmarked, the managers choose what they will measure the function against. Internal benchmarking is the analysis of existing practices within various departments or divisions of the organization, looking for best performance as well as identifying baseline activities and drivers. Competitive benchmarking looks at a company's direct competitors and evaluates how the company is doing in comparison. Knowing the strengths and weaknesses of the competition is not only important in plotting a successful strategy, but it can also help prioritize areas of improvement as specific customer expectations are identified. Industry benchmarking is a more trend-based approach. Because of its broad scope, it is primarily used by companies to establish performance baselines.

Once an internal department or another company has been selected to benchmark against, management collects data about its practices and performance. Benchmarking uses different sources of information, including published material, trade meetings, and conversations with industry experts, consultants, customers, and marketing

representatives. Databases such as APQC.org from the non-profit American Productivity and Quality Center contain performance indicators for thousands of different companies. Management analyzes the data and identifies the best practices. Once the opportunity for improvement has been observed, the managers must implement the necessary changes and monitor subsequent performance.

SUCCESSFUL BENCHMARKING

According to a 2007 Bain and Company survey, benchmarking received the fourth-highest usage score (81%) among more than two dozen management tools used by senior executives around the world. The survey also reported that users tend to be highly satisfied (rated 3.8 on a 5-point scale) with the results benchmarking provides to their companies.

There are several keys to successful benchmarking. Management commitment is one that companies frequently name. Since management from top to bottom is responsible for the continued operation and evaluation of the company, it is imperative that management be committed as a team to using and implementing benchmarking strategies. A strong network of personal contacts and an open mind to new ideas are other keys. In order to implement benchmarking at all stages, there must be a well-trained team of people in order for the process to work accurately and efficiently. Based on the information gathered by a well-trained team, there must also be an effort toward continuous improvement. Other keys include a benchmarking process that has historical success, sufficient time and staff, and complete understanding of the processes to be benchmarked.

In almost any type of program that a company researches or intends to implement, there must be goals and objectives set for that specific program. Benchmarking is no different. Successful companies determine goals and objectives, focus on them, keep them simple, and follow through on them. As in any program, it is always imperative to gather accurate and consistent information. The data should be understood and should be able to be defined as well as measured. The data must be able to be interpreted in order to make comparisons with other organizations. Lastly, keys to successful benchmarking include a thorough follow-through process and assistance from consultants with experience in designing and establishing such programs.

SEE ALSO *Competitive Advantage; Continuous Improvement; World-Class Manufacturer*

BIBLIOGRAPHY
APQC Process Classification Framework Houston: American Productivity and Quality Center, 2007. Available from: http://www.apqc.org/portal/apqc/ksn/PCF_5x.pdf?paf_gear_id= contentgearhome&paf_ dm=full&pageselect=contentitem& docid=152203.

Engle, Paul. "World-Class Benchmarking." *Industrial Engineer* August 2004.

Greene, Charles B. *Benchmarking the Information Technology Function.* New York: The Conference Board, 1993.

Mard, Michael J., et al. *Driving Your Company's Value: Strategic Benchmarking for Value.* New Jersey: John Wiley, 2004.

McNair, C.J., and Kathleen H.J. Leibfried. *Benchmarking: A Tool for Continuous Improvement.* Harper Business, 1992.

Powers, Vicki. "Boosting Business Performance through Benchmarking." *Financial Executive* November 2004.

Rigby, Darrell. *Management Tools and Trends* Boston: Bain & Company, 2007. Available from: http://www.bain.com/management_tools/Management_Tools_and_Trends_2007.pdf.

Tirbutt, Edmund. "Brimming with Confidence: Benchmarking Your Perks against Your Rivals' Can Provide HR with Added Reassurance." *Employee Benefits* November 2004.

BEST PRACTICES

In a general sense, the term best practice refers to the most efficient way of doing something. The fastest method that uses the least resources (including labor and parts) to create the highest quality output is the "best practice." Almost every thinkable industry has adopted best practices in some aspect of its processes, but those that have made use of it successfully and publicly have typically done so in the fields of technology development, quality control, project management, teaching (on the college and secondary circuits), manufacturing, healthcare, and sales.

What was once considered plain "good sense" in many corporate spheres can now often be referred to as best practice, making the phrase seem inconsequential or part of corporate pop culture to opponents who would rather stick to common sense approaches and hard work. Best practice, therefore, can be seen as still in its infancy in terms of truly determining what it defines and for whom. For now, best practice is a way to describe the best ideas for the successful completion of specific jobs during actual application. It would be hard to oppose this kind of simple sense in any industry, but opponents of the term "best practice" oppose it on the basis that for some it has become an umbrella under which what is best for a particular agenda is the objective, not what is best overall. For example, a construction company that subcontracts a friend's bulldozer company for a kickback may be seen as best practice for both friends, but it would not be considered a best practice for those paying for the construction.

Best practice is also the outgrowth of the standard of good practice (SoGP) and benchmarking, both of which are highly organized methodologies. As it applies to business in general, best practice itself is optimally executed

using the tenets established by Robert Camp in his 1989 text "Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance."

PHASES OF IMPLEMENTATION

Planning. Some consider the planning phase of benchmarking or best practice to be the step in which a firm decides what, exactly, it would like to improve within its process. Where does the problem begin? Where does it end? What are the frequent complaints among workers and managers? Once these questions are answered, a more concrete plan of what needs to be done to have the best practice possible for the particular phase of production or creation can be conceived.

In this initial phase of creating a best practice for any aspect of a firm's process, it is extremely important to remember the stakeholders, customers, and employees; what will they think of changing the practice in question? If there is any doubt as to whether any party will object to changes in the process, sidestepping the forward movement of best practice implementation may be best until alternative approaches or unanimous opinions on the change can be reached.

Analysis. Once a consensus has been reached about where the problem exists, and there are no challenging opinions or opponents of changing the existing format of a firm's process, analysis of the problem can begin. Fundamental aspects of the analysis phase of best practice implementation include answering important questions about: why the current system is not working; what goals are not being met due to an outdated method; where is production slowed and why; what are the aspects of the existing process that contribute to a negative public image for the firm; and what resources are being used inefficiently to achieve too little. Analysis of these questions will establish whether there is in fact a great enough need to constitute the implementation of a new, better practice.

During the analysis phase of best practice conception, it is crucial to ensure that all data used in the analysis and decision-making process is true, accurate, from a reliable source, and timely. Additionally, those who gather data must be careful and considerate of sources and should never misrepresent why and how the information may be used. Proprietary information should never be shared with anyone outside of the benchmarking, analysis, or best practice implementation process.

Integration. The integration phase of best practice implementation is the creation of a measurable plan based on information gathered during analysis. The plan will allow action to be taken so that the best practice can be created and initialized. Integration will begin the process of solving the problem and lay the groundwork for the action that must be taken to bring the best practice to fruition. Looking to how other firms have successfully integrated their analysis into a workable plan is a good way to ensure a positive outcome.

Action. The action part of implementing best practice will need to follow the measurable plan created during the integration process. The plan has to be measurable in terms of resources and hours used, monies budgeted, and any other quantitative aspects of the new practice. This will enable managers to determine whether the new practice is actually the best practice in regards to time, money, and resources.

Another part of taking action is monitoring the effectiveness of the plan and how well the action is working. Are workers and managers following the new plan or is there resistance to the change? Monitoring the effectiveness of the new action plan allows managers to establish whether real change is taking place. The action should be taken for at least one fiscal quarter to determine its efficacy within the firm's processes.

It is important to remember how to determine when and how a best practice should be implemented. Changing the old model for reasons other than what is best for the firm at large should always be avoided, and implementing a plan of action must always be a measurable process; otherwise, determining the results it has created is nearly impossible. The best practice will always be the one that creates the best results in the least amount of time while using the fewest resources.

BIBLIOGRAPHY

"Benchmarking Best Practices." Available from: http://www.finance.alberta.ca/publications/measuring/results_oriented/module2_overview.pdf.

Camp, Robert. *Benchmarking: The Search for Industry Best Practices that Lead to Superior Performance.* Portland, OR: ASQC Quality Press, 1989.

Stenzel, Joel, Gary Cokins, Bill Flemming, Anthony Hill, Michael Hugos, Paul R. Niven, Karl D. Schubert, and Alan Stratton. *CIO Best Practices: Enabling Strategic Value with Information Technology.* Hoboken, NJ: John Wiley & Sons, 2007.

BLACK FRIDAY

Black Friday is the term used for the day after Thanksgiving in the United States. This day is often considered the start of the holiday shopping season and is often marked by major sales, loss leaders, and early opening hours at retailers.

BACKGROUND

The practice of referring to especially difficult days with the word "Black" stems from early financial panics, dating as far back as 1869. According to several sources, the term Black Friday was first used to refer to the day after Thanksgiving in 1975, because of horrendous traffic and badly behaved shoppers. The name Black Friday stuck, and over time it has become accepted that the name refers to the accounting practice of recording profits in black ink and losses in red ink. In other words, Black Friday is the day that retailers get out of the red and into the black. Statistically, Black Friday is not actually the day with the highest sales of the year. It is important, however, as a predictor or indicator of consumer attitudes for the season at hand.

BLACK FRIDAY IN CONTEXT

The holiday shopping season is the most important one for most retailers, but the season's duration has increased in recent years. According to retail tracking organizations, most malls were decorated for Christmas by November 1 during 2006. Retail managers begin the holiday season preparation long before the decorations go up; planning for staffing and advertising is usually completed by October. Training for holiday staff can then take place in November, before the rush hits. On average, most retailers extend their hours for the season beginning on the day after Thanksgiving, or Black Friday. These extended hours generally last through Christmas Eve.

RECENT DEVELOPMENTS

Some recent developments in holiday retailing have changed the status of Black Friday and the time frame connected to the holiday season as a whole. First, the immense popularity of prepaid giftcards changes preconceived ideas about the parameters of the holiday buying season. The season has traditionally begun after Thanksgiving and ended on Christmas Eve. Because of the cards, however, holiday sales continue to be made in January, when recipients of the giftcards redeem them. This, coupled with the tendency to start the holiday shopping season earlier and earlier each year, has led to an ever-expanding holiday season.

The widespread popularity of online shopping is the second development that has affected the status of Black Friday and the entire holiday shopping season. According to a survey conducted by a leading consulting agency, chief marketing officers consider the first Monday after Thanksgiving, called Cyber Monday because of online shopping, as important as Black Friday.

Despite changes in the holiday retailing landscape, Black Friday traffic has increased slightly in recent years. While overall sales vary based on economic factors, in most years Black Friday ranks about fifth for total sales, with the Saturday before Christmas dependably being the number one sales day of the year.

BIBLIOGRAPHY

"'Black Friday' & 'Cyber Monday' Play Crucial Roles in Holiday Shopping Season According to BDO Seidman, LLP Survey of CMOs." *BusinessWire*, 12 November 2007. Available from: http://www.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20071112005255&newsLang=en

"Black Friday Weekend Traffic Up 4.8 Percent as Consumers Shop for Smaller Ticket Items" *National Research Federation*, 25 November 2007. Available from: http://www.nrf.com/modules.php?name=News&op=viewlive&sp_id=420

International Council of Shopping Centers. *Holiday Watch: Economic Perspective: 2007*. Available from: http://holiday.icsc.org

International Council of Shopping Centers. *Holiday Watch Media Guide: 2006 Facts and Figures*. Available from: http://holiday.icsc.org/index06.php

"US Retailers Cautious as Black Friday Approaches" *Research Recap*. Available from: http://www.researchrecap.com/index.php/2007/11/12/us-retailers-cautious-as-black-friday-nears

Vargas, Melody. "Haul Out the Holly." About.com: Retail Industry. Available from: http://retailindustry.about.com/od/storeoperations/a/holiday_prep.htm

BRAINSTORMING

Brainstorming was developed by Alex F. Osborn in 1939 to enhance the ability of work groups to solve problems creatively. The participants in his early groups called his process "brainstorming" because it seemed to them that they were using their brains "to storm a creative problem and to do so in commando fashion, with each stormer audaciously attacking the same objective." According to David Whetten and Kim Cameron, there are four cardinal principles that govern effective brainstorming processes:

1. No evaluation of the effectiveness of any given alternative is to be undertaken while the group is generating alternatives. Evaluation of alternatives must come at a later stage in the problem-solving process.

2. The leader of the group must place no parameters upon the group regarding what kinds of alternatives or solutions should be suggested; in fact, the team leader should encourage the group to come up with novel ideas that normally would not receive consideration in the organization.

3. The quantity of ideas should initially take precedence over the quality of ideas; that is, the leader should push the group to produce a large number of ideas irrespective of their quality.

4. Participants should feel free to add to or modify previous ideas proposed by others; it is often the case that marginal ideas that are added upon or altered in some fashion become transformed into powerful solutions. It should be emphasized that ideas do not belong to the individual who presents them, but to the group.

BRAINSTORMING CATEGORIES

In Hossenlopp and Hass's 2007 book *Unearthing Business Requirements*, several types of brainstorming sessions are listed, separating the different ways innovation is encouraged. When planning a brainstorming session, it is wise to first decide what type of session to have, how many people to invite, and what the parameters of the session will be—the decisions to be made or problems to solve.

The first type of brainstorming is the *Individual* session. In this structure, the team leader of the session listens to the input of all members as the problem is explored, and creates a single list of ideas based on the conversations. This adds focus to the brainstorming, and it is often helpful to have a person designated to listen to the others and record the suggestions in a cohesive, clear manner.

The second type of brainstorming is the *Open* meeting. In an open session, participants call out thoughts and suggestions as inclined, and these thoughts are collected into a list of ideas. Many types of brainstorming go through open phases, and though they can often be confusing, such free-for-all sessions work particularly well for skilled, strong-willed individuals. A listener or designated note-taker is usually required for open sessions as well, although they will not generally have as much authority as in an individual meeting.

The last type of brainstorming is the *Structured* meeting. Structured sessions are planned and carried out carefully, avoiding any confusion. Usually, this means group participants write down their ideas silently, and then meet for a short time to select the best ideas of the pool to examine. Using these ideas, the group then returns to silent cogitation, refining their thoughts into a second series of ideas, which are again taken and improved. By the end of such a session, the goal is to have several ideas already subject to extensive analysis and ready to be accepted or rejected. Although this type of brainstorming has excellent clarity, it can be stifling for the more creative or strong-willed participants.

No matter what type of brainstorming is planned, having some sort of focus for the meeting is highly advised. Hossenlopp and Hass suggest writing down the goals or purpose of the session somewhere where everyone can see it, whether on a PowerPoint or a whiteboard. This gives a visual center for the participants to gather around.

FACILITATING BRAINSTORMING

When generating ideas, it is best to have the members of a group first generate ideas individually and silently rather than shouting out ideas as an entire group. Research indicates that by having people work individually, they generate a greater number of unique ideas than when brainstorming as a group. After individual brainstorming, all ideas can be shared, and further brainstorming as a group can be used.

What topics should be addressed in brainstorming sessions? While theoretically it is possible to brainstorm around any topic, Osborn believed that the problem or topic should be specific rather than general; that is, it should be narrow enough so that the participants can easily comprehend its nature and target their responses to its solution. Also, multiple problems, such as brainstorming about what a new product should be named, how it should be packaged, and how it should be advertised, should not be set before a brainstorming group. The problems should be separated, and brainstormed in separate meetings that are devoted to one of the aforementioned topics.

Osborn believed the ideal size for a brainstorming group was between five and ten people; however, he also contended that with the right kind of leader, large numbers of people of up to one hundred could successfully participate in brainstorming sessions. However, research indicates that larger groups generally do not generate more ideas than small groups.

In order to facilitate success, leaders of brainstorming sessions should do the following:

1. Facilitators should teach the principles and objectives of brainstorming to the group before beginning the brainstorming session. Unless all group members understand these rules, the brainstorming effort will fail.

2. Facilitators must enforce the rules during the brainstorming session. Inevitably, people will begin evaluating suggestions during the "generation" phase of brainstorming or violate one of the other principles. When such violations occur, the leader must re-teach the principle in question that has been violated, and relaunch the brainstorming process in the group.

3. Facilitators must ensure that the ideas are listed so that they can be referred to later when the group analyzes the ideas that it has generated. Idea records are often kept on flip charts, but an individual can record the information and the results can be photocopied and distributed to the participants as well.

4. Facilitators should try to encourage all group members to get involved in the session and contribute ideas. Some group members may be reluctant to share their thoughts, which could lead to one or

two participants dominating the session. A good facilitator finds ways to draw out ideas from all group members.

5. Facilitators need to keep the group focused and prevent participants from getting discouraged. Typically, participants offer several ideas at the beginning of a session; often these are the more obvious alternative solutions to the problem at hand. After these initial ideas are offered, the session might get bogged down as the quantity of ideas subsides. Facilitators should assist the group to push past this initial stage and continue working to come up with other alternatives, because it is at this point where truly creative solutions to problems may be offered.

6. Facilitators need to be able to restate and distill poorly articulated ideas in a way that clarifies without altering their meaning.

After a large set of ideas has been generated, they must then be evaluated and culled according to their efficacy. At this point, a large number of options are open to the leader in terms of how the ideas should be evaluated. However, generally it is advisable that the group who generated the ideas be accountable for evaluating them as well. During the analysis stage the leader must facilitate an evaluation of the ideas that the group generated. As the listed ideas are subtracted, merged, and refined in group discussion, it is common for a more comprehensive solution to the problem to be produced than what could have been generated individually or in other group problem-solving processes.

AVOIDING GROUPTHINK

Certain problems plague group synergy when people gather to make decisions. Irving Janis coined the term "groupthink" in the 1970s to describe these pitfalls, and today organizations should be wary of groupthink, especially when creating new ideas or seeking inspiration. Most groups are not aware of the mistakes they make under groupthink, and so require some kind of outside check or review of their decisions. Daniel Levi, in his 2007 book *Group Dynamics for Teams*, gives eight commonly recognized signs of groupthink—"symptoms" that can show up in meetings and lead to poor decisions. These signs should be known and watched for by the members of the brainstorming session:

1. *Illusion of invulnerability.* The group believes its decisions are without fault, and that they will work no matter what.

2. *Collective rationalization.* Ideas are supported throughout the group, so that poor ideas are often encouraged on the basis of the group's high opinion of each other.

3. *Belief in the group's morality.* The group considers itself to be always in the right and is never ethically questionable or capable of doing wrong.

4. *Pressure on dissenters.* Those who disagree with the majority of the group are immediately silenced or belittled, pressured into joining the majority or leaving the group.

5. *Stereotypes of outside groups.* The group believes it is superior to other tools and organizational structures, exaggerating its own importance and forgetting the necessity of other groups or processes.

6. *Self-censorship.* Group members who disagree keep their opinions to themselves. They are afraid to question the others and are convinced it is easier to just agree with everyone rather than bring up negative aspects to ideas.

7. *Illusion of unanimity.* The group believes that all its members agree with all decisions.

8. *Self-appointed mind guards.* The group has members who downplay all negative results and block criticism from reaching the group.

POTENTIAL PROBLEMS

Certain studies have shown that brainstorming may have some inherent flaws when trying to produce new ideas and processes. According to Levi, brainstorming may not be an improvement over the talented efforts of individuals. A study by Mullen, Johnson, and Salas conducted in 1991 showed that the total of individual work—people creating solutions on their own—usually equaled the number of useful ideas produced in brainstorming sessions. Levi also points out that during brainstorming, a great deal of time is wasted in the speaking queue that develops. People who are participating listen to the speaker while waiting to speak their own ideas, and while waiting do not contribute any thought-value to the group. This often creates a series of mental log jams in which people are waiting to say ideas without coming up with any more themselves.

If groupthink and negative employee impressions take over, the brainstorming session can degenerate to a "blamestorming" session. The change occurs when participants begin to blame their managers, restrictions, and organization for personal grievances. At this point, little creativity is possible, and unhealthy grumbling is more likely. Despite some of these faults, organizations believe that brainstorming fosters creativity and encourages its members, and the track record of success for brainstorming has sustained its popularity.

Face-to-face brainstorming sessions may not always generate a large number of creative ideas for a variety of reasons. One problem with face-to-face sessions is called production blocking, which is basically anything that

prevents a group member from verbalizing his or her ideas as they occur. Common production blocks are forgetting and distractions. Another problem with face-to-face sessions is evaluation apprehension, which simply means that individuals are afraid to vocalize their ideas. Evaluation apprehension might be caused because individuals are reluctant to share novel, but incompletely developed, ideas. Group members might also be afraid of how others will react if they suggest unpopular or politically sensitive alternatives. Another potential problem with face-to-face brainstorming is social loafing, which occurs when individuals put forth less effort on a group project than they do working alone.

Electronic brainstorming sessions may reduce some of these problems. In online or network settings, participants can simultaneously contribute ideas, and can usually do so anonymously. Anonymity may make it more likely that individuals will contribute a larger number of creative alternatives. In fact, empirical research suggests that electronic sessions are generally more effective than face-to-face sessions in terms of the number of alternative ideas generated.

Although the anonymity offered by electronic brainstorming sessions may reduce the negative impact of some of the problems associated with face-to-face sessions, other research suggests that social loafing might still be a problem. One study published in the *Journal of Management Information Systems* found that allowing participants in electronic sessions to view and compare their participation rates against those of others in the group (e.g., a tally of how many ideas were suggested by each person) increased individuals' contributions of ideas, as everyone could readily see who was not participating much. In this study, electronic idea forums that allowed social comparison were the most productive, followed by anonymous electronic forums. Face-to-face sessions were the least productive in terms of the quantity of alternative solutions generated.

BRAINSTORMING AS CREATIVE DECISION MAKING

Because of its emphasis on group participation and creativity, brainstorming may also be seen as a tool for creative decision making. Creative decision making is a group decision-making technique in which group members attempt to generate as many alternative solutions as possible for a given problem. It is one of a number of decision-making tools that are used to ensure consideration of a diverse set of alternative solutions. Other common decision-making techniques include the nominal group technique and the Delphi technique.

Businesses can approach brainstorming in a variety of ways. The online options are useful for a company that wishes to bring together far-flung departments, or talents that cannot easily meet face to face. In Andrew Griffiths' 2007 book *101 Ways to Market Your Business*, the author suggests having scheduled meetings for brainstorming. One possible schedule is a monthly meeting, giving all the members of the group time to plan or travel if needed. Griffiths also encourages making the sessions casual. Inviting a smaller group to lunch each month is one possibility—a small expenditure to put the group at ease and allow ideas to flow more easily.

SEE ALSO *Group Dynamics; Problem Solving*

BIBLIOGRAPHY
Ditkoff, Mitchell. "Ten Skills for Brainstorming: Breakthrough Thinking." *Journal for Quality and Participation* November/December 1998, 30–32.

Griffiths, Andrew. *101 Ways to Market Your Business: Building a Successful Business* Allen and Unwin, 2007.

Hosselhopp, Rosemary, and Kathleen Hass. *Unearthing Business Requirements: Elicitation Tools and Techniques* Management Concepts, 2007.

Ivancevich, John M., Robert Konopaske, and Michael T. Matteson. *Organizational Behavior and Management.* 7th ed. Boston: Irwin/McGraw-Hill, 2004.

Jones, Gareth R., Jennifer M. George, and Charles W.L. Hill. *Contemporary Management.* 2nd ed. Boston: Irwin/McGraw-Hill, 2000.

Levi, Daniel. *Group Dynamics for Teams* Sage Publications Inc, 2007.

Osborn, Alex F. *Applied Imagination: Principles and Procedures of Creative Thinking.* New York: Scribner, 1953.

Shepherd, Morgan M., et al. "Invoking Social Comparison to Improve Electronic Brainstorming: Beyond Anonymity." *Journal of Management Information Systems* 12, no. 3 (1996): 155–168.

Whetten, David A., and Kim S. Cameron. *Developing Management Skills.* 6th ed. Upper Saddle River, NJ: Prentice Hall, 2005.

BREAK-EVEN POINT

A company's break-even point is the amount of sales or revenues that it must generate in order to equal its expenses. In other words, it is the point at which the company neither makes a profit nor suffers a loss.

Calculating the break-even point (through break-even analysis) can provide a simple, yet powerful quantitative tool for managers. In its simplest form, break-even analysis provides insight into whether revenue from a product or service has the ability to cover the relevant costs of production of that product or service. Managers can use this information in making a wide range of business decisions, including setting prices, preparing competitive bids, and applying for loans.

BACKGROUND

The break-even point has its origins in the economic concept of the *point of indifference.* From an economic perspective, this point indicates the quantity of some good at which the decision maker would be indifferent (i.e., would be satisfied without reason to celebrate or to opine). At this quantity, the costs and benefits are precisely balanced.

Similarly, the managerial concept of break-even analysis seeks to find the quantity of output that just covers all costs so that no loss is generated. Managers can determine the minimum quantity of sales at which the company would avoid a loss in the production of a given good. If a product cannot cover its own costs, it inherently reduces the profitability of the firm.

MANAGERIAL ANALYSIS

Typically the break-even scenario is developed and graphed in linear terms. Revenue is assumed to be equal for each unit sold, without the complication of quantity discounts. If no units are sold, there is no total revenue ($0). However, total costs are considered from two perspectives. Variable costs are those that increase with the quantity produced; for example, more materials will be required as more units are produced. Fixed costs, however, are those that will be incurred by the company even if no units are produced. In a company that produces a single good or service, this would include all costs necessary to provide the production environment, such as administrative costs, depreciation of equipment, and regulatory fees. In a multi-product company, fixed costs are usually allocations of such costs to a particular product, although some fixed costs (such as a specific supervisor's salary) may be totally attributable to the product.

Figure 1 displays the standard break-even analysis framework. Units of output are measured on the horizontal axis, whereas total dollars (both revenues and costs) are the vertical units of measure. Total revenues are nonexistent

($0) if no units are sold. However, the fixed costs provide a floor for total costs; above this floor, variable costs are tracked on a per-unit basis. Without the inclusion of fixed costs, all products for which marginal revenue exceeds marginal costs would appear to be profitable.

In Figure 1, the break-even point illustrates the quantity at which total revenues and total costs are equal; it is the point of intersection for these two totals. Above this quantity, total revenues will be greater than total costs, generating a profit for the company. Below this quantity, total costs will exceed total revenues, creating a loss.

To find this break-even quantity, the manager uses the standard profit equation, where profit is the difference between total revenues and total costs. Predetermining the profit to be $0, he or she then solves for the quantity that makes this equation true, as follows:

$$\text{Let } TR = \text{Total revenues}$$
$$TC = \text{Total costs}$$
$$P = \text{Selling price}$$
$$F = \text{Fixed costs}$$
$$V = \text{Variable costs}$$
$$Q = \text{Quantity of output}$$
$$TR = P \times Q$$
$$TC = F + V \times Q$$
$$TR - TC = \text{profit}$$

Because there is no profit ($0) at the break-even point, $TR - TC = 0$, and then $P \times Q - (F + V \times Q) = 0$. Finally, $Q = F(P - V)$.

This is typically known as the contribution margin model, as it defines the break-even quantity (Q) {note: Q is previously defined as "quantity of output"} as the number of times the company must generate the unit contribution margin ($P - V$), or selling price minus variable costs, to cover the fixed costs. It is particularly interesting to note that the higher the fixed costs, the higher the break-even point. Thus, companies with large investments in equipment and/or high administrative-line ratios may require greater sales to break even.

As an example, if fixed costs are $100, price per unit is $10, and variable costs per unit are $6, then the break-even quantity is 25 ($100 ÷ [$10 − $6] = $100 ÷ $4). When 25 units are produced and sold, each of these units will not only have covered its own marginal (variable) costs, but will also have contributed enough in total to have covered all associated fixed costs. Beyond these 25 units, all fixed costs have been paid and each unit contributes to profits by the excess of price over variable costs, or the contribution margin. If demand is estimated to be at least 25 units, then the company will not experience a loss. Profits will grow with each unit demanded above this 25-unit break-even level.

Figure 1

**Simple Break-Even Analysis:
Total Revenues and Total Costs**
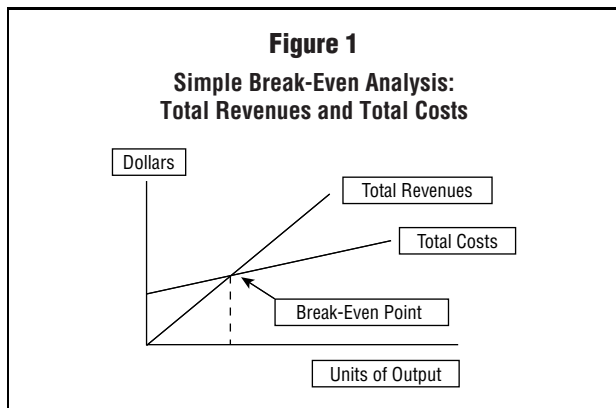
While it is useful to know the quantity of sales at which a product will cease to generate losses, it may be even more useful to know the quantity necessary to generate a desired level of profit. (Let D = desired level of profit.)

$$TR - TC = D$$
$$P \times Q - (F + V \times Q) = D$$
$$\text{Then } Q = (F + D) \div (P - V)$$

Here, the desired profit is regarded as an increase in the fixed costs to be covered by sales of the product. As the decision-making process often requires profits for payback period, internal rate of return, or net present value analysis, this form may be more useful than the basic break-even model.

BASIC ASSUMPTIONS

Several assumptions affect the applicability of break-even analysis. If these assumptions are violated, the analysis may lead to erroneous conclusions.

It is tempting to set the contribution margin (and thus the price) by using the sales goal (or certain demand) as the quantity. However, sales goals and market demand are not necessarily equivalent, especially if the customer is price-sensitive.

Price-elasticity exists when customers will respond positively to lower prices and negatively to higher prices, and is particularly applicable to nonessential products. A small change in price may affect the sale of skis more than the sale of insulin, an inelastic-demand item due to its inherently essential nature. Therefore, using this method to set a prospective price for a product may be more appropriate for products with inelastic demand. For products with elastic demand, it is wiser to estimate demand based on an established, acceptable market price.

Typically, total revenues and total costs are modeled as linear values, implying that each unit of output incurs the same per-unit revenue and per-unit variable costs. Volume sales or bulk purchasing may incorporate quantity discounts, but the linear model appears to ignore these options.

A primary key to detecting the applicability of linearity is determining the relevant range of output. If the forecast of demand suggests that 100 units will be demanded, but quantity discounts on materials are applicable for purchases over 500 units from a single supplier, then linearity is appropriate in the anticipated range of demand (100 units plus or minus some forecast error). If, instead, quantity discounts begin at 50 units of materials, then the average cost of materials may be used in the model.

A more difficult issue is that of volume sales, when such sales are frequently dependent on the ordering patterns of numerous customers. In this case, historical records of the proportionate quantity-discount sales may be useful in determining average revenues.

Linearity may not be appropriate due to quantity sales/purchases, as noted, or to the step-function nature of fixed costs. For example, if demand surpasses the capacity of a one-shift production line, a second shift may be added. The second-shift supervisor's salary is a fixed-cost addition, but only at a sufficient level of output. Modeling the added complexity of nonlinear or step-function costs requires more sophistication, but may be avoided if the manager is willing to accept average costs to use the simpler linear model.

One obviously important measure in the break-even model is that of fixed costs. In the traditional cost-accounting world, fixed costs may be determined by full costing or by variable costing. Full costing assigns a portion of fixed production overhead charges to each unit of production, treating these as a variable cost. Variable costing, by contrast, treats these fixed production overhead charges as period charges; a portion of these costs may be included in the fixed costs allocated to the product. Thus, full costing reduces the denominator in the break-even model, whereas the variable costing alternative increases the denominator. While both of these methods increase the break-even point, they may not lend themselves to the same conclusion.

Recognizing the appropriate time horizon may also affect the usefulness of break-even analysis, as prices and costs tend to change over time. For a prospective outlook incorporating generalized inflation, the linear model may perform adequately. Using the earlier example, if all prices and costs double, then the break-even point $Q = 200 \div (20 - 12) = 200 \div 8 = 25$ units, as determined with current costs. However, weakened market demand for the product may occur, even as materials costs are rising. In this case, the price may shift downward to \$18 to bolster price-elastic demand, while materials costs may rise to \$14. In this case, the break-even quantity is 50 ($200 \div [18 - 14]$), rather than 25. Managers should project break-even quantities based on reasonably predictable prices and costs.

It may defy traditional thinking to determine which costs are variable and which are fixed. Typically, variable costs have been defined primarily as "labor and materials." However, labor may be effectively salaried by contract or by managerial policy that supports a full workweek for employees. In this case, labor should be included in the fixed costs in the model.

Complicating the analysis further is the concept that all costs are variable in the long run, so that fixed costs and the time horizon are interdependent. Using a make-or-buy analysis, managers may decide to change from in-house production to subcontracting production; in this

case, fixed costs are minimal and almost 100 percent of the costs are variable. Alternatively, they may choose to purchase cutting-edge technology, in which case much of the variable labor cost is eliminated; the bulk of the costs then involve the (fixed) depreciation of the new equipment. Managers should project break-even quantities based on the choice of capital-labor mix to be used in the relevant time horizon.

Traditionally, fixed costs have been allocated to products based on estimates of production for the fiscal year and on direct labor hours required for production. Technological advances have significantly reduced the proportion of direct labor costs and have increased the indirect costs through computerization and the requisite skilled, salaried staff to support company-wide computer systems.

Activity-based costing (ABC) is an allocation system in which managers attempt to identify "cost drivers" which accurately reflect the appropriate usage of fixed costs attributable to production of specific products in a multi-product firm. This ABC system tends to allocate, for example, the CEO's salary to a product based on his or her specific time and attention required by this product, rather than on its proportion of direct labor hours to total direct labor hours.

EXTENSIONS OF BREAK-EVEN ANALYSIS

Break-even analysis typically compares revenues to costs. However, other models employ similar analysis.

In the crossover chart, the analyst graphs total-cost lines from two or more options. These choices may include alternative equipment choices or location choices. The only data needed are fixed and variable costs of each option. In Figure 2, the total costs (variable and fixed costs) for three options are graphed. Option A has the low-cost advantage when output ranges between zero and X units, whereas Option B is the least-cost alternative between X and X units of output. Above X units, Option

Figure 2
Crossover Chart of Three Options

Figure 3
Economic Order Quantity:
Ordering and Holding Costs
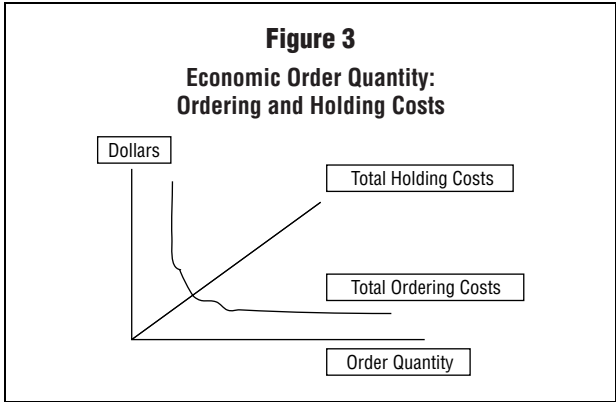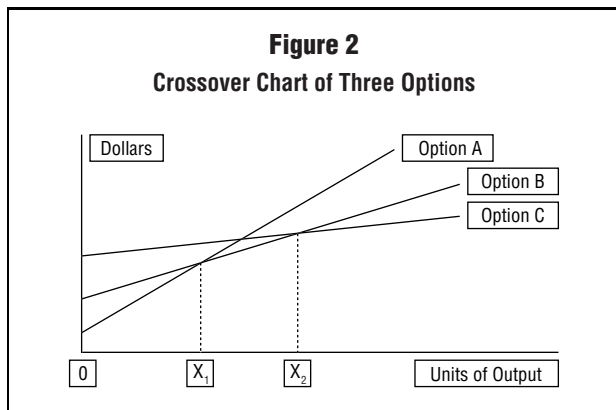
C will cost less than either A or B. This analysis forces the manager to focus on the relevant range of demand for the product, while allowing for sensitivity analysis. If current demand is slightly less than X, Option B would appear to be the best choice. However, if medium-term forecasts indicate that demand will continue to grow, Option C might be the least-cost choice for equipment expected to last several years. To determine the quantity at which Option B wrests the advantage from Option A, the manager sets the total cost of A equal to the total cost of B ($F_A + V_A \times Q = F_B + V_B \times Q$) and solves for the sole quantity of output (Q) that will make this equation true. Finding the break-even point between Options B and C follows similar logic.

The Economic Order Quantity (EOQ) model attempts to determine the least-total-cost quantity in the purchase of goods or materials. In this model, the total of ordering and holding costs is minimized at the quantity where the total ordering cost and total holding cost are equal (i.e., the break-even point between these two costs).

As companies merge, layoffs are common. The newly formed company typically enjoys a stock-price surge, anticipating the leaner and meaner operations of the firm. Obviously, investors are aware that the layoffs reduce the duplication of fixed-cost personnel, leading to a smaller break-even point and thus profits that begin at a lower level of output.

APPLICATIONS IN SERVICE INDUSTRIES

While many of the examples used have assumed that the producer was a manufacturer (i.e., labor and materials), break-even analysis may be even more important for service industries. The reason for this lies in the basic difference in goods and services: Services cannot be placed in inventory for later sale. What is a variable cost in manufacturing may necessarily be a fixed cost in services. For example, in the restaurant industry, unknown demand requires that cooks

and table-service personnel be on duty even when customers are few. In retail sales, clerical and cash register workers must be scheduled. If a barber shop is open, at least one barber must be present. Emergency rooms require round-the-clock staffing. The absence of sufficient service personnel frustrates the customer, who may balk at this visit to the service firm and may find competitors that fulfill their needs.

The wages for this basic level of personnel must be counted as fixed costs. They are necessary for the potential production of services, despite the actual demand. However, the wages for on-call workers might be better classified as variable costs. These wages will vary with units of production. Services, therefore, may be burdened with an extremely large ratio of fixed-to-variable costs.

Service industries, without the luxury of inventoriable products, have developed a number of ways to provide flexibility in fixed costs. Professionals require appointments, and restaurants take reservations; when the customer flow pattern can be predetermined, excess personnel can be scheduled only when needed, reducing fixed costs. Airlines may shift low-demand flight legs to smaller aircraft, using less fuel and fewer attendants. Hotel and telecommunication managers advertise lower rates on weekends to smooth demand through slow business periods and avoid times when the high-fixed-cost equipment is underutilized. Retailers and banks track customer flow patterns by day and by hour to enhance their short-term scheduling efficiencies. Whatever method is used, the goal of these service industries is the same as that in manufacturing: Reduce fixed costs to lower the break-even point.

The fixed costs of many of these examples are further decreased by taking advantage of the Internet. No longer are employees needed onsite for a specific number of hours. Instead, business owners can use the Web to offer shopping and banking experiences and to schedule appointments, among other things. In fact, in the first decade of the twenty-first century nearly three-quarters of small businesses report that the Internet has helped increase their revenues and sales, and has decreased their administrative costs. One online research group estimates that Web-based retailing comprised one-tenth of all total U.S. retail sales in 2008, and this percentage should continue to increase as more and more people shop online.

Shared services offers another way to reduce fixed costs. Using this strategy, companies centralize administrative tasks, such as finance and document copying, that several different divisions of a company often perform. By sharing services, companies are able to justify larger investments in technology by creating a critical mass; they create economies of scale by standardizing procedures that are often repeated, such as hiring.

Break-even analysis is a simple tool that defines the minimum quantity of sales that will cover both variable and fixed costs. Such analysis gives managers a quantity to compare to the forecast of demand. If the break-even point lies above anticipated demand, implying a loss on the product, the manager can use this information to make a variety of decisions. The product may be discontinued or, by contrast, may receive additional advertising and/or be re-priced to enhance demand. One of the most effective uses of break-even analysis lies in the recognition of the relevant fixed and variable costs. The more flexible the equipment and personnel, the lower the fixed costs and the lower the break-even point.

SEE ALSO *Activity-Based Costing; Cost Accounting; Financial Issues for Managers*

BIBLIOGRAPHY
"Breakeven Analysis." *Business Owner's Toolkit.* Available from: http://www.toolkit.cch.com/text/P06_7530.asp.

Deal, Jack. "The Break-Even Point and the Break-Even Margin." *Business Know-How.com.* Available from: http://www.businessknowhow.com/money/breakeven.htm.

"Exploring E-Commerce." *Entrepreneur.com.* Available from: http://www.entrepreneur.com/growyourbusiness/howtoguides/article81238.html.

Garrison, Ray H., and Eric W. Noreen. *Managerial Accounting.* Boston: Irwin/McGraw-Hill, 1999.

Henricks, Mark. "Learn To Share—Reducing Overhead Through Deployment of Shared Services." *Entrepreneur* March 2001. Available from: http:/findarticles.com/p/articles/mi_mODTI.

Horngren, Charles T., George Foster, and Srikant M. Datar. *Cost Accounting: A Managerial Emphasis.* Upper Saddle River, NJ: Prentice Hall, 1997.

Render, Barry, and Jay Heizer. *Principles of Operations Management.* Upper Saddle River, NJ: Prentice Hall, 1997.

BUDGETING

Organizations develop specific plans for saving and spending income. These plans, or budgets, are essential for developing spending and saving priorities. A properly prepared budget also serves as a reference to check how well money is being managed, by allowing managers to see actual revenues and expenses compared to budgeted revenues and expenses during a period. Managers can identify revenue shortfalls or expense excesses and take corrective action earlier.

The term "budget" can be dated back to medieval England, where it meant leather purse or wallet. A budget allows businesses to meet specific goals by creating a system of saving and spending money efficiently. Simply defined, a budget is a plan for using corporate funds in a way that best meets the firm's wants and needs. The plan

includes a recorded entry of expected income, expenses, and savings over a defined period of time.

A wide range of budgeting techniques exist and although the fundamental purposes are similar, the specifics among various organizations are often different. One important aspect of budgeting is how organizations increase cash to finance ongoing operations and new opportunities. Large corporations, for example, may have the option of increasing cash by selling *treasury stock*, previously authorized shares of ownership that have never been offered for sale on the stock market. The liquidity of equity (stock) markets allows managers to implement these equity decisions fairly quickly to budget for projected needs.

Several independent organizations rate the debt-paying ability of large corporations. This creates a market for corporate debt, more commonly referred to as bonds. Corporations with favorable debt ratings have the ability to borrow money, that is, issue bonds, at lower interest rates than those with unfavorable debt ratings.

Small businesses, in contrast, often do not have publicly traded shares of stock. Although these businesses can sell stock to investors, the process is more uncertain because the market for this type of stock is less liquid. Venture capital is also an option, but the number of small businesses seeking venture capital nearly always exceeds the amount of venture capital available. Also, debt-rating agencies do not rate the debt-paying ability of many small businesses, limiting the extent to which these businesses can raise cash through bond issues. Without a ready market for debt, small businesses must often turn to the less liquid forms of debt financing such as bank loans, in some cases at higher interest rates than would be available from established credit markets available to larger corporations.

Budgets allow businesses to better utilize the financial resources available to them. To begin with, budgets help businesses operate within their means. Over the long term, budgets assist businesses in spending less money than they earn. Next, budgets help businesses achieve their financial goals by planning for the future and organizing money into categories such as income, expenses, and savings. In short, budgets help a business avoid credit problems, better prepare for financial emergencies, and build better money management skills by creating a structured plan.

Businesses should follow several steps to successfully implement a budget. These include setting financial goals, planning budget categories, maintaining financial records, and balancing and adjusting the budget. Setting financial goals is the starting point in the budgeting process. Questions managers should ask include:

- "What do we want accomplished within one month, one year, or ten years?"
- "What new products or services do we want to offer in the short- and long-term, and how can we finance these?"
- "Will my operating expenses increase with inflation, and how will we increase revenue to meet these additional expenses?"

These questions provide a starting point to spur additional questions. The answers to these questions should help determine how income should be spent and saved. Managers should ask dozens of additional questions to cover all the categories of revenue, expense, and debt and equity financing.

In general, budgeting questions should revolve around estimates of income and expenses. Categories include fixed expenses such as rent, insurance premiums, and taxes; estimates of variable expenses such as utilities and wages; and estimates that allow for uncertainties.

One way to budget is by comparing estimated financial figures created before a budgeting period with actual experience at the end of the budgeting period. The initial estimates are called pro forma financial statements. The three primary types of financial statements are a balance sheet, income statement, and statement of cash flows. The balance sheet shows assets owned, liabilities owed, and owners' equity (owners' financial stake in the businesses). The income statement details profit and loss for a given period. The statement of cash flows helps managers see where cash came from and where it went. By comparing pro forma financial statements to end-of-period financial statements, managers can judge whether or not their budgets are in line with estimates. Adjustments can then be made for future budgeting periods.

Companies often experience a budget variance, the difference between a budgeted figure and an actual figure. There are two kinds of budget variance. A quantity variance is due to an increase or decrease in the quantity of the resource used. A cost variance is due to a difference in the cost of a resource. For example, a company may have a fuel budget based on an estimated consumption of 100 gallons at $3 per gallon. If the company uses more than 100 gallons of fuel, a quantity budget variance has occurred. Likewise, if the cost of the fuel increases to $3.50, the company is facing a cost variance. The variance tells companies that something is out of line.

A budget must meet certain characteristics to help businesses successfully manage money. The budget should be realistic as well as flexible. When a budget variance occurs, the budget should be specific enough to provide information that shows what costs are out of budget. When unexpected expenses arise, the spending plan should be able

to handle these costs. A budget is not a permanent plan and should be realigned when circumstances occur that alter budget categories. The budget should be carefully planned and organized, yet clear enough to be communicated to organizational stakeholders such as lenders and owners.

Companies create budgets for a mixture of reasons. They can serve a variety of functions, and many techniques can be implemented to develop them. Budgets can be used as a means of forecasting and planning for the future. Their creation can also be used as a motivational tool. The plan can be used as a means of evaluation and control as well as a resource for information and decision-making.

In addition to preparation or pro forma financial statements and comparison to actual financial statements, many different approaches to the budgeting process can be used depending on the desired function of the company. Breakeven analysis, for instance, estimates the amount of sales required to cover the expenses of a new product or service. Payback periods are similar, but increase the focus of breakeven analysis on needed sales by adding the length of time needed to achieve those sales. This tells managers how long it will take to recoup initial expenses. Another type of budgeting is capital budgeting, in which the estimated revenue from capital projects such as purchase of property, plants, and equipment is projected. Additional techniques include parametric, partial, zero-based, and equity budgeting. Each of these may be applied to organizations' financial situations depending on the needs of the individual businesses.

Each department within a corporation plays a key role in the overall budget process. Regardless of the approach, those working on the budget must know the corporation's goals and initiatives for the coming year. By considering corporate strategy, all departments within the corporation create their budget in a way that helps enable the company to hit its key initiatives for the coming fiscal year, and to meet short- and long-term corporate goals.

Budgeting is essential. Businesses without budgets can quickly find themselves short of cash not only for new products and services, growth and expansion, and improvements in capital projects, but also in simply meeting short-term needs such as payroll, insurance, and tax expenses. Budgeting is thus a key element in all business planning.

SEE ALSO *Break-even Point; Financial Issues for Managers; Zero-Based Budgeting*

BIBLIOGRAPHY
Henry, David. "Loading Up on Junk." *Business Week,* 31 Jan. 2005, 78–80.
Orlando, John. "Budgeting for IT: Four Pitfalls to Avoid." *SearchCIO.com,* 19 Sep. 2007. Available from: http://searchcio.techtarget.com/news/column/0,294698,sid182_gci1273064,00.html.

Schick, Allen. "Twenty-Five Years of Budgeting Reform." *OECD Journal on Budgeting* 1, no. 4 (2004): 102–124.
U.S. Small Business Administration. "Small Business Startup Guide." 2005. Available from: http://www.sba.gov/starting_business/startup/guide.html.
Vorster, Mike. "How to Manage Fixed-Cost Budgets." *Construction Equipment,* 1 Oct. 2006. Available from: http://www.allbusiness.com/economy-economic-indicators/economic/6292572-1.html.

BUSINESS PLAN

A business plan is a written document used to describe a proposed venture or idea. It typically includes the current state of a business, future vision for the business, target market analysis and challenges, sales and marketing strategies, and funding requirements to reach stated goals. Many business plans are designed with the intention of securing funding and investors to support a proposed idea; others are designed to assist with reorganization, takeovers, or to serve as an internal planning document. On its Web site, the U.S. Small Business Administration (SBA) describes it this way:

> A business plan precisely defines your business, identifies your goals, and serves as your firm's resume. It helps you allocate resources properly, handle unforeseen complications, and make good business decisions. Because it provides specific and organized information about your company and how you will repay borrowed money, a good business plan is a crucial part of any loan application. Additionally, it informs sales personnel, suppliers, and others about your operations and goals.

In addition to these continuing benefits, a business plan can also offer clear, immediate advantages to struggling companies, or to those intending to sell their business concepts. Mike McKeever gives several of these advantages in his book, *How to Write a Business Plan* (2007):

1. *A business plan will help the business find financial backers.* Since investors require a business plan before giving a company any significant backing, it is a good idea to plan and write one before looking for aid. After creating a plan, leaders of the business will understand more clearly where their money goes and what it is spent on—information the investors will want to know.

2. *A business plan will help a starting company decide whether to proceed or stop.* Creating a plan for a new business allows leaders to examine potential strengths and weaknesses of the business, giving them the confidence to move forward or possibly the knowledge to reassess the functionality of their ideas.

3. *A business plan allows leaders to improve the business concept.* In making the plan, leaders may realize parts of the organization they need to change or reevaluate. Writing the plan gives a chance to change the goals of the business for the better.

4. *A business plan helps keep the business on track.* With the straightforward rules, goals, and parameters of the plan written down, a business has more focus.

GETTING STARTED

The article "Write the Right Business Plan" lists ten things to consider before tackling the document:

1. Decide why you're writing your plan—what is your motivation?

2. Do your homework—read some books, explore web resources.

3. Compile your information—locate articles and financial statements.

4. Start typing—write down all your ideas, notes, and questions in outline form.

5. Write a rough draft—flesh out the outline with full sentences and paragraphs.

6. Do more research—support your case with data via small business association contacts, annual reports, and competitors in the chosen industry.

7. Think about the numbers—develop pro forma financial statements.

8. Write a final draft—demonstrate attention to detail with accuracy and clarity.

9. Get feedback—have someone else read over your plan and offer advice.

10. Polish your plan to perfection—include a cover page, table of contents, nondisclosure form, and an executive summary containing highlights.

Employees with the right skill set and expertise can collaborate to create the business plan. Alternatively, a consultant can be hired to assist with the process. A consultant can bring expertise and professionalism to the appearance and tone of your business plan, provide informed market analysis and research assistance, and supply educated projections for a market that the entrepreneur might be unfamiliar with or have little experience analyzing.

After determining who will be working on the plan, it is useful to decide on the scope of the plan and timeframe for completion of the plan. Once the team or consultant is in place, research and analysis can begin. Internal and external assessments should be conducted and then examined. The interpretations of these assessments will be the framework of the plan and will guide goal setting and strategies for the company. Once goals and strategies are determined, a solid business plan can be formed toward fulfilling these goals.

From a management perspective, a business plan allows managers to set priorities and allocate resources effectively. It brings order and direction to an organization and provides a vision of the future that employees throughout the company can put energy into and get excited about. This shared vision and focus will benefit the company at every level and ensure that all constituents are working cooperatively and cohesively. Ideally, all employees will utilize the information from the business plan to assist in goal setting, and guide in decision making and performance assessments.

A 2005 guide by Covello and Hazegren on beginning business plans reports that a strong plan will take approximately fifty to one hundred hours to complete. From an entrepreneur's stand, that is about six months of review, study, analysis, and research. This time devoted to making the business plan is useful, since by the end, the entrepreneur is aware of most of the positive and negative aspects of the business, and has a clear idea how to market it to outsiders.

ELEMENTS OF A BUSINESS PLAN

The U.S. Small Business Administration recommends that a business plan describe four main elements of the proposed venture: an overview of the business, a marketing analysis, a financial plan, and a management plan. An executive summary and other supporting documents should also accompany the plan. These elements provide a solid starting point for a general plan, but there is no single formula to a business plan and a multitude of factors will impact the amount of content needed in a good business plan.

The executive summary is a synopsis of the entire business plan. It is critical that this summary be carefully crafted and compelling. This is the first and possibly the only information that a potential investor will read; if it is not informative enough or if it is lacking crucial data, the investor might not read beyond this summary component.

The business overview segment is a profile of the company and its primary industry. Projections, trends, and industry outlooks should be included. In this section the company describes the unique elements that make it a prime candidate for its proposed venture.

A market analysis details how the company will handle its sales and marketing strategies. This analysis includes information on the company's products or services and intended customers, and how customers will be made aware of the product or service. This section should also include a competitive analysis with a breakdown identifying Strengths, Weaknesses, Opportunities, and Threats

(SWOT) to the company and the business proposed. A plan of action should explain how the company will address, exploit, or withstand each of these eventualities.

The financial section discusses the current financial state of the company and what types of financing will be required for the proposed venture. In this area, it is appropriate to discuss the specific dollar amounts required for the business venture, the cost to maintain and sustain the venture, and projections of income, balance sheets, and cash flow. Statistics, facts, and research should support any financial projections listed. In a 2008 article, "Successful Business Plan," Amy Tailor details the SMART model of financial analysis, which many experts watch for. According to the SMART system, the business should be able to list and explain how its goals are Specific, Measurable, Achievable, Realistic, and Timed. Specific goals should be natural to a strong business plan. Measurable goals should include current and expected data, along with systems of analysis to track changes. Achievable and realistic goals can be met within the framework of the business's assets and skills, and timed

goals are set forth at the proper moment in the organization's evolution.

The management plan section should discuss the strengths, experience, achievements, and expertise of the person or team undertaking the business venture. Investors want to know that they are offering their support to a person or team qualified and capable of handling the business proposed and the funds loaned.

A complete business plan will provide evidence to the lender that the entrepreneur has performed a thorough investigation of this new business venture, because it details how the business will generate cash flow, pay for operating expenses, and service debt repayment.

The accompanying table offers several elements for inclusion in designing a business plan.

In addition to these structures, Edward Rogoff gives six main strengths every business plan should convey in his 2007 book *Bankable Business Plans: Second Edition*. These strengths Rogoff calls the six immutable points, the goal being to prove these points to any reader of the business plan.

Elements of a Business Plan

1. Cover sheet
2. Statement of purpose
3. Table of contents

I. The Business
A. Description of business
B. Marketing
C. Competition
D. Operating procedures
E. Personnel
F. Business insurance

II. Financial Data
A. Loan applications
B. Capital equipment and supply list
C. Balance sheet
D. Breakeven analysis
E. Pro-forma income projections (profit & loss statements)
    1. Three-year summary
    2. Detail by month, first year
    3. Detail by quarters, second and third years
    4. Assumptions upon which projections were based
F. Pro-forma cash flow

III. Supporting Documents
A. Tax returns of principals for the last three years
B. Personal financial statement (all banks have these forms)
C. For franchised businesses, a copy of franchise contract and all supporting documents provided by the franchisor
D. Copy of proposed lease or purchase agreement for building space
E. Copy of licenses and other legal documents
F. Copy of resumes of all principals
G. Copies of letters of intent from suppliers, etc.

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1. You are profit-oriented.

2. You are honest.

3. You are qualified.

4. You are thorough.

5. You are committed to meeting everyone's needs.

6. You are flexible.

CUSTOMIZING FOR INVESTOR TYPE

Bankers, venture capital fund managers, and business angels each look at different features of a business plan when assessing it for investment. Bankers tend to focus on the financial aspects of the plan and give little emphasis to marketing and management issues. Venture capital fund managers are typically most interested in both the marketing and the financial aspects of the plan. Business angels focus on entrepreneurial elements and "investor fit" considerations. Thus business plan writers should customize their proposals based on the audience they are trying to reach.

Bankers are interested in businesses that will be successful over the long term and entrepreneurs who will remain committed to the project as described in the business plan. When making their lending decisions, they are interested in collateral as security for the loan, and tend to support projects that are less risky. A banker's main interest is the repayment of the loan.

Venture capital fund managers invest for capital gain, and when a venture is successful, they also benefit. Likewise, if a business fails, venture capital fund managers stand to lose significantly and at much cost to the outside investors whose funds they are managing. Therefore, venture capital fund managers focus on the uniqueness of the product or service, the status of the market, and the management team's potential for success. Venture capital fund managers' main interest is growth potential and potential returns.

Business angels' interests align more closely with venture capital fund managers than with bankers. Business angels focus on how their interests match up with the entrepreneur's and how well they are able to work with the entrepreneur over the length of the project. They seek out entrepreneurs who have strong, positive qualities, such as integrity and responsibility, and with whom they feel a connection. Because the investment is personal for the business angel, he or she is interested in financial gains, but also enjoys the opportunity to participate in the venture itself. A business angel's main interest is potential returns, camaraderie with the entrepreneur(s), and personal involvement.

Steingold, in his 2007 *Complete Guide to Selling a Business*, says that a good business plan will aid investors in several other, more intangible ways. The strength of a strong vision for business direction can inspire interested buyers, communicating the power of the idea as well as the financial prospects. Investors who believe in the organization's goals will be much more likely to understand business models and provide financial support for endeavors. Also, Steingold believes a strong business plan gives buyers a cushion, something to rely on when they get cold feet. Negotiations can go on for weeks, and when the time lends uncertainty to the buyer's decision, they can rely on the business plan as proof the sellers know what they are doing.

RECENT TRENDS

An article by A. Gome investigates a growing trend among certain entrepreneurs to move away from the old-style business plan that contains an extended, long-term outlook. They are opting instead to use an abbreviated, shorter-term document that better fits their business strategy.

Long-range planning documents don't work as well for some entrepreneurs because of the fast-changing markets they are entering into, which renders the business plan irrelevant within months. And, the short-term nature of some ventures precludes the need for a long-term plan. It is unnecessary to have a five-year plan if the entrepreneur expects to conclude his venture within a shorter time frame.

LIVING DOCUMENTS

Replacing the traditional business plan is what is called a "living document," typically one page in length and with a forward-looking range of one year. Goal-setting may be projected on three- to six-month timeframes, which are more easily monitored and attainable. The living document contains similar elements of a typical business plan—vision, values, objectives, methods toward reaching objectives—but abbreviated to fit on a single page. This document needs constant updating and adjusting, with ample flexibility to respond to customer and market fluctuations. Highly-tailored documents may also need to be prepared for each type of stakeholder, whether bankers, venture capital fund managers, or business angels.

RESOURCES

There are many resources for the entrepreneur looking to write a business plan. Local business organizations, public libraries, colleges and universities may offer useful workshops, seminars, or courses.

Local SBA offices or Web sites (<http://www.sba.gov>) also offer resources. The SBA has sponsored more than 200,000 loans worth more than $45 billion, making it the largest single financial backer of U.S. businesses in the country. The SBA provides free online courses, e-mail guidance, print materials, and face-to-face consultations to small business owners.

The SBA also administers the Small Business Development Center Program to provide management assistance to current and prospective small business owners. This program provides a broad-based system of assistance for the small business community by linking the resources of federal, state and local governments with the resources of the educational community and the private sector.

There are also several books and software programs that assist with creating a business plan.

SEE ALSO *Entrepreneurship; Venture Capital*

BIBLIOGRAPHY

Bunderson, Gaye. "Have Your Business Plan in Hand Before Seeking $$$." *Idaho Business Review* 31 January 2005.

Business Plans Handbook. Farmington Hills, MI: Gale Group, Inc., 2004.

Covello, Joseph A., and Brian Hazelgren. *Your First Business Plan.* Sourcebooks, Inc., 2005.

Delmar, F., and S. Shane. "Does Business Planning Facilitate the Development of New Ventures?" *Strategic Management Journal* 24 (December 2004): 1165–1185.

Gome, A. "Plan Not to Plan." *BRW* 27 (February 2005): 72–73.

Lasher, William. *The Perfect Business Plan Made Simple.* New York, NY: Broadway Books, 2005.

Mason, Colin, and Matthew Stark. "What Do Investors Look for in a Business Plan?" *International Small Business Journal* 22 (June 2005): 227–248.

McKeever, Mike P. *How to Write a Business Plan.* Berkeley, CA: Nolo, 2007.

Office of Small Business Development Centers. U.S. Small Business Administration. Available from: http://www.sba.gov/sbdc/aboutus.html.

Pinson, Linda. *Anatomy of a Business Plan: A Step-By-Step Guide to Building a Business and Securing Your Company's Future.* Chicago, IL: Dearborn Trade Publishing, 2005.

Rogoff, Edward G. *Bankable Business Plans: Second Edition.* New York: Rowhouse Publishing, 2007.

Steingold, Fred S. *The Complete Guide to Selling a Business.* Berkely, CA: Nolo, 2007.

Tailor, Amy. "Successful Business Plan." *Alternative Library of Stock Market.* http://alternativestocklibrary.com, 2008.

U.S. Small Business Administration. "Elements of a Business Plan." Available from: http://www.sba.gov/starting_business/planning/writingplan.html.

BUSINESS PROCESS REENGINEERING

Process reengineering is redesigning or reinventing how people perform their daily work, and it is a concept that is applicable to all industries regardless of size, type, and location.

While selected elements of process reengineering are well documented in the late nineteenth and early twentieth centuries, process reengineering as a body of knowledge (or as an improvement initiative) takes the best of the historical management and improvement principles and combines them with more recent philosophies and principles; in theory, this makes all people in an organization function as process owners and reinvent processes. It is this combination of the old and the new as well as the emphasis on dramatic, rapid reinvention that makes process reengineering an exciting concept.

The beginning of business process reengineering is often cited as an MIT research project conducted from 1984 to 1989, showing that managers were beginning to recreate their businesses using new technology and ideas. The concept traveled quickly through the business world, jumpstarted by a 1990 article by Michael Hammer called "Re-engineering Work: Don't Automate, Obliterate." Neil Botten and Adrian Sims explain Hammer's idea in their 2007 CIMA textbook, *Management Accounting–Business Strategy* and use as an example the reengineering of credit sales at IBM. The IBM sales force processed certain sales in a series of steps, each step requiring separate authorization: authorization of the sale, approval by the legal department, allocation of funds from the financial, and so on. This process took weeks, and was often too long to make a sale. Realizing the entire process needed only a few minutes to complete, IBM used technology to reinvent the steps, and today the IBM sales force uses laptops to carry out all authorizations on a demand basis.

BPR (business process reengineering) is often compared to TQM (total quality management), and the rise in one has corresponded to the rise in the other in recent years. In Malhotra's 1998 article "Business Process Redesign: An Overview," he cites clear differentiation between the two regarding how they are carried out. TQM is seen as being composed of small, incremental steps, all aimed at improving the company's efficiency over time. In contrast, BPR is composed of much larger steps; it is an overhaul, a radical redesigning of the business's plans and ways of reaching goals.

The process of BPR can begin in many different ways and on many different levels within an organization. Peter Carter, in his Introductory Guide to BPR (2005), suggests that BPR can start with an organization's mission or vision statement. Profound changes in a mission statement can give a company new direction, serving as a base for reengineering across company levels. Since mission and vision statements often include goals and areas of focus for organizations, any change in them trickles down to change the entire organization. (Other principle ways to implement business process reengineering are covered later in the article.)

In today's technological business world, many tools for BPR can be found in software or in a company's online

structures. Carter gives several examples, such as easy and instant electronic documentation of processes, simulation analysis, and "object oriented technology," allowing decisions made in the network to affect all parts of that network. The advent of ERP (enterprise resource planning) systems helped organizations unite many departments into integrated online resources, making BRP much easier.

BASICS OF PROCESS REENGINEERING

The first question in process reengineering is: "Why are we doing this at all?" Answering this question is the beginning of the immediate, dramatic change and the application of supporting technical and behavioral concepts and tools that are necessary to implement process reengineering. To accomplish this, organizations must foster an environment that encourages quantum leaps in improvement by throwing out existing systems and processes and inventing new ones.

The intent of process reengineering is to make organizations significantly more flexible, responsive, efficient, and effective for their customers, employees, and other stakeholders. According to field experts Hammer and James Champy, process reengineering requires the "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed."

If process reengineering is to work, a business's priorities must change in the following ways: (1) from boss to customer focus; (2) from controlled workers to empowered, involved process owners and decision makers; (3) from activity-based work to a results orientation; (4) from scorekeeping to leading and teaching so that people measure their own results; (5) from functional (vertical) to process (horizontal or cross functional) orientation; (6) from serial to concurrent operations; (7) from complex to simple, streamlined processes; (8) from empire building and guarding the status quo to inventing new systems and processes and looking toward the future (i.e., from the caretaker mentality to visionary leadership).

As organizational priorities change, the culture will change as well. As people understand the vision for a better culture with better capabilities and results, they will be able—individually and as members of teams—to contribute positively to make the organizational vision a reality.

REASONS FOR PROCESS REENGINEERING

There are several reasons for organizations to reengineer their business processes: (1) to re-invent the way they do work to satisfy their customers; (2) to be competitive;

(3) to cure systemic process and behavioral problems; (4) to enhance their capability to expand to other industries; (5) to accommodate an era of change; (6) to satisfy their customers, employees, and other stakeholders who want them to be dramatically different and/or to produce different results; (7) to survive and be successful in the long term; and (8) to invent the "rules of the game."

Whatever the reason for reengineering, managers should ask themselves: What do our customers and other stakeholders want/require? How must we change the processes to meet customer and other stakeholder requirements and be more efficient and effective? Once streamlined, should the processes be computerized (i.e., how can information technology be used to improve quality, cycle time, and other critical baselines)? Processes must be streamlined (i.e., re-invented) before they are computerized. Otherwise, the processes may produce results faster, but those results may not be the ones needed.

REQUIREMENTS FOR SUCCESSFUL PROCESS REENGINEERING

Many experts indicate that there are essential elements of process reengineering, including:

- Initiation from the top by someone with a vision for the whole process and relentless deployment of the vision throughout the organization.

- Leadership that drives rapid, dramatic process redesign.

- A new value system which includes a greater emphasis on satisfying customers and other stakeholders.

- A fundamental re-thinking of the way people perform their daily work, with an emphasis on improving results (quality, cycle time, cost, and other baselines).

- An emphasis on the use of cross-functional work teams, which may result in structural redesign as well as process redesign.

- Enhanced information dissemination (including computerization after process redesign) in order to enable process owners to make better decisions.

- Training and involvement of individuals and teams as process owners who have the knowledge and power to re-invent their processes.

- A focus on total redesign of processes with non-voluntary involvement of all internal constituents (management and non-management employees).

- Rewards based on results and a disciplined approach.

POTENTIAL PROBLEMS

In Robert Plant and Stephen Murrell's book *An Executive's Guide to Business Technology* (2007), several negative issues of BRP are examined. The authors note that, because BRP is such an intense, company-wide overhaul, it has the potential to break an organization as much as make it. If the workforce is angry or is against the change, BRP can fail, despite careful planning. Plant and Murrell give the example of the drug company Foxmeyer, which attempted a massive reengineering strategy based on BRP systems but was driven to bankruptcy in 1996. Since BRP can be so greatly affected by employee attitude, Plant and Murrell advise careful expectation management of the reinvention. However, experts state there are many other reasons that process reengineering fails, including:

- Not focusing on critical processes first.

- Trying to gradually "fix" a process instead of dramatically re-inventing it.

- Making process reengineering the priority and ignoring everything else (e.g., strategy development and deployment, re-structuring based on new strategies, etc.).

- Neglecting values and culture needed to support process reengineering and allowing existing culture, attitudes, and behavior to hinder reengineering efforts (e.g., short-term thinking, bias against conflict, consensus decision making, and so forth).

- "Settling" for small successes instead of requiring dramatic results.

- Stopping the process reengineering effort too early, before results can be achieved.

- Placing prior constraints on the definition of the problem and the scope for the reengineering effort.

- Trying to implement reengineering from the bottom up instead of top down.

- Assigning someone who doesn't understand reengineering to lead the effort.

- Skimping on reengineering resources.

- Dissipating energy across too many reengineering projects at once.

- Attempting to reengineer when the CEO is near retirement.

- Failing to distinguish reengineering from, or align it with, other improvement initiatives (e.g., quality improvement, strategic alignment, right-sizing, customer-supplier partnerships, innovation, empowerment, etc.).

- Concentrating primarily on design and neglecting implementation.

- Pulling back when people resist making reengineering changes (not understanding that resistance to change is normal).

RELATED STRATEGIES

Strategic approaches that are process-focused and that are extensions of process reengineering include the following:

- Intensification—improving/re-inventing processes to better serve customers

- Extension—using strong processes to enter new markets

- Augmentation—expanding processes to provide additional services to existing customers

- Conversion—using a process that you perform well and performing that process as a service for other companies

- Innovation—applying processes that you perform well to create and deliver different goods and services

- Diversification—creating new processes to deliver new goods or services

Bjorn Anderson gives some guidelines for businesses seeking BRP in his 2007 book *Business Process Improvement Toolbox*. Businesses that are looking for an increase in profits or a certain percentage gain in certain areas should not attempt BRP. Although process reengineering does increase profits and growth if it is a success, it should not be attempted simply to bolster a company's income. Neither should it be attempted by organizations that are looking to solely streamline business and combine operations. Instead, process reengineering is a valuable concept for organizations that are willing to undergo dramatic change and radical process redesign. It can co-exist with ongoing gradual process improvement efforts because not all processes can be radically redesigned at once.

In process reengineering, as in all improvement initiatives, assessments should be made in terms of cost/benefit analysis, and risk analysis. However, even the assessments should be done with a sense of urgency since process reengineering requires speed as well as radical redesign. Documentation of results will serve as the baseline for future improvements.

The various improvement methodologies (i.e., continuous improvement and process reengineering) should not be used as separate efforts but rather as two approaches within a single improvement initiative. In fact, a single flowchart can be used to make choices regarding both continuous process improvement and process reengineering. Both gradual continuous improvement and process reengineering should be an integral part of process management.

SEE ALSO *Continuous Improvement; Product-Process Matrix*

BIBLIOGRAPHY

Anderson, Bjorn. *Business Process Improvement Toolbox.* American Society for Quality, 2007.

Bossidy, Larry, and Ram Charan. *Execution: The Discipline of Getting Things Done.* New York: Crown Publishing Group, Random House, 2002.

Botten, Neil, and Adrian Sims. *CIMA Learning System 2007: Management Accounting Business Strategy.* Oxford: Butterworth-Heinemann, 2007.

Carter, Peter. "Business Process Reengineering." *Teamtechnology.com.* Team Technology, 2005.

Champy, James. *Reengineering Management.* New York: HarperCollins Publishers, 1995.

Davenport, Thomas H. "Need Radical Innovation and Continuous Improvement? Integrate Process Reengineering and TQM." *Planning Review* May-June 1993, 7–12.

Hammer, Michael. *The Reengineering Revolution.* New York: HarperCollins Publishing, 1996.

Hammer, Michael, and James Champy. *Reengineering the Corporation.* New York: Harper Business Publisher, 1993.

Hengst, Marielle den, and Gert-Jan de Vreede. "Collaborative Business Engineering: A Decade of Lessons from the Field." *Journal of Management Information Systems* 20, no. 4 (spring 2004): 85–113.

Kinni, Theodore. "A Reengineering Primer." *Quality Digest* January 1994, 26–30.

Kumar, Sameer, and Ralph Harris. "Improving Business Processes for Increased Operational Efficiency: A Case Study." *Journal of Manufacturing Technology Management* 15, no. 7 (2004): 662.

Malhotrah, Yogesh. "Business Process Redesign: An Overview." *Brint Institute,* 1998. Available from: http://www.kmbook.com/bpr.htm.

Petroski, Henry. "Look First to Failure." *Harvard Business Review* 82, no. 10 (October 2004): 18.

Plant, Robert, and Stephen Murrell. *An Executive's Guide to Information Technology: Principles, Business.* Cambridge: Cambridge University Press, 2007.

———. *Process Innovation.* Boston: Harvard Business School Press, 1993.

———. *Process Reengineering Training Manual.* Commerce, TX: Center for Excellence, 1994.

Pryor, Mildred Golden, and Donald W. Pryor. "Process Reengineering as a Quality Strategy." *Israel Society For Quality Proceedings* November 1994, 681–696.

———. "Reengineering Work: Don't Automate, Obliterate." *Harvard Business Review* July-August 1990, 104–112.

Reijers, H.A., and S. Liman Mansar. "Best Practices in Business Process Redesign: An Overview and Qualitative Evaluation of Successful Redesign Heuristics" *OMEGA* 33, no. 4 (August 2005): 283.

Roberts, Lon. *Process Reengineering: The Key To Achieving Breakthrough Success.* Milwaukee, WI: ASQ Press, 1994.

———. *X-Engineering the Corporation: Re-inventing Your Business in the Digital Age.* New York: Warner Business Books, 2001.

Young, Martha, and Michael Jude. "Business Process Virtualization, Outsourcing and Process Reengineering." Available from: http://www.informit.com/articles/article.asp?p=169681.

BUSINESS STRUCTURE

One of the first critical decisions to be made when forming a new company is the formal structure that the business will take. The formal structure of the business impacts issues such as liability, ownership, operating strategy, and taxation. Four different business structures are discussed below: partnership, corporation, subchapter S, and limited liability corporation (LLC).

PARTNERSHIPS

A partnership is a business association where two or more individuals (or partners) share equally in profits and losses. As is the case with a sole proprietorship, partners have full legal responsibility for the business (including debts against the business). Persons entering into this type of business need a partnership agreement detailing how much each partner owns of the business, how much capital each person will contribute, and the percentage of profits to which they are entitled; how company decisions will be made; if the company is open to new/additional partners, and how they can join; and in what cases and how the company would be dissolved.

In a general partnership, all partners are liable for actions made on the company's behalf, including decisions made and actions taken by other partners. Profits (and loss) are shared by all partners, as are company assets and authority.

A limited partnership is a similar business arrangement with one significant difference. In a limited partnership, one or more partners are not involved in the management of the business and are not personally liable for the partnership's obligations. The extent to which the limited partner is liable is thus "limited" to his or her capital investment in the partnership.

In a limited partnership agreement, several conditions must be met, the most important of which is that a limited partner or partners have no control or management over the daily operations of the organization. At least two partners, and one or more of the general partners, must manage the business and are liable for firm debts and financial responsibilities. If a limited partner becomes involved in the operation of the partnership, he or she stands to lose protection against liability. In addition, a limited partnership agreement, certificate, or registration has to be filed, usually with the secretary of state, but this varies by state. Such an agreement generally

includes the names of general and limited partners, the nature of the business, and the term of the limited partnership or the date of dissolution. Since limited partnerships are often used to raise capital, the agreement has a set term of duration. Individual states may also have additional limited partnership requirements.

The most frequent use of the limited partnership agreement has been as an investment, removing the limited partner from financial liability but raising capital through his or her investments or contributions. Limited partnerships are common in real estate investments and, more recently, in entertainment business ventures.

Partnerships are not required to file tax returns for the company, but individual partners do have to claim their share of the company's income or loss on personal tax returns. The Internal Revenue Service (IRS) governs limited partnerships for tax purposes. IRS guidelines restrict limited partnership investments to 80 percent of the total partnership interests. (See IRS Revenue Procedure 92-88 for information governing limited partnerships.) Limited partnerships are also taxable under state revenue regulations.

CORPORATIONS

The major difference between a partnership and a corporation is that the corporation exists as a unique and separate entity from its owners, or shareholders. A corporation must be chartered by the state in which it is headquartered. It can be taxed, sued, or entered into contractual agreements, and it is responsible for its own debts. The shareholders own the corporation, and they elect a board of directors to make major decisions and oversee corporate policy. The corporation files its own tax return and pays taxes on its income from operations. Unlike partnerships, which often dissolve when a partner leaves, a corporation can continue despite turnover in shareholders/ownership. For this reason, a corporate structure is more stable and reliable than a partnership.

Incorporating offers several major advantages over partnership. Sale of stock can help raise large amounts of capital significantly faster and shareholders are only responsible for their personal financial investment in the company. Shareholders have only limited liability for debts and judgments made against the company. And the corporation can deduct the cost of benefits paid to employees from corporate tax returns.

Forming a corporation costs more money than forming a partnership, including legal and regulatory fees, which vary depending on the state in which the business is incorporated. Corporations are subject to monitoring by federal and state agencies, and some local agencies. More paperwork related to taxes and regulatory compliance is required. Taxes are higher for corporations, partic-

ularly if it pays dividends, which are taxed twice (once as corporation income, then again as shareholder income).

SUBCHAPTER S

Some small businesses are able to take advantage of the corporate structure and avoid double taxation. These companies must be small, domestic firms with seventy-five shareholders or less and only one class of stock, and all shareholders must meet eligibility requirements. If a company meets these requirements, they can treat company profits as distributions through shareholders' personal tax returns. This way the income is taxed to shareholders instead of the corporation, and income taxes are only paid once. Subchapter S corporations are also known as small business corporations, S-corps, S corporations, or tax-option corporations.

LIMITED LIABILITY CORPORATION

The limited liability corporation (LLC) structure combines the benefits of ownership with the personal protection a corporation offers against debts and judgments. One or more people can form an LLC, and business owner(s) can either choose to file taxes as a sole proprietorship/partnership or as a corporation. The process of forming an LLC is more extensive than a partnership agreement but still involves less regulatory paperwork than incorporation.

Major advantages offered by the LLC structure are:

- The business does not have to incorporate (or pay corporate taxes).
- One person alone can create an LLC.
- Owners can be compensated through company profits.
- Business losses can be reported against personal income.

Still, some may choose to file taxes as a corporate entity, particularly if owners want to keep corporate income within the business to aid its growth. According to the Small Business Administration, an LLC cannot file partnership tax forms if it meets more than two of the following four qualifications that would classify it as a corporation: (1) limited liability to the extent of assets; (2) continuity of life; (3) centralization of management; and (4) free transferability of ownership to interests. If more than two of these apply, the LLC must file corporation tax forms.

An LLC that chooses to be taxed as an S corporation can also do the following, which the traditional S corporation cannot:

- Have more than seventy-five business owners
- Include a nonresident alien as an owner

- Have either a corporation or a partnership as an owner

- Have more than 80 percent ownership in a separate corporate entity

- Have disproportionate ownership—ownership percentages that are different from each respective owner's investment in the business

- Have flow-through business loss deductions in excess of each respective owner's investment in the business

- Have owners/members who are active in the management of the business without losing limited personal liability exposure

Companies can change their business structure. Tax filing—and the subsequent tax payment—prompts many businesses to make decisions about restructuring their business. Owners may opt for a new structure due to changes to tax laws or in the business itself. In order to anticipate what changes in structure might be beneficial, companies should schedule an annual discussion about long-term business plans with an accountant and/or tax advisor.

SEE ALSO *Entrepreneurship; Organizational Chart*

BIBLIOGRAPHY

"Choosing a Business Structure." *AccountingWEB.com*, 22 Apr. 2008. Available from: http://www.accountingweb.com/cgi-bin/item.cgi?id=105002&d=883&h=884&f=882&date format=%25o%20%25B%20%25Y.

"Choosing the Best Ownership Structure for Your Business." *NOLO.com.* Available from: http://www.nolo.com/resource.cfm/catid/5de04e60-45bb-4108-8d757e247f35b8ab/111/182/.

Gabriel, Michael Lynn. *Everyone's Partnership Book.* Available from: http://www.attorneyetal.com/Previews/Partnr.html.

Hynes, Dennis L. *Agency, Partnership, and the LLC in a Nutshell.* St. Paul, MN: West Publishing, 1997.

Mancuso, Anthony. *LLC or Corporation?: How to Choose the Right Form for Your Business Entity.* Berkeley, CA: NOLO, 2005.

Meier, David. "The Many Benefits of Forming an LLC: A Closer Look at Why This Legal Structure Can Be Good for Business." *Entrepreneur,* 16 Aug. 2004. Available from: http://www.entrepreneur.com/article/0,4621,316656,00.html.

U.S. Small Business Administration. "Forms of Business Ownership." Available from: http://www.sba.gov/starting_business/legal/forms.html.

C

CAFETERIA PLAN— FLEXIBLE BENEFITS

A cafeteria plan, also called a flexible benefit plan, allows employees to choose from a menu of optional benefits the ones that best fit their individual needs. Cafeteria plans earn their nickname from the flexibility they give employees in customizing their benefits from this menu. In a cafeteria plan, benefits required by law (e.g., Social Security, unemployment compensation, workers' compensation) and those mandated by company policies or labor agreements are supplemented by a list of other benefits to which employees can subscribe.

Employees' choices of optional benefits are limited only by the total benefit dollars available and the variety of benefits offered by the employer. Optional benefits that are often part of cafeteria plans include dental insurance, vision care, group-term life insurance, child care, and disability insurance. Many companies offer some form of cafeteria benefit plan to their employees, although smaller companies are less likely than larger companies to offer flexible benefits.

Most cafeteria plans are compliant with Section 125 of the Internal Revenue Code. This means that they meet specific requirements set out by the Internal Revenue Service (IRS). Such plans offer the potential of cost savings both to employers and employees, particularly because amounts spent by either the employer or the employee are spent out of pre-tax earnings. Thus, both employers and employees may save on Federal Insurance Contributions Act payroll taxes. The employee also may save on state and federal income taxes.

TYPES OF CAFETERIA PLANS

Employers offer several variations of cafeteria plans, including core-plus plans and modular plans. Core-plus plans provide a set of mandatory benefits that are usually designed to meet the basic needs of all employees. In addition to legally-required benefits, medical insurance, long-term disability insurance, and retirement benefits are often included in the core. Optional benefits are offered to employees who spend benefit credits to select other benefits that best fit their needs.

Modular plans usually package several different bundles of benefits that offer increasingly extensive arrays of benefits. The basic module might include only the legally-required benefits, basic health insurance, and life insurance. A second module might include everything in the basic module plus additional benefits. A third module might include everything in modules one and two, and additional benefits. Employees would choose the module that best fits their needs and life situation.

Two specific benefits are often part of the cafeteria plan: pre-tax health insurance premium deductions, known as a Premium Only Plan (POP), and flexible spending accounts (FSAs) for dependent care and out-of-pocket unreimbursed medical expenses. Under POP plans, employees may elect to withhold a portion of their pre-tax salary to pay for their premium contribution for most employer-sponsored health and welfare benefit plans. The POP plan is the simplest type of Section 125 plan. It requires little maintenance after it is set up through a company's payroll.

FSAs are reimbursement accounts that employees fund based on those qualified expenses that they expect

to incur during the year. As mentioned previously, the two main types of reimbursement accounts are dependent care and health care reimbursement accounts. While there are no federal limits on how much employees may set aside, there are employer-mandated limits. Employers set an annual maximum on FSAs, which are subject to an annual "use-or-lose" rule. An FSA cannot provide a cumulative benefit to the employee beyond the plan year.

PROBLEMS WITH CAFETERIA PLANS

Perhaps the largest problem with cafeteria plans, as opposed to one-size-fits-all benefit plans, is that cafeteria plans are more complicated to administer. Since employees choose individualized benefit packages, the company must take care to record and maintain each employee's benefit package accurately. The company must maintain adequate communication with employees about changes in the cost of benefits, their coverage, and their use of benefits. Employees must also be offered the opportunity to revisit their benefit choices and make new selections as their needs and life situations change. Additionally, employers must comply with IRS rules and regulations regarding cafeteria plans so that the plans retain their tax-favored status.

Another issue that arises with cafeteria plans is the adverse selection problem. This problem occurs because employees are likely to choose the optional benefits they are most likely to use. If enough employees do this, the cost of the benefit will eventually be driven up, as the premiums received must cover the expenditures of the benefit. For example, suppose a company allows employees to change their cafeteria plan selections once each year. During this "free enrollment" period, an employee who knows (or suspects) that he or she faces extensive dental work in the coming year would be more likely to sign up for dental insurance than the employee who expects only routine dental care. Likewise, an employee who has begun having vision problems would probably be more likely to sign up for vision coverage than an employee with perfect eyesight.

Sometimes employers will place restrictions on certain benefits to try to alleviate the adverse selection problem. Modular plans may reduce the adverse selection problem, as the employer can package benefits in a way that limits employees' opportunity to choose individual benefits by requiring them to choose a broad package of benefits.

In addition to cafeteria plans, companies are adopting benefit programs that offer financial incentives as a reward for employees who adopt healthy lifestyles. A 2007/2008 Watson Wyatt and National Business Group on Health survey found that nearly half of employers surveyed offer financial incentives to encourage workers to improve their health. An additional 26 percent of employers reported that they will offer similar financial incentives before 2010.

Regardless of trends in health care, the increasing diversity of the labor force means that the demand for benefit packages tailored to individual needs and circumstances is likely to remain strong. Thus, the number of companies offering flexible benefit plans and the rate of employee participation in such plans should continue to increase.

SEE ALSO *Human Resource Management*

BIBLIOGRAPHY

Bryson, Trent D. "The Benefits of Cafeteria Plans." *Entrepreneur*, 14 September 2005. Available from: http://www.entrepreneur.com/humanresources/compensationandbenefits/article79978.html.

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources*. 4th ed. Upper Saddle River, NJ: Prentice-Hall, 2004.

Henderson, Richard L. *Compensation Management in a Knowledge-Based World*. 9th ed. Upper Saddle River, NJ: Prentice-Hall, 2003.

Internal Revenue Service. "FAQs for Government Entities Regarding Cafeteria Plans." Available from: http://www.irs.gov/govt/fslg/article/0,,id=112720,00.html.

"More Companies to Offer Financial Incentives for Healthy Lifestyles." *HR.BLR.com,* 9 Nov. 2007. Available from: http://hr.blr.com/news.aspx?id=77371.

"Using a Cafeteria Plan." *AOL Money* & *Finance*. Available from: http://money.aol.com/basics/3canvas/_a/using-a-cafeteriaplan/20050225133409990018.

CAPACITY PLANNING

Capacity planning has seen an increased emphasis due to the financial benefits of the efficient use of capacity plans within material requirements planning systems and other information systems. Insufficient capacity can cause deteriorating delivery performance, unnecessarily increase work-in-process, and frustrate sales and manufacturing personnel. However, excess capacity can be costly and unnecessary. The inability to properly manage capacity can be a barrier to the achievement of maximum firm performance. In addition, capacity is an important factor in the organization's choice of technology.

Capacity is usually assumed to mean the maximum rate at which a transformation system produces or processes inputs. Sometimes, this rate may actually be "all at once"—as with the capacity of an airplane. A more usable definition of capacity would be the volume of output per elapsed time and the production capability of a facility.

Capacity planning is the process used to determine how much capacity is needed (and when) in order to

manufacture greater product or begin production of a new product. A number of factors can affect capacity—number of workers, ability of workers, number of machines, waste, scrap, defects, errors, productivity, suppliers, government regulations, and preventive maintenance. Capacity planning is relevant in both the long term and the short term. However, there are different issues at stake for each.

LONG-TERM CAPACITY PLANNING

Over the long term, capacity planning relates primarily to strategic issues involving the firm's major production facilities. In addition, long-term capacity issues are interrelated with location decisions. Technology and transferability of the process to other products is also intertwined with long-term capacity planning. Long-term capacity planning may evolve when short-term changes in capacity are insufficient. For example, if the firm's addition of a third shift to its current two-shift plan still does not produce enough output, and subcontracting arrangements cannot be made, one feasible alternative is to add capital equipment and modify the layout of the plant (long-term actions). It may even be desirable to add additional plant space or to construct a new facility (long-term alternatives).

SHORT-TERM CAPACITY PLANNING

In the short term, capacity planning concerns issues of scheduling, labor shifts, and balancing resource capacities. The goal of short-term capacity planning is to handle unexpected shifts in demand in an efficient, economic manner. The time frame for short-term planning is frequently only a few days but may run as long as six months.

Alternatives for making short-term changes in capacity are fairly numerous and can even include the decision to not meet demand at all. The easiest and most commonly used method to increase capacity in the short term is working overtime. This is a flexible and inexpensive alternative. While the firm has to pay one and one half times the normal labor rate, it foregoes the expense of hiring, training, and paying additional benefits. When not used abusively, most workers appreciate the opportunity to earn extra wages. If overtime does not provide enough short-term capacity, other resource-increasing alternatives are available. These include adding shifts, employing casual or part-time workers, the use of floating workers, leasing workers, and facilities subcontracting.

Firms may also increase capacity by improving the use of their resources. The most common alternatives in this category are worker cross-training, and overlapping or staggering shifts. Most manufacturing firms inventory some output ahead of demand so that any need for a capacity change is absorbed by the inventory buffer. From a technical perspective, firms may initiate a process design

intended to increase productivity at work stations. Manufacturers can also shift demand to avoid capacity requirement fluctuation by backlogging, queuing demand, or lengthening the firm's lead times. Service firms accomplish the same results through scheduling appointments and reservations.

A more creative approach is to modify the output. Standardizing the output or offering complimentary services are examples. In services, one might allow customers to do some of the process work themselves (e.g., self-service gas stations and fast-food restaurants). Another alternative—reducing quality—is an undesirable yet viable tactic.

Finally, the firm may attempt to modify demand. Changing the price and promoting the product are common examples. Another alternative is to partition demand by initiating a yield or revenue management system. Utilities also report success in shifting demand by the use of "off-peak" pricing.

CAPACITY-PLANNING TECHNIQUES

There are four procedures for capacity planning; capacity planning using overall factors (CPOF), capacity bills, resource profiles, and capacity requirements planning (CRP). The first three are rough-cut approaches (involving analysis to identify potential bottlenecks) that can be used with or without manufacturing resource planning (MRP) systems. CRP is used in conjunction with MRP systems.

Capacity using overall factors is a simple, manual approach to capacity planning that is based on the master production schedule and production standards that convert required units of finished goods into historical loads on each work center. Bills of capacity is a procedure based on the manufacturing production schedule (MPS). Instead of using historical ratios, however, it utilizes the bills of material and routing sheet (which shows the sequence or work centers required to manufacture the part, as well as the setup and run time). Capacity requirements can then be determined by multiplying the number of units required by the MPS by the time needed to produce each. Resource profiles are the same as bills of capacity, except lead times are included so that workloads fall into the correct periods.

Capacity requirements planning is only applicable in firms using MRP or MRP II. CRP uses the information from one of the previous rough-cut methods, plus MRP outputs on existing inventories and lot sizing. The result is a tabular load report for each work center or a graphical load profile for helping plan-production requirements. This will indicate where capacity is inadequate or idle, allowing for imbalances to be corrected by shifts in personnel or equipment or the use of overtime or added shifts. Finite capacity scheduling is an extension of CRP

that simulates job order stopping and starting to produce a detailed schedule that provides a set of start and finish dates for each operation at each work center.

Technology plays an essential role in capacity planning. Many companies rely on software to provide real-time inventory data, a task especially important in an increasingly globalized economy dependent on outsourcing. Furthermore, the technology sector itself requires extensive capacity planning in order to optimize network traffic. According to a Microsoft capacity-planning white paper, "Network planning can be compared to designing a town's road system. In both tasks, you need to understand who is using which routes, how large batches of traffic are (and can be), where journeys start, where they stop, and how all of these things vary over time."

A failure to understand the critical nature of managing capacity can lead to chaos and serious customer service problems. If there is a mismatch between available and required capacity, adjustments should be made. However, it should be noted that firms cannot have perfectly-balanced material and capacity plans that easily accommodate emergency orders. If flexibility is the firm's competitive priority, excess capacity would be appropriate.

SEE ALSO *Aggregate Planning; Manufacturing Resources Planning*

BIBLIOGRAPHY
Baron, Anthony. "Strategies in Network Capacity Planning and Network Optimization." Microsoft TechNet. Available from: http://www.microsoft.com/technet/archive/winntas/maintain/ntopt3.mspx?mfr=true.

Cochran, Jeffery K., and Alberto Marquez Uribe. "A Set Covering Formulation for Agile Capacity Planning Within Supply Chains." *International Journal of Production Economics* 95, no. 2 (2005): 139–149.

Gunter, Neil J. *Guerilla Capacity Planning: A Tactical Approach to Planning for Highly Scalable Applications and Services.* New York: Springer, 2006.

Jonsson, Patrik, and Stig-Arne Mattsson. "Use and Applicability of Capacity Planning Methods." *Production and Inventory Management Journal* 43, no. 3-4 (2002): 89–95.

Meredith, Jack R., and Scott M. Shafer. *Operations Management for MBAs.* 2nd ed. New York: John Wiley and Sons, Inc., 2002.

Vollmann, Thomas E., William L. Berry, D. Clay Whybark, and Robert F. Jacobs. *Manufacturing Planning and Control Systems.* Boston: McGraw-Hill, 2005.

CASE METHOD OF ANALYSIS

The case method of analysis involves studying actual business situations—written as an in-depth presentation of a company, its market, and its strategic decisions—in order to improve a manager's or a student's problem-solving ability. Cases typically investigate a contemporary issue in a real-life context. There are multiple issues to consider, and many "correct" or viable alternatives for solving the case issues are presented. Case studies provide students with a "note of reality" that makes learning more relevant and enjoyable.

Cases are written and published in textbooks by students, faculty, or consultants. Cases may be based on actual company experiences, like a consulting project, or may be developed from articles and events in business periodicals and newspapers. Cases include actual information of a company's decisions and may include interviews, observations, or data from firm and industry records, as well as database records and published historical facts on the company and the industry. Barbazette identified five types of case studies:

1. Identification case studies help learners identify positive and negative characteristics of the situation.

2. Problem-solving case studies use systematic and creative problem-solving techniques.

3. Practice case studies require students to use a new idea or try a new skill.

4. Application case studies are used at the end of a training program to summarize and review.

5. Serial case studies progressively add new elements.

HISTORY OF CASES

The case method was invented by the Harvard Business School in the 1920s, where it still remains the foundation for teaching and research. By studying and examining actual cases, professors believed students could develop better insight as to how organizations reach conclusions. This method of study and analysis is seen as an effective way to train young business leaders to consider facts and present them more efficiently.

POPULARITY OF CASES TODAY

Today, cases remain a popular method of study in educational institutions across the country, particularly in Master of Business Administration (MBA) programs. While technology, computer simulations, and other learning methods continue to grow, cases fill a much-needed function in the educational process of students, future managers, and leaders. Cases are used in a wide variety of disciplines and areas of study. They are also popular for executive training and are used in weekend-format continuing education and professional development programs.

In their study of the skills of technologists, Birchall and Smith found that technologists are often seen as not having sufficient input into the strategic decision-making

processes of organizations. Thus, many turn to MBA programs to develop their knowledge, understanding, and personal competencies. The case method has traditionally been used to aid in this educational process. They also stress the use of multimedia tools and groupware to create enhanced learning opportunities based on a dynamic case analysis.

Many groups and organizations also publish cases for educational use. Sources for cases for business schools include:

- The Aspen Institute Business and Society Program

- The Batten Institute, Darden Graduate School of Business, University of Virginia

- Harvard Business School

- Richard Ivey School of Business, University of Western Ontario

- South-Western Publishing Company's CaseNet

- Stanford Graduate School of Business

The American Association for Business Communication, for example, included the best cases for teaching communications in a special issue of *Business Communication Quarterly*. Rogers and Rymer report that their reviewer panel of experienced instructors agreed that the best cases include the following attributes:

- Focus on the discipline

- Require decision making

- Furnish a business context

- Present an engaging story or scenario

- Provide sufficiently-realistic detail for analysis and response

- Function readily in a classroom setting

- Apply to a wide range of teaching philosophies and educational settings

- Relate to contemporary issues and problems

In recent years, the use of case studies in job interviews has become increasingly popular, particularly in the consulting and investment banking industries. Typically, an interviewer will present a business situation similar to those handled by the company. The interviewee is then asked to work through the case and eventually arrive at a feasible conclusion in a short period of time. According to the McKinsey & Company Web site, "Since no particular background or set of qualifications necessarily prepares [an individual to be a successful consultant], we've come to rely upon the case study as an integral part of our interview process...It gives us an opportunity to gauge

[the interviewee's] sense of prioritization and judgment within a business context."

TEACHING WITH CASES

Cases rely almost exclusively upon discussion to elicit diverse ideas, experiences, and views about case material. Cases allow students to explore actual decisions made by companies. The case presents an account of what happened to a business or industry over a period of time, for example. It includes the events with which managers had to deal and charts various responses to these decisions. According to Hill and Jones, cases provide students with the experience of organizational problems they have not yet had the opportunity to experience first-hand. In a relatively short period of time, students have the chance to appreciate and analyze problems faced by many different companies and to understand how managers attempted to resolve them. Cases also illustrate underlying business theories.

To prepare a case analysis, students typically read the case several times before a classroom discussion. They first read for a general idea about the problem, the players in the case, the level of the decision, and the type of company or industry presented. On second and subsequent readings, students look for deeper problems and issues and try to differentiate symptoms from real case problems.

Some schools encourage students to research the company by locating articles on the company at the time the case situation occurred. Another research technique is to have students conduct a financial analysis of the company that might include ratio analysis or industry/competitor research. Many schools encourage students to discuss assigned cases in small groups or study teams before class. These teams may develop potential alternatives to solve the problems and ensure each member has considered the relevant facts in the case.

Class discussion occurs in either one large group or several smaller groups. In these groups, participants decide on the solution(s) and the proper course of implementation. They must also consider the time frame for implementation as well as evaluation and success measures. Class members or participants critique the various viable alternatives that are presented. The class is then presented with what the company under study actually did to solve the problem. Some cases are used as quizzes or exams.

For the most part, teaching with cases has changed relatively little over the years. An exception to this is the "real-time case method" developed by Theroux in 2001. In this method, a semester-long case is delivered in weekly installments and focuses on one company and the current events it faces. This method differs from the traditional case-study method by its extended coverage and real-time

interactivity. In some iterations of this method, students participate in online forums in which they can ask the managers questions about the company.

STUDENTS' PERCEPTIONS OF CASES

Although case method teaching has been used extensively in virtually all business schools for years, little research has been conducted to investigate the effectiveness and usefulness of the method. Among the few studies available is Weil's, which measures students' perceptions. Weil's study confirmed the usefulness of the case method.

Many students favor the case method because there are no "right" or "wrong" answers to the cases. Unlike solving a math or finance problem, there may be multiple ways to reach a successful solution for the case. Diversity of opinion and diversity of group make-up often bring unique solutions to cases. Students learn to respond quickly, formulate answers, speak up, and participate in class discussion. They learn to separate background information from the real problem. They learn to succinctly state problems, to recommend potential alternative solutions, and to explore the pros and cons of each solution. They learn to find hidden information in charts, graphs, tables, and financial data often included in cases.

Some students are discouraged by cases because they do not yield only one clear answer. Students are forced to develop skills of critical thinking, and these skills, while important to today's managers, take time to perfect. Students may also fear presenting their ideas to a large group. They may fear public speaking or presentation in general or they may fear their particular thoughts will be ridiculed by others. Some with limited work or life experience may not feel capable of critiquing a top-level manager's past decisions. However, these unique and fresh ideas often present interesting alternatives.

SEE ALSO *Business Plan; Training Delivery Methods*

BIBLIOGRAPHY

Barbazette, Jean. *Instant Case Studies: How to Design, Adapt, and Use Case Studies in Training.* San Francisco: Pfeiffer, 2004.

Barnes, Louis B., C.R. Christensen, and Abby J. Hansen. *Teaching and the Case Method.* 3rd ed. Boston: Harvard Business School Press, 1994.

Birchall, David, and Matty Smith. "Developing the Skills of Technologists in Strategic Decision Making—A Multi-Media Case Approach." *International Journal of Technology Management* 15, no. 8 (1998): 854–868.

"Cases." Stanford University Graduate School of Business. Available from: <http://gsbapps.stanford.edu/cases/>.

"Case Interview." McKinsey & Company. Available from: http://www.mckinsey.com/careers/how_do_i_apply/how_to_do_well_in_the_interview/case_interview.aspx.

Christensen, C.R. *Teaching by the Case Method.* Boston: Harvard Business School, 1983.

Copeland, M. "The Genesis of the Case Method in Business Administration." In *The Case Method at the Harvard Business School.* ed. Malcolm P. McNair. New York: McGraw-Hill, 1954.

Cosentino, Marc P. *Case in Point: Complete Case Interview Preparation.* 5th ed. Boston: Burgee Press, 2007.

Hill, Charles W.L., and Gareth R. Jones. *Strategic Management: An Integrated Approach.* 5th ed. Boston: Houghton/Mifflin Publishing Co., 2001.

Hunger, J.D., and Thomas L Wheelen. *Essentials of Strategic Management.* 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2003.

Klein, Hans E., ed. *The Art of Interactive Teaching with Cases, Simulations, Games, and other Interactive Methods.* Boston: The World Association for Case Method Research and Application, 1995.

Oyelere, Peter, Joanna Yeoh, Colin Firer, and Sidney Weil. "A Study of Students' Perceptions of the Usefulness of Case Studies for Development of Finance and Accounting-Related Skills and Knowledge." *Accounting Education* 10, no. 2 (2001): 123–146.

Rogers, Priscilla S., and Jone Rymer. "Business and Management Communication Cases: Challenges and Opportunities." *Business Communication Quarterly* 61, no. 1 (1998): 7–25.

Theroux, J., and C. Kilbane. "The Real-Time Case Method: A New Approach to an Old Tradition." *Journal of Education for Business* 79, no. 3 (2004): 163–167.

CASH FLOW ANALYSIS AND STATEMENT

Cash flow analysis is a method of analyzing the financing, investing, and operating activities of a company. The primary goal of cash flow analysis is to identify, in a timely manner, cash flow problems as well as cash flow opportunities. The primary document used in cash flow analysis is the cash flow statement. Since 1988, the Securities and Exchange Commission (SEC) has required every company that files reports to include a cash flow statement with its quarterly and annual reports. The cash flow statement is useful to managers, lenders, and investors because it translates the earnings reported on the income statement—which are subject to reporting regulations and accounting decisions—into a simple summary of how much cash the company has generated during the period in question. "Cash flow measures real money flowing into, or out of, a company's bank account," Harry Domash notes on MSN Money. "Unlike reported earnings, there is little a company can do to overstate its bank balance."

THE CASH FLOW STATEMENT

A typical cash flow statement is divided into three parts: cash from operations (from daily business activities like collecting payments from customers or making payments

to suppliers and employees); cash from investment activities (the purchase or sale of assets); and cash from financing activities (the issuing of stock or borrowing of funds). The final total shows the net increase or decrease in cash for the period.

Cash flow statements facilitate decision making by providing a basis for judgments concerning the profitability, financial condition, and financial management of a company. While historical cash flow statements facilitate the systematic evaluation of past cash flows, projected (or pro forma) cash flow statements provide insights regarding future cash flows. Projected cash flow statements are typically developed using historical cash flow data modified for anticipated changes in price, volume, interest rates, and so on.

To enhance evaluation, a properly-prepared cash flow statement distinguishes between recurring and nonrecurring cash flows. For example, collection of cash from customers is a recurring activity in the normal course of operations, whereas collections of cash proceeds from secured bank loans (or issuances of stock, or transfers of personal assets to the company) is typically not considered a recurring activity. Similarly, cash payments to vendors is a recurring activity, whereas repayments of secured bank loans (or the purchase of certain investments or capital assets) is typically not considered a recurring activity in the normal course of operations.

In contrast to nonrecurring cash inflows or outflows, most recurring cash inflows or outflows occur (often frequently) within each cash cycle (i.e., within the average time horizon of the cash cycle). The cash cycle (also known as the operating cycle or the earnings cycle) is the series of transactions or economic events in a given company whereby:

1. Cash is converted into goods and services.
2. Goods and services are sold to customers.
3. Cash is collected from customers.

To a large degree, the volatility of the individual cash inflows and outflows within the cash cycle will dictate the working-capital requirements of a company. Working capital generally refers to the average level of unrestricted cash required by a company to ensure that all stakeholders are paid on a timely basis. In most cases, working capital can be monitored through the use of a cash budget.

THE CASH BUDGET

In contrast to cash flow statements, cash budgets provide much more timely information regarding cash inflows and outflows. For example, whereas cash flow statements are often prepared on a monthly, quarterly, or annual basis, cash budgets are often prepared on a daily, weekly,

or monthly basis. Thus, cash budgets may be said to be prepared on a continuous rolling basis (e.g., are updated every month for the next twelve months). Additionally, cash budgets provide much more detailed information than cash flow statements. For example, cash budgets will typically distinguish between cash collections from credit customers and cash collections from cash customers.

A thorough understanding of company operations is necessary to reasonably assure that the nature and timing of cash inflows and outflows is properly reflected in the cash budget. Such an understanding becomes increasingly important as the precision of the cash budget increases. For example, a 360-day rolling budget requires a greater knowledge of a company than a two-month rolling budget.

While cash budgets are primarily concerned with operational issues, there may be strategic issues that need to be considered before preparing the cash budget. For example, predetermined cash amounts may be earmarked for the acquisition of certain investments or capital assets, or for the liquidation of certain indebtedness. Further, there may be policy issues that need to be considered prior to preparing a cash budget. For example, should excess cash, if any, be invested in certificates of deposit or in some form of short-term marketable securities (e.g., commercial paper or U.S. Treasury bills)?

Generally speaking, the cash budget is grounded in the overall projected cash requirements of a company for a given period. In turn, the overall projected cash requirements are grounded in the overall projected free cash flow. Free cash flow is defined as net cash flow from operations less the following three items:

1. Cash used by essential investing activities (e.g., replacements of critical capital assets)
2. Scheduled repayments of debt
3. Normal dividend payments

If the calculated amount of free cash flow is positive, this amount represents the cash available to invest in new lines of business, retire additional debt, and/or increase dividends. If the calculated amount of free cash flow is negative, this amount represents the amount of cash that must be borrowed (and/or obtained through sales of nonessential assets, etc.) in order to support the strategic goals of the company. To a large degree, the free cash flow paradigm parallels the cash flow statement.

Using the overall projected cash flow requirements of a company (in conjunction with the free cash flow paradigm), detailed budgets are developed for the selected time interval within the overall time horizon of the budget (i.e., the annual budget could be developed on a daily, weekly, or monthly basis). Typically, the complexity of the company's operations will dictate the level of detail required for the

cash budget. Similarly, the complexity of the corporate operations will drive the number of assumptions and estimation algorithms required to properly prepare a budget (e.g., credit customers are assumed to remit cash as follows: 50 percent in the month of sale; 30 percent in the month after sale; and so on). Several basic concepts germane to all cash budgets are:

1. Current period beginning cash balances plus current period cash inflows less current period cash outflows equals current period ending cash balances.

2. The current period ending cash balance equals the new (or next) period's beginning cash balance.

3. The current period ending cash balance signals either a cash flow opportunity (e.g., possible investment of idle cash) or a cash flow problem (e.g., the need to borrow cash or adjust one or more of the cash budget items giving rise to the borrow signal).

RATIO ANALYSIS

In addition to cash flow statements and cash budgets, ratio analysis can also be employed as an effective cash flow analysis technique. Ratios often provide insights regarding the relationship of two numbers (e.g., net cash provided from operations versus capital expenditures) that would not be readily apparent from the mere inspection of the individual numerator or denominator. Additionally, ratios facilitate comparisons with similar ratios of prior years of the same company (i.e., intracompany comparisons) as well as comparisons of other companies (i.e., intercompany or industry comparisons). While ratio analysis may be used in conjunction with the cash flow statement and/or the cash budget, ratio analysis is often used as a stand-alone, attention-directing, or monitoring technique.

TRANSACTION VALUATION

The cash flow statement is an essential part of cash flow valuation techniques. In recent years, cash flow has become an increasingly common method of valuating both public and private companies, especially for industries where large up-front capital expenditures can result in negative earnings. For example, *The Motley Fool* reports that "cable TV companies . . . have reported negative earnings for years due to the huge capital expense of building their cable networks, even though their cash flow has actually grown." Investors use cash flow analysis to unmask this type of growth, typically using a definition of cash flow called amortization.

ADDITIONAL BENEFITS

In his book, *Buy Low, Sell High, Collect Early, and Pay Late: The Manager's Guide to Financial Survival,* Dick Levin suggests the following benefits that stem from cash

forecasting (i.e., preparing a projected cash flow statement or cash budget):

1. Knowing what the cash position of the company is and what it is likely to be avoids embarrassment. For example, it helps avoid having to lie that the check is in the mail.

2. A firm that understands its cash position can borrow exactly what it needs and no more, thereby minimizing interest or, if applicable, the firm can invest its idle cash.

3. Walking into the bank with a cash flow analysis impresses loan officers.

4. Cash flow analyses deter surprises by enabling proactive cash flow strategies.

5. Cash flow analysis ensures that a company does not have to bounce a check before it realizes that it needs to borrow money to cover expenses. In contrast, if the cash flow analysis indicates that a loan will be needed several months from now, the firm can turn down the first two offers of terms and have time for further negotiations.

LOAN APPLICATIONS

Potential borrowers should be prepared to answer the following questions when applying for loans:

1. How much cash is needed?

2. How will this cash help the business (i.e., how does the loan help the business accomplish its business objectives as documented in the business plan)?

3. How will the company pay back the cash?

4. How will the company pay back the cash if the company goes bankrupt?

5. How much do the major stakeholders have invested in the company?

Admittedly, it is in the best interest of the potential borrower to address these questions prior to requesting a loan. Accordingly, in addition to having a well-prepared cash flow analysis, the potential borrower should prepare a separate document addressing the following information:

1. Details of the assumptions underpinning the specific amount needed should be prepared with cross-references to relevant information included in the cash flow analysis.

2. The logic underlying the business need for the amount of cash requested should be clearly stated and cross-referenced to the relevant objectives stated in the business plan or some other strategic planning document.

3. The company should clearly state what potential assets would be available to satisfy the claims of the lender in case of default (i.e., the company should indicate the assets available for the collateralization of the loan).

4. Details of the equity interests of major stakeholders should be stated.

In some cases, the lender may also request personal guarantees of loan repayment. If this is necessary, the document will need to include relevant information regarding the personal assets of the major stakeholders available to satisfy the claims of the lender in case of default.

INADEQUATE CAPITALIZATION

Many businesses fail due to inadequate capitalization. Inadequate capitalization basically implies that there were not enough cash and/or credit arrangements secured prior to initiating operations to ensure that the company could pay its debts during the early stages of operations (when cash inflows are nominal, if any, and cash outflows are very high). Admittedly, it is extremely difficult to perform a cash flow analysis when the company does not have a cash flow history. Accordingly, alternative sources of information should be obtained from trade journals, government agencies, and potential lenders. Additional information can be solicited from potential customers, vendors, and competitors, allowing the firm to learn from others' mistakes and successes.

UNCONSTRAINED GROWTH

While inadequate capitalization represents a front-end problem, unconstrained growth represents a potential back-end problem. Often, unconstrained growth provokes business failure because the company is growing faster than its cash flow. While many cash flow problems are operational in nature, unconstrained growth is a symptom of a much larger strategic problem. Accordingly, even to the extent that cash flow analyses are performed on a timely basis, such analyses will never overcome a flawed strategy underpinning the unconstrained growth.

BANKRUPTCY

A company is said to be bankrupt when it experiences financial distress to the extent that the protection of the bankruptcy laws is employed for the orderly disposition of assets and settlement of creditors' claims. Significantly, not all bankruptcies are fatal. In some circumstances, creditors may allow the bankrupt company to reorganize its financial affairs, allowing the company to continue or reopen. Such a reorganization might include relieving the company from further liability on the unsatisfied portion of the company's obligations. Admittedly, such reorganizations are performed in vain if the reasons underlying the financial distress have not been properly resolved. Unfortunately, properly-prepared and timely cash flow analyses cannot compensate for poor management, poor products, or weak internal controls.

SEE ALSO *Budgeting; Financial Issues for Managers; Financial Ratios; Strategic Planning Tools*

BIBLIOGRAPHY
Brahmasrene, Tantatape, C.D. Strupeck, and Donna Whitten. "Examining Preferences in Cash Flow Statement Format." *CPA Journal* 58 (2004).

"Cash Flow-Based Valuations." The Motley Fool. Available from: http://www.fool.com/school/cashflowbasedevaluations.htm.

"Cash Flow Statement." Center for Business Planning. Available from: http://www.businessplans.org/cashflow.html.

Domash, Harry. "Check Cash Flow First." Winning Investing.com. Available from: http://www.winning investing.com/cash_flow.htm.

"Intro to Fundamental Analysis: The Cash Flow Statement." Investopedia.com. Available from: http://www.investopedia.com/university/fundamentalanalysis/cashflow.asp.

Levin, Richard I. *Buy Low, Sell High, Collect Early, and Pay Late: The Manager's Guide to Financial Survival.* Englewood Cliffs, NJ: Prentice-Hall, 1983.

Mills, John, and Jeanne H. Yamamura. "The Power of Cash Flow Ratios." *Journal of Accountancy* 186, no. 4 (1998): 53–57.

"Preparing Your Cash Flow Statement." U.S. Small Business Administration, Online Women's Business Center. Available from: http://www.onlinewbc.gov/docs/finance/cashflow.html.

Priest, William W., and Lindsay H. McClelland. *Free Cash Flow and Shareholder Yield: New Priorities for the Global Investor.* Hoboken, NJ: Wiley, 2007.

Silver, Jay. "Use of Cash Flow Projections." *Secured Lender* March/April 1997: 64–68.

Simon, Geoffrey A. "A Cash Flow Statement Says, 'show Me the Money!'" *Tampa Bay Business Journal* 27 (2001).

CELLULAR MANUFACTURING

Cellular manufacturing is a manufacturing process that produces families of parts within a single line or cell of machines operated by machinists who work only within the line or cell. A cell is a small scale, clearly-defined production unit within a larger factory. This unit has complete responsibility for producing a family of like parts or a product. All necessary machines and manpower are contained within this cell, thus giving it a degree of operational autonomy. Each worker is expected to have mastered a full range of operating skills required by his or her cell. Therefore, systematic job rotation and training are necessary conditions for effective cell development.

Complete worker training is needed to ensure that flexible worker assignments can be fulfilled.

Cellular manufacturing, which is actually an application of group technology, has been described as a stepping stone to achieving world class manufacturing status. The objective of cellular manufacturing is to design cells in such a way that some measure of performance is optimized. This measure of performance could be productivity, cycle time, or some other logistics measure. Measures seen in practice include pieces per man hour, unit cost, on-time delivery, lead time, defect rates, and percentage of parts made cell-complete.

Since many manufacturing tasks are in fact not perfectly defined and not necessarily easy to represent graphically or with data, the use of "fuzzy set theory" is common when designing cellular manufacturing systems. Huang, Heutte, and Loog's 2007 book, *Advanced Intelligent Computing Theories and Applications*, suggests practicing "fuzzy algorithms" when designing a factory for cells or other types of lean manufacturing. The parameters of a particular part of the factory, or a particular task the workers carry out, may not be clear. There may be overlap, or constant human decision involved. This makes creating mathematic models of possible cells difficult, so fuzzy clustering and fuzzy mathematical programming are used in the equations. These tools enable the creators of cell structures to allow some uncertainty in what the machine and workers do, when assigning productions to various cells. They provide, essentially, room for error in the equations pertaining to cellular manufacturing.

The basic cell-creating process involves placing a cluster of carefully selected sets of functionally dissimilar machines in close proximity to each other. The result is small, stand-alone manufacturing units dedicated to the production of a set or family of parts—or essentially, a miniature version of a plant layout.

While the machinery may be functionally dissimilar, the family of parts produced contains similar processing requirements or has geometric similarities. Thus, all parts basically follow the same routing with some minor variations (e.g., skipping an operation). The cells may have no conveyorized movement of parts between machines, or they may have a flow line connected by a conveyor that can provide automatic transfer.

Cellular manufacturing is a hybrid system that links the advantages of a job shop with the product layout of the continuous flow line. The cell design provides for quick and efficient flow, as well as the high productivity associated with assembly lines. However, it also provides the flexibility of the job shop, allowing both similar and diverse products to be added to the line without slowing the process. Figures 1 and 2 compare a cellular layout to that of the typical job shop (process layout).

Figure 1
Process Layout

Hydraulic Presses Milling Machines
Lathes Welders

Figure 2
Cellular Layout

Cell #1 Cell #2
Cell #3 Cell #4
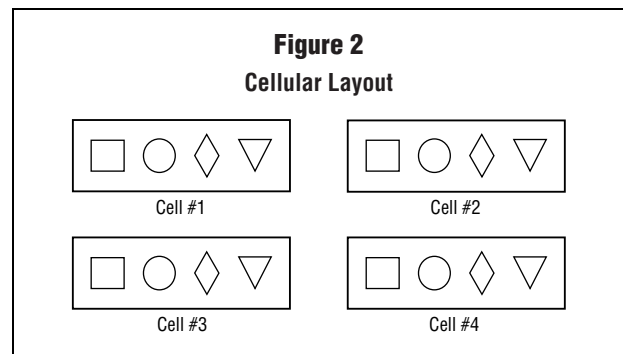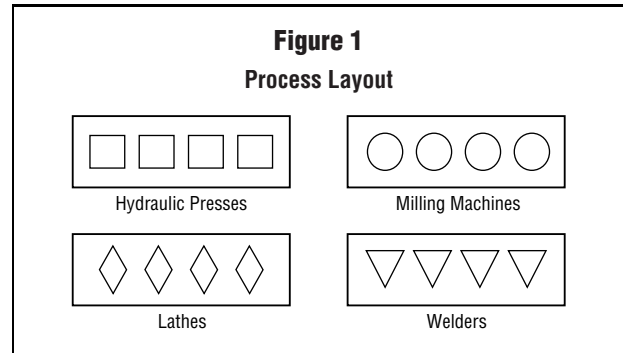
BENEFITS OF CELLULAR MANUFACTURING

Many firms utilizing cellular manufacturing have reported near immediate improvements in performance, with only relatively minor adverse effects. Cited improvements which seem to have occurred fairly quickly include reductions in work-in-process, finished goods, lead time, late orders, scrap, direct labor, and workspace.

In particular, production and quality control is enhanced. By breaking the factory into small, homogeneous and cohesive productive units, production and quality control is made easier. Cells that are not performing according to volume and quality targets can be easily isolated, since the parts/products affected can be traced to a single cell. Also, because the productive units are small, the search for the root of problems is made easier.

Quality parameters and control procedures can be dovetailed to the particular requirements of the parts or workpieces specific to a certain cell. By focusing quality control activity on a particular production unit or part type, the cell can quickly master the necessary quality requirements. Control is always enhanced when productive units are kept at a minimum operating scale, which is what cellular manufacturing provides.

When production is structured using cellular manufacturing logic, flow systematization is possible. Grouping of parts or products into sets or families reveals which ones are more or less amenable to continuous, coupled flow. Parts that are standardized and common to many products will have very low changeover times, and thus, are quickly convertible to continuous, line-flow production. Products that are low-volume, high-variety and require longer set-up times can be managed so that they evolve toward a line flow.

Cells can be designed to exploit the characteristics peculiar to each part family so as to optimize the flow for each cell and for groups of cells as a whole. Flow systematization can be done one cell at a time so as to avoid large disruptions in operations. Then the cells that were easy to systemize can provide experience that can be exploited when the more difficult systematization projects occur later. Cells that have been changed to a line flow will invariably show superior performance in the areas of quality, throughput time, and cost, which can lead to eventual plant-wide benefit.

LIMITATIONS

While its benefits have been well documented, it should also be noted that some have argued that implementing cellular manufacturing could lead to a decrease in manufacturing flexibility. It is felt that conversion to cells may cause some loss in routing flexibility, which could then impact the viability of cell use. Obtaining balance among cells is also more difficult than for flow or job shops. Flow shops have relatively fixed capacity, and job shops can draw from a pool of skilled labor, so balance isn't that much of a problem. By contrast, with cells, if demand diminishes greatly, it may be necessary to break up that cell and redistribute the equipment or reform the families.

Also, some researchers have warned that the benefits of cellular manufacturing could deteriorate over time due to ongoing changes in the production environment. Finally, it must be noted that conversion to cellular manufacturing can involve the costly realignment of equipment. The burden lies with the manager to determine if the costs of switching from a process layout to a cellular one outweigh the costs of the inefficiencies and inflexibility of conventional plant layouts.

THE IMPLEMENTATION PROCESS

A wide variety of methods for the implementation of cellular manufacturing have been proposed. These range from complex computer and mathematical models to straightforward applications, such as production flow analysis. A pattern for implementation is now presented.

The first step in implementing cellular manufacturing is to break down the various items produced by the company into a number of part sets or families. The grouping process (group technology) involves identifying items with similarities in design characteristics or manufacturing characteristics, and grouping them into part families. Design characteristics include size, shape, and function; manufacturing characteristics or process characteristics are based on the type and sequence of operations required. In many cases, though not always, the two kinds of characteristics are correlated. Therefore design families may be distinctly different from processing families.

Once identified, similar items can be classified into families. Then a system is developed that facilitates retrieval from a design and manufacturing database. For example, the system can be used to determine if an identical or similar part exists before a completely new part is designed. If a similar part is found, it may be that a simple modification would produce satisfactory results without the expense of new part design. Similarly, planning the manufacturing of a new part after matching it with an existing part family can eliminate new and costly processing requirements.

This grouping of part or product families requires a systematic analysis that often proves to be a major undertaking. Usually there is a considerable amount of data to analyze, and this in turn can be quite time-consuming and costly. Three primary methods exist for accomplishing the grouping process: visual inspection, examination of design and production data, and production flow analysis. Visual inspection is the least accurate of the three but nonetheless the simplest and the least costly. The most commonly used method of analysis is the examination of design and production data. This method is more accurate but is also more time-consuming. Production flow analysis examines operation sequences and machine routing to uncover similarities (therefore, it has a manufacturing perspective rather than a design perspective). However, unless the operation sequencing and routings are verified, this method could be far from optimal.

The resulting number of families determines the number of cells required, as well as what machines are required within each cell. The cell usually includes all the processing operations needed to complete a part or subassembly. However, it is possible for a product to go from raw materials to packaging and be ready for shipment by the time it reaches the end of the cell.

The families will also help determine where within the cell each machine will be located for the most efficient flow, and how many employees are needed within each cell. After the product families are determined, the machines needed for the production process of a specific family are organized into cells according to processing requirements (e.g., the order of processing). Frequently, machines are grouped in an efficient U-shaped configuration. Since each

machine operates on its own for much of the cycle, few workers may be needed, and even then only for a limited number of steps.

The optimal layout is one that minimizes the distance between cells, or the distance to the next production point. The resulting reduction in time and handling ultimately provides a reduction in processing costs. Some firms utilize "linked-cell manufacturing," which is the concept of arranging the manufacturing cells near the assembly cells. Again, this decreases travel distances while reducing materials handling. Hopefully, the floor layout will also provide for the easy flow of a product to shipping, if shipping is located close to the cells in a streamlined flow.

Some plants in advanced stages of cellular manufacturing utilize what is known as a "mini-plant." The cell not only does the manufacturing, but also has its own support services, including its own industrial engineer, quality manager, accountant, and marketing representative and/or salesperson. Only research and development and human resource management are not dedicated to the mini-plant.

An entire facility can be broken down into a number of mini-plants, each of which operates as an independent profit center.

KAIZEN EVENTS

Michel Baudin's book, *Working with Machines* (2007), discusses several different approaches to implementing cellular manufacturing; one of the most common is the *kaizen* event. The goal of a *kaizen* event is to analyze the organization's production capabilities, find a usable cell model that can be applied to the factory, then buy the necessary equipment and convert the production process to cellular manufacturing, all within a very short amount of time (the goal is often one week). While *kaizen* refers to the Japanese notion of constant improvement and has many business applications, *kaizen* events are short bursts of intense, permanent change. These are popular in America when adopting such processes as cellular conversion.

In a *kaizen* event, several different factors must be present. On a purely practical level, it must be possible to move the old equipment, ship the new machinery, and then install it, all within several days. The team designated to carry out the *kaizen* event must be skilled enough to handle such high-speed decisions and action, hopefully having previous experience in swift conversions. Baudin also suggests that the manager in charge of the *kaizen* project must be motivated to succeed in a very short time. If the manager has a deadline of six months, he will not aim for finishing in a week. An energetic, motivated

supervisor and a very strict timetable are both necessary to pull off a successful *kaizen* switchover.

There are, of course, dangers in completely converting to cellular manufacturing within one week. Analysis is often rushed and can be open to errors. Mistakes can be made in ordering and installing machinery. Workers may not have enough time to be properly trained in the new system or the new layout of the factory. An organization should only attempt a *kaizen* event if it is confident in its skilled team.

COMMON CELLULAR MANUFACTURING TECHNIQUES

Certain techniques are used in cellular manufacturing to ease the process, or to make transitions more simple. These are integrated into the new layout designs to help production. The EPA gives several examples for 2008:

SMED, or single-minute exchange of die, is used by organizations that have only a limited number of machines but several different products to create. To enable cellular manufacturing, organizations become practiced at switching out machine parts to produce different products on demand. The goal is to reach the ability to switch the machines to different procedures in under a minute, hence the "single-minute" part of SMED.

The process of *Autonomation* is used by organizations that have production lines that can be switched to automatic assembly. Computers and robotic systems are set up to take control of certain parts of the cells, and they are often capable of following very detailed instructions. Once automated, systems can be programmed to double check themselves, detect recurring flaws, cease production when necessary, and run through halting routines if the machinery needs to be reset. Employees are free to focus on other aspects of production while also being available to fix any occurring assembly problems.

Organizations moving to cellular manufacturing often install *right-sized equipment*, or equipment that meets the required models for the tight cells of production. Usually, this means that large machinery will be replaced with smaller machinery that performs the same task in order to save room and to allow the production lines room to set up the cells. Right-sized equipment is often movable and can be switched around at convenience.

THE IMPACT OF CELLULAR MANUFACTURING ON WORKERS

Nancy Hyer and Urban Wemmerlov noted in *Mechanical Engineering* that while technology and processes represent the "hard side" of cells, people represent the "soft side." They state that the soft side factors are far more difficult to change than are the hard side factors. Most implementing

firms spend most of their time struggling with soft issues. Cellular manufacturing calls for radical changes in the way industrial work is designed, structured, planned, controlled, and supervised. It makes worker self-management a reality, so management must be convinced that the workers can master all the required aspects of the work.

The decision to implement cellular manufacturing requires a deep commitment to excellence and a desire to permanently change the way factories are viewed and managed. Cellular manufacturing affects workers in a number of ways. Among the factors now discussed are issues of self-management, motivation, employee input, supervision, and group cohesiveness.

Examples of successful cellular manufacturing are common, especially in technology and parts production. Viking Plastics, in a 2001 drive to expand their cellular manufacturing capabilities, switched their injection molding press assembly to an all-electric model which allowed employees to focus on quality control in other areas. Other companies such as DMP (Defiance Metal Products) work with cellular manufacturing when making products of similar natures. DMP divided their process in cells, such as the Punch and Brake Cell and the Weld Assembly Cell.

Self-Management. Cell workers are encouraged to think creatively about production problems and are expected to arrive at pragmatic solutions to them. While they are free to seek advice from plant management and staff, the identified problems and subsequent analysis, and usually the solutions, are entirely their own. Workers have the authority and are encouraged to implement and follow up on action plans to improve their work. Some managers ask cells to set improvement targets for themselves and measure their performance in comparison to these targets. In addition, workers are given the freedom to plan, coordinate, and control their work within their cell as long as they meet company standards of quality, volume, time, and cost.

In the Productivity Development Team's 1999 book *Cellular Manufacturing: One-piece Flow for Workteams*, the aspect of worker independence is referred to as "autonomous maintenance." Autonomous maintenance involves teaching different tasks to the same employees, thereby making the factory team more versatile. Operator groups and maintenance groups can be combined into one unit of skilled employees that have the ability to deal with a multitude of problems on the factory floor. Operators are taught to clean equipment, notice signs of wear and damage, and deal with breakdowns themselves, making the cell even stronger as a whole.

Motivation. Behavioral psychology proposes that challenging work assignments keep employees motivated, sat-

isfied, and productive. Flexible work assignments within the cells ensure that employees are constantly learning new tasks and constantly being challenged. Job rotation within the cell introduces variety in work patterns, thereby breaking the monotony (which has been known to cause absenteeism and problems in quality and productivity). Industrial work is productively accomplished in a group work setting. Cellular manufacturing can energize the group, attacking the lethargy found in many industrial situations.

Employee Input. With the cell work group energized and motivated, the employees are more likely to actively and continually bring their mental capabilities to bear on job-related problems. Cell workers are the closest ones to the production process, so practical ideas are likely to instigate other ideas, which could then give rise to a continuous, almost self-sustaining chain reaction of improvement. As the workers see their own creative output being implemented, they begin to develop self-esteem and a stronger desire to succeed. They even begin to challenge each other to improve on their prior accomplishments.

The drive toward excellence is fueled by the human need to achieve until the desire to excel and continuously improve becomes part of the factory culture. Then as workers learn by doing more, they become more proficient at generating ideas, which perpetuates the cycle of improvement. Cellular manufacturing can be the structural catalyst that starts, contains, and sustains the improvement process.

Supervision. The intense use of manufacturing cells tends to flatten the factory management structure and reduce overhead costs. When work group autonomy, worker versatility, and small group improvement activities converge, the need for supervision is drastically reduced, if not eliminated altogether. Cell manufacturing perpetuates the idea that the work group should supervise itself. A workforce that is motivated, trained, and assigned specific clear responsibility for a product or part, coupled with simplified production planning and control, does not need to be minutely controlled or supervised in order to do a good job.

Group Cohesiveness. The creation of small-scale productions dedicated to production of a few similar parts increases work group cohesiveness. Since each cell has few employees, typically less than fourteen, extensive interpersonal contact is unavoidable. The workers are now part of a single, identifiable unit with operating autonomy and responsibility for a specific product, linked by the common purpose of continually improving the productive unit for which they are responsible. The cell structure keeps problems at a level where they are manageable and gives employees the opportunity to exercise

their creative potential in a pragmatic way. When problems that call for technical expertise beyond that of the workers arise, managers and production staff can be called on to provide assistance. Cell manufacturing builds a cohesive subculture within the wider social environment of the plant.

The use of flexible work assignments contributes even more to the group's cohesiveness and loyalty. Employees who regularly perform the work also done by coworkers are more likely to demonstrate empathy and support when dealing with each other on the job. If each worker has experienced each job firsthand, they are more able to offer encouragement and advice on how the work can be improved and each worker is more receptive to the input of his or her coworkers. Each worker can view and understand completely the task, responsibilities, and mission that top management has dedicated to the cell. The cross-fertilization process that emerges can generate some truly creative ideas for process improvement. As the expression goes, "as iron sharpens iron, so shall one man sharpen another."

Finally, work-group cohesiveness, reinforced by the cell structure, facilitates total people management. Due to its small scale and mission focus, the cell can be easily mobilized. Top management is too far removed, spatially and socially, from the workers to be able to interact with them extensively enough to significantly control the socialization process. Management can shape corporate values and create a nurturing social environment, but it cannot instill these values into the minds of the lower-level employees. Hence, corporate values are better communicated and instilled into daily work habits by small group processes.

The cell is better able to exercise social control over deviant workers, since it can directly and immediately manipulate social rewards and punishment. Any worker who fails to conform may find his deviant behavior quickly detected and reacted to by the withdrawal of the social support of the cell. Deviant behavior that is hidden from management for long periods of time is very visible to the small group and can be dealt with quickly.

Conversely, high-performing group members are also quickly visible but are rewarded with esteem and respect from the other cell workers. Consequently, management can work through the cell to instill the corporation's values, attitudes, and philosophies. Once these are internalized by the group's key members, the group itself will take over the socialization process of indoctrinating these values into the mindset of each worker.

FOCUSED CELLULAR MANUFACTURING

In a 2003 article in the *International Journal of Operations and Production Management*, Fahad Al-Mubarak and

Basheer M. Khumawala discuss a similar alternative to cellular manufacturing, focused cellular manufacturing (FCM). They define focused cellular manufacturing as a layout scheme that groups components by end-items and forms the cell of the machine for fabrication and assembly of the end-items. It differs from cellular manufacturing in that it does not attempt to take advantage of process similarities so as to reduce setup times.

The major advantage of FCM is the reduction of completion times for assembled end-items and work-in-process inventories while maintaining some degree of flexibility. In addition, it should be easy to install in a firm producing a few end-items in large volume or many end-items produced in small volume. Apparently, installing a single, focused cell for a few end-items is more practical than installation of many cells as required for a cellular layout.

The flow systematization and physical process integration of cellular manufacturing reinforce each other in potent ways. The underlying mechanisms can be collectively used to push manufacturing to higher performance levels. The result is an effectively designed cellular manufacturing structure, a production operation that integrates many concepts of superior manufacturing performance into a single small-scale production unit whose place in the large manufacturing system is clearly visible.

PROBLEMS AND DIFFERENTIATION

Since cellular manufacturing can be easily disrupted by machine breakdown (or the time it takes to repair broken machinery), it is always wise to have replacements on hand and the capability to substitute the broken parts quickly. This extra machinery and the space it occupies will be a significant cost, and it should therefore always be counted in the cost when considering a switch to lean manufacturing. When production includes duplicate machinery, multi-period production planning, or dynamic system reconfiguration, careful planning is required, since cellular manufacturing can be difficult to change once put into place. Production that requires seasonal shifts—or that may be subject to technological changes—also presents difficulties when switching to cellular manufacturing.

One final note is to distinguish cellular manufacturing from flexible manufacturing. A flexible manufacturing system is a more fully automated version of cellular manufacturing. A flexible manufacturing system utilizes a computer to control the start of work at each machine and to control the transfer of parts from machine to machine. While quite expensive, flexible manufacturing systems enable manufacturers to achieve some of the benefits of product layouts because the system can operate with little or no human intervention.

BIBLIOGRAPHY

Ahkioon, S., A.A. Bulgak, and T. Bektas. "Cellular manufacturing systems with routing flexibility, machine procurement, product planning, and dynamic system reconfiguration." *International Journal of Production Research* 21 November 2007.

Al-Mubarak, Fahad and Basheer M. Khumawala. "Focused Cellular Manufacturing: An Alternative to Cellular Manufacturing." *International Journal of Operations and Production Management* 23, no. 3 (2003): 277–299.

Baudin, Michel. *Working with Machines: The Nuts and Bolts of Lean Operations with Jidoka.* New York: Productivity Press, 2007.

"Cellular Manufacturing." *DMP* 2008. Available from: http://www.defiancemetal.com/cells.htm..

Huang, De-Shueng, Laurent Heutte, and Marco Loog. *Advanced Intelligent Computing Theories and Applicatons.* Springer, 2007.

Hyer, Nancy, and Urban Wemmerlov. "Cell Manufacturing: The Hard Part Is to Get People in Step with the Program." *Mechanical Engineering* 126, no. 3 (2004): E14–16.

Manufacturingtalk editorial team. "Injection molding press for precision engineering." *Manufacturingtalk.* edited 07 June 2007. <

Meredith, Jack R., and Scott M. Shafer. *Operations Management for MBAs.* Hoboken, NJ: John Wiley & Sons, Inc., 2004.

Productivity Development Team. *Cellular Manufacturing: One-piece Flow for Workteams.* New York: Productivity Press, 1999.

U.S. Environmental Protection Agency. "Cellular Manufacturing," 2008. Available from: http://www.epa.gov/lean/thinking/cellular.htm.

CHANGE—MANAGING

SEE *Managing Change*

CHANGE—TRENDS IN ORGANIZATIONS

SEE *Trends in Organizational Change*

CHAOS THEORY

Chaos theory is a scientific principle describing the unpredictability of systems. Heavily explored and recognized during the mid-to-late 1980s, its premise is that systems sometimes reside in chaos, generating energy but without any predictability or direction. These complex systems may be weather patterns, ecosystems, water flows, anatomical functions, or organizations. While these systems' chaotic behavior may appear random at first, chaotic systems can be defined by a mathematical formula, and

they are not without order or finite boundaries. This theory, in relation to organizational behavior, was somewhat discounted during the 1990s, giving way to the very similar complexity theory. Complexity theory differs primarily in that it tries to find simple ways to explain and control multifaceted business systems, while chaos theory is more concerned with predicting changes and understanding the random parts of systems.

Organizations respond to the ideas of chaos theory in a number of different ways, from eagerness to skepticism. As Lyndon Pugh's 2007 *Change Management in Information Services* says, "The key points about chaos theory are that it affirms the need for environmental sensitivity, and that uncertainty represents opportunities."

ORIGINS OF CHAOS THEORY

One of the first scientists to comment on chaos was Henri Poincaré (1854–1912), a late-nineteenth-century French mathematician who extensively studied topology and dynamic systems. He left writings hinting at the same unpredictability in systems that Edward Lorenz (b. 1917) would study more than half a century later. Poincaré explained, "It may happen that small differences in the initial conditions produce very great ones in the final phenomena. A small error in the former will produce an enormous error in the latter. Prediction becomes impossible." Unfortunately, the study of dynamic systems was largely ignored long after Poincaré's death.

During the early 1960s, a few scientists from various disciplines were again taking note of "odd behavior" in complex systems such as the earth's atmosphere and the human brain. One of these scientists was Edward Lorenz, a meteorologist from the Massachusetts Institute of Technology (MIT), who was experimenting with computational models of the atmosphere. In the process of his experimentation he discovered one of chaos theory's fundamental principles—the Butterfly Effect. The idea is named for its assertion that a butterfly flapping its wings in Tokyo can impact weather patterns in Chicago. More scientifically, the Butterfly Effect proves that forces governing weather formation are unstable. These unstable forces allow minuscule changes in the atmosphere to have major impact elsewhere. More broadly applied, the Butterfly Effect means that what may appear to be insignificant changes to small parts of a system can have exponentially larger effects on that system. It also helps to dispel the notion that random system activity and disturbances must be due to external influences, and not the result of minor fluctuations within the system itself.

Another major contributor to chaos theory is Mitchell Feigenbaum (b. 1944). A physicist at the theoretical division of the Los Alamos National Laboratory starting in 1974, Feigenbaum dedicated much of his time

researching chaos and trying to build mathematical formulas that might be used to explain the phenomenon. Others working on related ideas (though in different disciplines) included a Berkeley, California mathematician who formed a group to study "dynamical systems," and a population biologist pushing to study strangely-complex behavior in simple biological models. During the 1970s, these scientists and others in the United States and Europe began to see beyond what appeared to be random disorder in nature (the atmosphere, wildlife populations, etc.), finding connections in erratic behavior. As recounted by James Gleick (b.1954) in *Chaos*, a French mathematical physicist had just made the disputable claim that turbulence in fluids might have something to do with a bizarre, infinitely tangled abstraction he termed a "strange attractor." Stephen Smale (b. 1930), at the University of California, Berkeley, was involved in the study of "dynamical systems." He proposed a physical law that systems can behave erratically, but the erratic behavior cannot be stable. At this point, however, mainstream science was not sure what to make of these theories, and some universities and research centers deliberately avoided association with proponents of chaos theory.

By the mid-1980s, chaos was a buzzword for the fast-growing movement reshaping scientific establishments, and conferences and journals on the subject were on the rise. Universities sought chaos "specialists" for high-level positions. A Center for Nonlinear Studies was established at Los Alamos, as were other institutes devoted to the study of nonlinear dynamics and complex systems. A new language consisting of terms such as *fractals*, *bifurcations*, and *smooth noodle maps* was born. In 1987, James Gleick published his landmark work, *Chaos: Making a New Science*, chronicling the development of chaos theory, as well as the science and scientists fueling its progress.

There are many possible applications for chaos theory, in and out of the business world, and many are still being studied. In Amita Paul's 2008 article on chaos theory and business practices, Paul gives several examples of data that can be predicted by studying complexity models, such as epileptic seizures, financial markets, manufacturing systems, and weather systems. In order to capitalize on chaos theory, Paul suggests a three-tiered approach:

1. A goal should be created, a particular state to be aimed at by the business. This could be the solving of a problem or reaching a certain state of productivity.

2. The organization and its structure should be capable of reaching its goal—it should be achievable.

3. The means to influence the systems should be known by the organization, and the leaders should be willing to put the plans into motion.

Paul admits the many applications possible for chaos theory, but questions its usefulness in the business world. Complexity analysis is always very complicated, requiring a large amount of data and intense mathematics, which can be open to error. A business must have talent, time, and funds to began a chaos analysis on any of its systems.

THE SCIENCE OF CHAOS THEORY

As stated by James Gleick, chaos is a science of the "global nature of systems," and so it crosses many disciplinary lines—from ecology to medicine, electronics, and the economy. It is a theory, method, set of beliefs, and way of conducting scientific research. Technically, chaos models are based on "state space," improved versions of the Cartesian graphs used in calculus. In calculus, speed and distance can be represented on a Cartesian graph as x and y. Chaos models allow the plotting of many more variables in an imaginary space, producing more complex imaginary shapes. Even this model assumes, however, that all variables can be graphed, and may not be able to account for situations in the real world where the number of variables changes from moment to moment.

The primary tool for understanding chaos theory (and complexity theory as well) is dynamic systems theory, which is used to describe processes that constantly change over time (e.g., the ups and downs of the stock market). When systems become dislodged from a stable state, they go through a period of oscillation, swinging back and forth between order and chaos. According to Margaret J. Wheatley in *Leadership and the New Science*, "Chaos is the final state in a system's movement away from order." When a system does reach that point, the parts of a system are manifest as turbulence, totally lacking in direction or meaning. Wheatley quotes researchers John Briggs and F. David Peat explaining the process of oscillation:

> Evidently familiar order and chaotic order are laminated like bands of intermittency. Wandering into certain bands, a system is extruded and bent back on itself as it iterates, dragged toward disintegration, transformation, and chaos. Inside other bands, systems cycle dynamically, maintaining their shapes for long periods of time. But eventually all orderly systems will feel the wild, seductive pull of the strange chaotic attractor.

In simpler terms, every system has the potential to fall into chaos.

The above "strange attractor" is the very same that a French mathematical physicist identified in the early 1960s. In complex systems, where all should fall apart, the attractor comes in, magnetically pulling system variables into an area and creating a visible shape. Because previous efforts to graph such phenomena could only be

completed in two dimensions, this effect could not be visualized. However, computers now allow the phenomena of "strange attractors" to become visible, as images of multiple dimensions representing multiple variables can finally be created.

Part of the difficulty in studying chaos theory arises because complex systems are difficult to study in pieces. Scientists' efforts to separate pieces of dynamical systems often fall apart. The system depends on each minute part of that system and the way it interacts with all other components. As Briggs and Peat state, "The whole shape of things depends upon the minutest part. The part is the whole in this respect, for through the action of any part, the whole in the form of chaos or transformative change may manifest."

In the same breath, it is important to establish the importance of the autonomy the smallest parts of a system possess. Each component of a complex system has the ability to fluctuate, randomly and unpredictably, within the context of the system itself. The system's guiding principles (the attractors) allow these parts to cohere over time into definite and predictable form. This runs contrary to the impression many have of chaos theory, believing there is no order to be had in such a system. However, chaotic movement does possess finite boundaries, within which is the capacity for infinite possibility. Even lacking direction, parts of a system can combine so that the system generates multiple configurations of itself, displaying "order without predictability." These systems never land in the same place twice, but they also never exceed certain boundaries.

PRACTICAL APPLICATION OF CHAOS THEORY

By the early 1980s, evidence accumulated that chaos theory was a real phenomenon. One of the first frequently-cited examples is a dripping water faucet. At times, water drops from a leaky faucet exhibit chaotic behavior (the water does not drip at a constant or orderly rate), eliminating the possibility of accurately predicting the timing of those drops. Scientists took advantage of applications using chaos to their benefit; chaos-aware control techniques could be used to stabilize lasers and heart rhythms, among multiple other uses.

As Kolb and Overdahl point out in their 2007 *Futures, Options, and Swaps*, chaos theory was also considered to have great potential in predicting the future changes of stocks and bonds. Although no set analysis has been able to use chaos theory infallibly to find patterns in the futures market, much work in chaos mathematics is focused on finding ways to predict stock prices. The idea is that the fluctuations of the trading market resemble the drip of a faucet or the fractals of tree branches; this

implies they are similar enough that someone could conceivably find the proper mathematical points and predict changes correctly.

Another arena within which chaos theory is useful is that of organizations. Applying chaos theory to organizational behavior allows theorists to take a step back from the management of day-to-day activities and see how organizations function as unified systems. An organization is a classic example of a nonlinear system (i.e., a system in which minor events have the potential to set off grave consequences or chain reactions, and major changes may have little or no effect on the system whatsoever). In order to exploit the chaotic quality of an organization, one needs to try to see the organizational shape that emerges from a distance. Instead of pinpointing causes in the organization for organizational problems, the company is better served, according to chaos theory, by looking for organizational patterns that lead to certain types of behavior within the organization.

Organizational expectations for acceptable behavior, and the degree of freedom with which individuals are allowed to work, shape the way a company's problems and challenges are handled by its members. By allowing people and groups within an organization some autonomy, businesses encourage the organization to organize itself, enacting multiple iterations of its own functioning until the various pieces of the organization can work together most effectively. An organization that encourages this type of management has been termed a *fractal organization*, one that trusts in natural organizational phenomena to order itself.

In the guide *CIMA Learning System* (2007), Botten and Sims discuss what this means for organizations trying to apply complexity theories in a useful manner. How does a business know when chaos theory applications have not done enough or have done too much? After taking a practical look at the results of chaos research, Botten and Sims created a concept of three separate states an organization can find itself in.

Chaos can either: (1) not affect a simple system at all, leading to consistent and accurate results without change; or (2) it can affect a system with a slight amount of error, so that some calculations will always be wrong and some results unexpected; or (3) chaos can reign uncontrolled on a complex system without predictability or order. These three possibilities apply to everything chaos theory deals with, from weather to business planning. Botten and Sims define the first state as *stable equilibrium*, the second as *bounded instability* (chaos under control), and the third as *explosive instability* (uncontrolled chaos).

While explosive instability can be very dangerous for a company, leading to loss of profit and the implosion of its systems, stable equilibrium can also pose a threat to

organizations. Business tends to suffer without change and without at least a little chaos to produce the unexpected, thereby forcing the adaptation and innovation that make organizations successful. In a static environment, organizations lose the ability to react well. Therefore, Botten and Sims suggest that the best state for business systems is the middle state, bounded instability, where an amount of controlled chaos is making the system unpredictable enough to be valuable, but not so unpredictable that it falls apart. In bounded instability, the system is not so repetitive that employees grow bored and lose the ability to function, but instead change occurs based on understood phenomena—the different seasons, for instance, or popular opinion, or the advances of technology. When a business reaches the third stage, explosive instability, it has gone too far; from a chaos theory perspective, it resembles a wildfire or war more than a functioning part of an organization. The middle road should be aimed for when applying chaos theory—not complete predictability and not utter confusion.

However, applying chaos theory to organizational practice tends to go against the grain of most formal management patterns. Order can be confused with the more popular notion of control. Defined by organization charts and job descriptions, traditional management does not generally seek to add disorder to its strategic plan. As Wheatley states, "It is hard to open ourselves up to a world of inherent orderliness." Organizations are focused on structure and design. Charts are drawn to illustrate who is accountable to whom or who plays what role and when. Business experts break down organizations into the smallest of parts. They build models of organizational practice and policy with hope that this atomizing yields better information on how to improve the organization's functioning. However, chaos theory implies that this is unnecessary, even harmful.

Self-organizing systems are those enabled to grow and evolve with free will. As long as each part of the system remains consistent with itself and the systems's past; these systems can harness the power of creativity, evolution, and free will—all within the boundaries of the organization's overall vision and culture. In this respect, chaos theory shows the need for effective leadership, a guiding vision, strong values, organizational beliefs, and open communication.

WRITING ON CHAOS THEORY

During the 1980s, chaos theory did begin to change decision-making processes in business. A good example is the evolution of high-functioning teams. Members of effective teams frequently recreate the role each member plays, depending on the needs of the team at a given point. Though not always the formally-designated manager, informal leaders emerge in an organization not because they have been given control, but because they have a strong sense of how to address the needs of the group and its members. The most successful leaders understand that it is not the organization or the individual who is most important, but the relationship between the two. And that relationship is in constant change.

One of the most influential business writers of the 1980s and 1990s, Tom Peters (b. 1942), wrote, *Thriving on Chaos: Handbook for a Management Revolution* in 1987. Peters offers a strategy to help corporations deal with the uncertainty of competitive markets through customer responsiveness, fast-paced innovation, empowering personnel, and most importantly, learning to work within an environment of change. In fact, Peters asserts that we live in "a world turned upside down," and survival depends on embracing "revolution." While not explicitly concerned with chaos theory, Peters's focus on letting an organization (and its people) drive itself is quite compatible with the central tenets of chaos theory.

As the global economy and technology continue to change the way business is conducted on a daily basis, evidence of chaos is clearly visible. While businesses could once succeed as "non-adaptive," controlling institutions with permanently-installed hierarchical structures, modern corporations must be able to restructure as markets expand and technology evolves. According to Peters, "To meet the demands of the fast-changing competitive scene, we must simply learn to love change as much as we have hated it in the past."

Organizational theorist Karl Weick (b. 1936) offers a similar theory to that of Peters, believing that business strategies should be "just in time...supported by more investment in general knowledge, a large skill repertoire, the ability to do a quick study, trust in intuitions, and sophistication in cutting losses." Though he did not articulate his theories in terms of the explicit ideas offered by quantum physics and chaos theory, his statements support the general idea that the creation and health of an organization (or a system) depends on the interaction of various people and parts within that system. However, as Wheatley states in her book:

> Organizations lack this kind of faith, faith that they can accomplish their purposes in various ways and that they do best when they focus on direction and vision, letting transient forms emerge and disappear. We seem fixated on structures...and organizations, or we who create them, survive only because we build crafty and smart—smart enough to defend ourselves from the natural forces of destruction.

As Botten and Sims theorized with their ideas on bounded instability, some chaos is considered good for an organization. Anthony Walker calls this the "edge of

chaos" in his 2007 book, *Project Management in Construction*. While the edge of chaos is far from a stable environment, it is also very exciting—a place where the organization's predictable "legitimate system" tries to keep structures unchanged, and its dangerous "shadow system" attempts to undermine and challenge the status quo. When both are in healthy competition with each other, at the edge of chaos, they provide the power for change and required innovation.

SEE ALSO *Complexity Theory; Trends in Organizational Change*

BIBLIOGRAPHY

Botten, Neil, and Adrian Sims. *CIMA Learning Strategy 2007: Managment Accounting Business Strategy.* Oxford: Butterworth-Heineman, 2006.

Chen, Guanrong, and Xinghuo Yu, eds. *Chaos Control: Theory and Applications (Lecture Notes in Control and Information Sciences).* New York: Springer-Verlag, 2003.

Farazmand, Ali. "Chaos and Transformation Theories: A Theoretical Analysis with Implications for Organization Theory and Public Management." *Public Organization Review* 3, no. 4 (2003): 339–372.

Gleick, James. *Chaos: Making a New Science.* New York: Penguin Books, 1987.

Kolb, Robert W. and, James A Overdahl. *Futures, Options, and Swaps.* Blackwell Publishing, 2007.

Paul, Amita. "Chaos Theory." *12Manage: The Executive Fast Track,* 2008. Available from: http://www.12manage.com/methods_lorenz_chaos_theory.html.

Peters, Tom. *Thriving on Chaos.* New York: HarperCollins, 1987.

Pugh, Lyndon. *Change Management in Information Services.* Ashgate Publishing Ltd., 2007.

Sullivan, Terence J. "The Viability of Using Various System Theories to Describe Organisational Change." *Journal of Educational Administration* 42, no. 1 (2004): 43–54.

Walker, Anthony. *Project Management in Construction.* Blackwell Publishing, 2007.

Wheatley, Margaret J. *Leadership and the New Science: Discovering Order in a Chaotic World Revised.* San Francisco: Berrett-Koehler Publishers, 2001.

CLOSED SYSTEMS

SEE *Open and Closed Systems*

COALITION BUILDING

Coalitions refer to the temporary formation of persons, groups, or even nations for some type of joint or common action. It is most often used in relation to political or national issues, such as in the Coalition to Protect Senior Care. In business, coalitions have been present for many years as a means of bringing together people, departments within an organization, entire companies, or industries with some common purpose. Examples of such purposes might include achieving a common corporate goal, lowering insurance rates, regulating an industry action, or strategic planning. Coalitions are an exercise in power, whether in politics or business.

HISTORY OF COALITIONS

The concept of coalition building has too often been confused with interest groups and lobbying. The term refers to the formation of different interests, but not necessarily with the same intent as an interest group. From the French *coalascere*, the word is generally defined in political terms. Most early coalitions were temporary alliances formed among nontraditional allies to combat a common foe. An example of this type of usage is the coalition between the United States and Afghanistan (as well as other countries), in which a multi-national force comes together to fight militants in Afghanistan. Coalitions are also formed for election purposes. A historical example of this is the Republican Party, formed in the mid-nineteenth century from representatives from virtually all parties then existing on the American political scene—Whigs, Democrats, Free-Soilers, Abolitionists, Know-Nothings, members of the temperance movement, and others without a party allegiance. All of these elements did not survive the formation of the Republican Party as we know it today.

COALITIONS DEFINED

There are various definitions of a coalition that fit an organizational behavior setting. One simply states that a coalition occurs when members of a group organize to support their side of a particular issue. Another definition refers to a coalition as a relationship over a specific issue. Coalitions exist to preserve and even enhance self-interests, whether those of an individual or group, and achieve an adequate balance of power favorable to the coalition members' advantage. A more complete definition is a group formed to pursue a strategy that will be to the advantage of those most directly affected.

Another example of a coalition is one that forms over the issue of funding for management information systems within a single organization. Individuals express initial concern about a lack of resources to fully develop an integrated information system, yet have no formal way to share concerns with management. These individuals represent several units within the organization, including accounting, research, marketing, and distribution—few of whom commonly interact with the others. The issue focuses on management's budget control. But, as a group, membership serves on the overall organizational budget planning committee. At the point of decision making, the

Figure 1
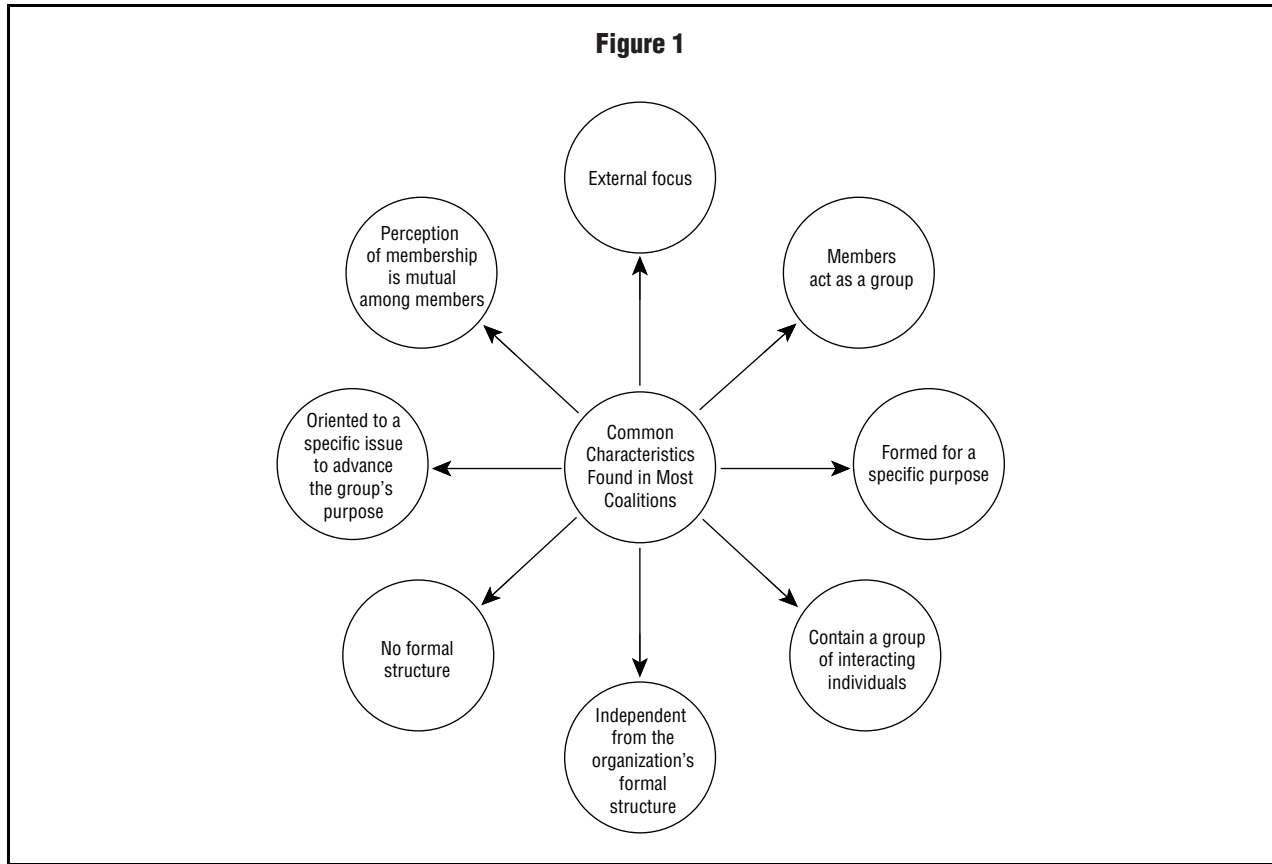
coalition acts in accord with common interests to recommend a comprehensive information system mutual to the needs of all units. Once this recommendation is forwarded to the organization's executive, the coalition disbands or continues, depending on the final decision on how the resources are to be used for information management.

Whatever definition of coalitions is accepted, understanding organizational coalitions enhances understanding of behavior in complex organizational structures. Coalitions are a potent force in organizations. Organizational behavior literature is largely independent of the social psychology literature on coalitions, yet a closer tie between the two fields is building. Likewise, business and organization literature has not utilized the vast literature of political science that examines the unique formation of coalitions for mutual goals. The merging of these three independent disciplines into a body of coalition literature can only enhance our understanding of the formation of groups for common purposes.

COALITION BUILDING

A review of the business and behavioral science literature on coalitions suggests the following are common characteristics found in most coalitions:

1. Members act as a group.

2. They are formed for a specific purpose.

3. They contain a group of interacting individuals.

4. They are independent from the organization's formal structure.

5. They have no formal structure.

6. They are oriented to a specific issue to advance the group's purpose.

7. Perception of membership is mutual among members.

8. They have an external focus.

These characteristics may be common with other types of groups within organizations, but coalitions are separate and quite often powerful. As a part of an organizational power structure, coalitions are frequently seen as a manager's legitimate search for power, and as such, are used to increase personal power or to achieve organizational goals. When building a coalition, potential members will identify those individuals or groups who have a common interest or goal and who are most likely to join. Generally, coalitions take time to form as participants

identify the common goal, the best manner to approach that goal, and the individuals or groups most likely to share the preferred strategy of goal-seeking. Borrowing from social psychology literature, "Coalitions form, one person (or group) at a time."

Coalitions are used to increase a power base. Therefore, an understanding of coalition building is integral to a comprehensive knowledge of organizational behavior. In politics, the word "temporary" is closely associated with coalitions, but this is not necessarily the rule in corporate life. Social psychologists Keith Murnigham and Danny Brass conclude that successful coalitions are fluid, form rather quickly, expand, burst at the moment of decision, and then rapidly disappear. Other types of relationships within the organization can include alliances, networks, cliques, a supportive managerial relationship, and other forms. Networks are a broad-based cooperative pursuit of general self-interests, while alliances involve individuals or groups supporting each other. A clique is a group of individuals held together by a common interest. Cliques often form coalitions. Research indicates that some surreptitiousness (e.g., mobilizing quietly) may be essential to building a coalition. There is also research concluding that resistance, fear of retaliation, and insults often create ripe conditions for coalition building.

Several conditions have to be present for the formation of a coalition. First, there has to be an issue that requires addressing or interest in an issue that coalition members find they have in common. Second, potential members have to share a belief that they can achieve success through building a coalition. Third, there must be an understanding that the action taken has to be jointly performed. Once these criteria are met, the building of the coalition begins. Generally, coalition members form from a weakness—that is, individually they are not strong enough in the organization to achieve their goal.

When this collective action leads to a response, coalitions can take one of several directions. If initially successful, the coalition may grow. But the same is true if the coalition first encounters failure yet persists in reaching a collective goal. Disbanding the coalition is also a possibility in either scenario, resulting in the dormancy of the coalition. Coalitions may well be strengthened by success and continue to grow in power and influence. A dormant coalition may also be able to exercise power at a later time, but this is unlikely in most organizations. Coalitions may prevail and coalition goals may become the dominant organizational goal, although this alternative course of coalition action lacks adequate research findings from which to derive any solid conclusions. The stability of coalitions thus depends on goals, course of action, outcomes, and continued common interest.

COALITION GOALS

Coalition goals generally focus on the distribution of resources, usually a source of contention in organizations. The lack of adequate resources, changes in the resource base, perceived inequitable resource distribution, and lack of a comprehensive understanding of resource allocation frequently result in the development of coalitions. Research also indicates that those with broader discretion and influence in job responsibilities and work activities are more likely to participate in coalition building. When the work environment is more rigidly controlled, coalitions are not as likely to be pursued as a strategy for addressing collective goals.

An example of a coalition and its effectiveness can be found in Belarus's 2007 bid for a seat on the UN Human Rights Council. Objecting to the country's record of human rights violations, more than 40 nongovernmental organizations from around the world came together to condemn Belarus's bid. As a result of these efforts as well as campaigns by the United States and parts of Europe, Belarus was defeated and did not win a seat on the Council. Although an example of a very powerful coalition, it includes most of the common characteristics of the coalition—an interacting group (the nongovernmental organizations), a specific purpose (blocking Belarus's bid), a concentrated act (petitioning the UN), no formal internal structure (a group of organizations), external focus (the leadership of an intergovernmental human rights body), and orientation to advance the members' purpose (human rights advocacy).

COALITION LITERATURE

The concept of coalitions has undergone differing applications and meanings within organizational theory. The earliest uses focus on conflicts within organizations and the presence of multiple goals within the same organization. Herbert Simon, former professor at Carnegie Mellon University and 1978 recipient of the Nobel Prize in economics, was one of the first researchers to identify the issue of conflict over goals in an organization. Simon, however, failed to mention coalitions arising within the organizations over this conflict. Simon's 1958 book, *Organizations*, which he co-authored with James G. March, mentioned coalitions between but not within organizations. March, also at Carnegie Mellon and later at Stanford, did draw a relationship between coalitions and organizations in a 1962 article in the *Journal of Politics*. March continued his work with Richard Cyert (also at Carnegie Mellon at that time and later president of the institution from 1972 to 1990) in works like the 1963, *A Behavioral Theory of the Firm*.

The second significant period of coalition research centered on James Thompson, who adopted the work of

March and Cyert in his 1967 book, *Organizations in Action*, where he coined the term, "dominant coalition." Thompson (who was teaching business at Indiana University in 1967) concluded there were certain constraints on coalition building, mainly the organization's technology and environment. Thompson theorized that the more uncertainty in organizations due to technology and environment, the more power bases that exist. The coalition grows as the uncertainty increases.

Thompson also used the term, "inner circle" to describe the select few within an organization whose connections provide them with influence. Their role in coalition building is often one of leadership, but they seldom act alone in achieving goals. Their power is enhanced as the coalition strives to achieve a group goal; thus, the individual and coalition feed off each other. Carrying Thompson's point one step further, interdependency in an organization creates a greater likelihood for the formation of a coalition or coalitions.

A third phase of coalition scholarship was generated with the introduction of political science and social psychology methods and studies to organizational behavior. This led to the current divergent use of the term, and research from several disciplines points to how individual efforts at influence become the basis for coalition building. The application of different schools of research on coalitions led to more thorough study into the formation and operation of coalitions in the organization. In addition, game theory proponents contribute to understanding of the role of coalitions and their formation.

More recently, research into coalitions has moved away from the organizational environment to the political arena where coalitions have an impact on business. Periodical literature is highlighted with articles on how coalitions influence international business and economics, the health care industry, diversity and integration issues, foreign trade, the insurance market, and community activism. In the area of organizational behavior, research centers on the role of coalitions in organizational change, or how groups with seemingly dichotomous interests merge to exercise power on business strategy and decision making within an organization undergoing significant administrative and structural change.

In their seminal article on coalition research, William Stephenson, Jone Pearce, and Lyman Porter (of the University of California at Irvine) state that the study of coalitions has yet to produce any new way of understanding organizational processes. Considering the wide array of research from psychology, political science, game theory, sociology, and organizational behavior, their conclusion still begs an adequate answer. We can come to an understanding of the conditions necessary for the formation of a coalition, how they are built, how they exercise power and influence, and how they survive or disband, yet the question of the role of the coalition in organizational behavior remains unanswered and fertile for the researcher so inclined to look further for questions and answers.

SEE ALSO *Group Decision Making; Group Dynamics; Managing Change; Organizational Structure; Teams and Teamwork; Trends in Organizational Change*

BIBLIOGRAPHY

Johns, Gary. *Organizational Behavior: Understanding and Managing Life at Work.* New York: HarperCollins, 1996.

March, James G., and Richard M. Cyert. *A Behavioral Theory of the Firm.* Englewood Cliffs, NJ: Prentice-Hall, 1963.

Murnigham, John Keith, and Daniel J. Brass. "Intraorganizational Coalitions." In *Research on Negotiation in Organizations.* eds. Max H. Bazerman, Roy J. Lewicki, and Blair H. Sheppard. Greenwich: JAI Press, 1991.

Pfeffer, Jeffrey. *New Directions for Organization Theory: Problems and Prospects.* New York: Oxford University Press, 1997.

Ray, Debraj. *A Game-Theoretic Perspective on Coalition Formation (The Lipsey Lectures).* New York: Oxford University Press, 2008.

Roberts, Joan M. *Alliances, Coalitions and Partnerships: Building Collaborative Organizations.* St. Paul, MN: New Society Publishers, 2004.

Simon, Herbert A., and James G. March. *Organizations.* New York: Wiley, 1958.

Stephenson, William B., Jone L. Pearce, and Lyman W. Porter. "The Concept of Coalition in Organization Theory and Research." *Academy of Management Review* (April 1985): 256–268.

Thompson, James D. *Organizations in Action: Social Science Bases of Administrative Theory.* New York: McGraw-Hill, 1967.

"UN: 'No' to Belarus on Rights Council." Human Rights Watch. Available from: http://hrw.org/englinsh/docs/2007/05/17/belaru15966.htm.

COMMUNICATION

Communication is the sharing or exchange of thought by oral, written, or nonverbal means. To function effectively, managers need to know, and be able to apply strategically, a variety of communication skills that match varying managerial tasks. These tasks might call for nonverbal, presentational, or written skills as the manager meets others, speaks at meetings, or prepares reports to be read by clients or those higher on the organizational ladder. To work effectively, managers also need to know sources of information. Finally, managers need to understand the different communication channels available.

UPWARD AND DOWNWARD COMMUNICATION

Information, the lifeblood of any organization, needs to flow freely to be effective. Successful management requires downward communication to subordinates, upward communication to superiors, and horizontal communication to peers in other divisions. Getting a task done, perhaps through delegation, is just one aspect of the manager's job. Obtaining the resources to do that job, letting others know what is going on, and coordinating with others are also crucial skills. These skills keep the organization working and enhance the visibility of the manager and her division, thus ensuring continued support and promotion.

Downward communication is more than passing on information to subordinates. It may involve effectively managing the tone of the message, as well as showing skill in delegation to ensure the job is done effectively by the right person. In upward communication, tone is even more crucial, as are timing, strategy, and audience adaptation. In neither case can the manager operate on automatic as the messages are sent out.

THE COMMUNICATION PROCESS

At first glance the communication process, or the steps taken to get a message from one mind to another, seems simple enough. As the definition at the opening suggested, the sender has an idea, which he transmits to the receiver through signs—physical sensations capable of being perceived by another. These signs might be a printed or spoken word, a gesture, a handshake, or a stern look, to name just a few. The receiver takes those signs, interprets them and then reacts with feedback.

The process is more complex, though. When communicating, the sender encodes the message. That is, she chooses some tangible sign (something which can be seen, heard, felt, tasted, or smelled) to carry the message to the receiver. The receiver, in turn, decodes that message; that is, he finds meaning in it. Yet the signs used in messages have no inherent meaning; the only meaning in the message is what the sender or receiver attributes to it.

To make sense out of a message, to determine the meaning to attribute to it, the receiver uses perception. With perception, the receiver interprets the signs in a communication interaction in light of his past experience. That is, he makes sense out of the message based on what those signs meant when he encountered them in the past. A firm, quick handshake, for example, may signal "businesslike" to someone because in the past he found people who shook hands that way were businesslike.

PERCEPTION

No person sees things exactly the same way as another; each has a unique set of experiences, a unique perceptual "filter," through which he or she compares and interprets messages. Making up this filter is the unique blend of education, upbringing, and all of the life experiences of the perceiver. Even in the case of twins, the perceptual filter will vary between them. When communicating, each receiver uses that filter to give meaning to or make sense out of the experience.

Herein lies the challenge in communication, particularly for managers who need to be understood in order to get things done: getting the receiver to comprehend the message in a way similar to what was intended. While the word "communication" implies that a common meaning is shared between sender and receiver, this is not always the case. Under optimum circumstances, the meaning attributed to the message by the receiver will be close to what was intended by the sender. In most situations, however, the meaning is only an approximation, and may even be contrary to what was intended. The challenge of communication lies in limiting this divergence of meanings between sender and receiver.

While the wide range of potential experiences makes communicating with someone from within the same culture a challenge, across cultures the possibilities are even wider and the challenges even greater. What one sign means in one culture might be taken in an entirely different way in another. The friendly Tunisian businessman who holds another man's hand as they walk down the street may be misunderstood in the North American culture, for example. Similarly, an intended signal may mean nothing to someone from another culture, while an unintended one may trigger an unexpected response.

Understanding the dynamics that underlie perception is crucial to effective and successful communication. Because people make sense out of present messages based on past experiences, if those past experiences differ, the interpretations assigned may differ slightly or even radically depending on the situation. In business communication, differences in education, roles in the organization, age, or gender may lead to radical differences in the meaning attributed to a sign.

AUDIENCE ADAPTATION

The effective communicator learns early the value of audience adaptation and that many elements of the message can be shaped to suit the receiver's unique perceptual filter. Without this adaptation, the success of the message is uncertain. The language used is probably the most obvious area. If the receiver does not understand the technical vocabulary of the sender, then the latter needs to use terms common to both sender and receiver.

On the other hand, if the receiver has less education than the sender, then word choice and sentence length may need to be adapted to reflect the receiver's needs. For

example, if the receiver is skeptical of technology, then someone sending a message supporting the purchase of new data processing equipment needs to shape it in a way that will overcome the perceptual blinders the receiver has to the subject. If the receiver is a superior, then the format of the message might need to be more formal.

COMMUNICATION BARRIERS

Communication barriers (often also called noise or static) complicate the communication process. A communication barrier is anything that impedes the communication process. These barriers are inevitable. While they cannot be avoided, both the sender and receiver can work to minimize them.

Interpersonal communication barriers arise within the sender or receiver. For example, if one person has biases against the topic under discussion, anything said in the conversation will be affected by that perceptual factor. Interpersonal barriers can also arise between sender and receiver. One example would be a strong emotion like anger during the interaction, which would impair both the sending and receiving of the message in a number of ways. A subtler interpersonal barrier is bypassing, in which the sender has one meaning for a term, while the receiver has another (for example, "hardware" could be taken to mean different things in an interchange).

Organizational barriers arise as a result of the interaction taking place within the larger work unit. The classic example is the serial transmission effect. As a message passes along the chain of command from one level to the next, it changes to reflect the person passing it along. By the time a message goes from bottom to top, it is not likely to be recognized by the person who initiated it.

Although communication barriers are inevitable, effective managers learn to adapt messages to counteract their impact. The seasoned manager, especially when in the role of sender, learns where they occur and how to deal with them. As receiver, she has a similar and often more challenging duty. The effort is repaid by the clearer and more effective messages that result.

COMMUNICATION REDUNDANCY

While audience adaptation is an important tool in dealing with communication barriers, it alone is not enough to minimize their impact. As a result, communication long ago evolved to develop an additional means to combat communication barriers: redundancy, the predictability built into a message that helps ensure comprehension. Every message is, to a degree, predictable or redundant, and that predictability helps overcome the uncertainty introduced by communication barriers. Effective communicators learn to build in redundancy where needed.

Communication redundancy occurs in several ways. One of the most obvious of these is through simple repetition of the message, perhaps by making a point early and again later into the same message. A long report, by contrast, might have its main points repeated in a variety of places, including the executive summary, the body, and the conclusion.

Another source of redundancy lies in the use of multiple media. Much spoken communication is repeated in the nonverbal elements of the message. A formal oral presentation is usually accompanied with slides, product samples, or videotaped segments to support the spoken word. A person interviewing for a job stresses his seriousness and sincerity with a new suit, a warm handshake, consistent eye contact, and an earnest tone in his voice.

NONVERBAL COMMUNICATION

Nonverbal communication occurs when there is an exchange of information through nonlinguistic signs. In a spoken (and to some extent written) message, it consists of everything except the words. Nonverbal communication is a valid and rich source of information and merits close study. As with other elements of communication, the meaning of nonverbal signals depends upon perception. It does not have to be intentional in order to carry meaning to another person.

Nonverbal communication serves a variety of purposes, including sending first impressions such as a warm handshake. It also signals emotions (through tears or smiles), status (through clothing and jewelry), and when one wants to either take or relinquish a turn in conversation (using gestures or drawing a breath). Nonverbal signals can also signal when someone is lying; for example when being deceptive, vocal pitch often rises.

Many think of "body language" as synonymous with nonverbal communication. Body language is a rich source of information in interpersonal communication. The gestures that an interviewee uses can emphasize or contradict what he is saying. Similarly, his posture and eye contact can indicate respect and careful attention. Far subtler, but equally important, are the physical elements over which he has little control, but which still impact the impression he is making on the interviewer. His height, weight, physical attractiveness, and even his race are all sources of potential signals that may affect the impression he is making.

But nonverbal signals come from many other sources, one of which is time. If the interviewee in the previous example arrived ten minutes late, he may have made such a poor impression that his chances for hire are jeopardized. A second interviewee who arrives ten minutes early signals eagerness and promptness.

Haptics is a source of nonverbal communication that deals with touch. An interviewee with a weak handshake

may leave a poor impression. The pat on the back that accompanies a verbal "well done" and a written commendation may strongly reinforce the verbal and written statements. Subconsciously, most managers realize that when the permissible level of haptic communication is exceeded, it is done to communicate a message about the state of the parties' relationship. It is either warmer than it had been, or one of the parties wishes it so. Unfortunately, explain Borisoff and Victor, conflict can arise when the two parties involved do not agree on an acceptable haptic level for the relationship.

Nonverbal communication also includes proxemics, a person's relationship to others in physical space. Most are familiar with the idea of a personal space "bubble" that we like to keep around ourselves. In the North American culture, this intimate space may be an 18-inch circle around the person, which only those closest are allowed to invade. Just beyond this space close friends may be tolerated, and acquaintances even farther out. Other cultures may have wider or narrower circles. Table 1 sets out the meanings typically attributed to personal spaces in the North American culture.

Managers also send nonverbal signals through their work environment. These signals can affect the communication process in obvious or subtle ways. For example, a manager may arrange the office so that she speaks to subordinates across a broad expanse of desk. Or, she may choose to be less intimidating and use a round table for conferences. The artifacts she uses in the office may say something about who the manager is, or how she wishes to be seen. The organization also speaks through the space it allots to employees. For example, the perception that a large, windowed, corner office may signal prestige while a tiny, sterile cubicle may convey (intentionally or unintentionally) low status.

THE GRAPEVINE

The grapevine is the informal, confidential communication network that quickly develops within any organiza-

tion to supplement the formal channels. The structure of the grapevine is amorphous; it follows relationship and networking patterns within and outside the organization, rather than the formal, rational ones imposed by the organization's hierarchy. Thus, members of a carpool, or people gathering around the water cooler or in the cafeteria, may be from different divisions of a company, but share information to pass the time. The information may even pass out of the organization at one level and come back in at another as people go from one network to another. For example, a member of a civic group might casually (and confidentially) pass on interesting information to a friend at a club, who later meets a subordinate of the first speaker at a weekend barbecue.

The grapevine has several functions in the organization. For one, it carries information inappropriate for formal media. Fearing legal repercussions, most would rarely use printed media to share opinions on the competence, ethics, or behavior of others. At the same time, they will freely discuss these informally on the grapevine. Similarly, the grapevine will carry good or bad news affecting the organization far more quickly than formal media can.

The grapevine can also serve as a medium for translating what top management says into meaningful terms. For example, a new and seemingly liberal policy on casual dress may be translated as it moves along the grapevine to clarify what the limits of casual dress actually are. As it informally fleshes out or clarifies what is also traveling in the formal channels, the grapevine can also serve as a source of communication redundancy. And when these corporate-sanctioned channels are inaccurate, especially in an unhealthy communication climate, what is on the grapevine is usually trusted far more by those using it than what passes on the formal channels.

Participants in the grapevine play at least one of several roles. The first of these, the liaison, is the most active participant since he both sends and receives information on the grapevine. This person often has a job with easy access to information at different levels of the organization (and often with little commitment to any level). This might be a secretary, a mailroom clerk, a custodian, or a computer technician. Often, too, the liaison is an extrovert and likable. While this role means that the liaison is in on much of what is going on in the organization, he also takes a chance since the information he passes on might be linked back to him.

Another role played in the grapevine is the dead-ender. This person generally receives information, but rarely passes it on. By far the most common participant in the grapevine, this person may have access to information from one or more liaisons. This role is the safest one to play in the grapevine since the dead-ender is not linked

Table 1
Proxemic Distances in the North America Culture

Zone	Distance	Persons Tolerated
Intimate	0" to 18"	Partner/spouse, parents, children
Personal	1.5' to 4'	Close friends
Social	4' to 12'	Business associates
Public	12' and up	Strangers

Adapted from Smeltzer and Waltman et al., pp. 234-235

to the information as it moves through the organization. Many managers wisely play this role since it provides useful information on what is happening within the organization without the additional risk passing it on to others might entail.

The third role is the isolate. For one or more reasons, she neither sends nor receives information. Physical separation may account for the role in a few instances (the classic example is the lighthouse keeper), but the isolation may also be due to frequent travel that keeps the individual away from the main office. Frequently, the isolation can be traced to interpersonal problems or to indifference to what is happening in the organization (many plateaued employees fit in this category). Not surprisingly, top management often plays the role of isolate, although often unwillingly or unknowingly. This isolation may be owing to the kinds of information passing on the grapevine or to the lack of access others have to top management.

Of course, what is passing on the grapevine may affect a person's behavior or role played. The isolate who is close to retirement and indifferent to much of what is going on around him may suddenly become a liaison when rumors of an early retirement package or a cut in health benefits circulate. Meanwhile, the youngest members of the organization may not give a passing thought to this seemingly irrelevant information.

COMMUNICATION CHANNELS

Communication channels—or the media through which messages are sent—can have an influence on the success of communication. Typical channels used in business communication are face-to-face conversations, telephone conversations, formal letters, memos, or e-mails. Each channel has its own advantages and disadvantages in communicating a particular message.

Media richness theory indicates that the various communication channels differ in their capability to provide rich information. Face-to-face interaction is highest in media richness, because a person can perceive verbal and nonverbal communication, including posture, gestures, tone of voice, and eye contact, which can aid the perceiver in understanding the message being sent. Letters and e-mails have fairly low media richness; they provide more opportunity for the perceiver to misunderstand the sender's intent. Thus, messages should be communicated through channels that provide sufficient levels of media richness for their purpose. For instance, when managers give negative feedback to employees, discipline them, or fire them, it should be done in person. However, disseminating routine, nonsensitive information is properly done through memos or e-mails, where media richness is not critical.

E-MAIL

E-mail, a common business tool used to spread messages across company structures, can also come with pitfalls. The ease of composing and sending e-mails creates a sometimes lax environment where messages can become garbled, and laziness on the part of the sender can lead to misunderstanding or confusion. Normally clear communicators might omit helpful sentence structure or assume that their tone carries over in an e-mail when, in fact, the static of time-and-place is actually ruining the message. It is common for most companies to have monitoring and collection systems on all e-mail communication, but problems can be readily solved with more careful writing techniques. The University of California offers several helpful guidelines in its *Guide to Electronic Communication*

E-mail should always have the appropriate degree of formality. The structure and tone of a business letter is a good example to follow. How would you properly speak to your organization, manager, or employees? E-mails should be written with the same professionalism. Not only are they read by the intended person, but e-mails are also often sent to or seen by others.

A reply to an e-mail should always include some summary of the original message. It is rude to force the reader to reread or reconsider what they have already written. A sentence, or even a few words, is usually enough, This is also why it is polite to include links to any articles or Web sites you are referring to within the e-mail.

When sending out a mass e-mail, it is considered polite to summarize the responses you receive. A simple tally of the replies, and communication of the general decision, is enough.

Email messages should be concise. Readers rarely have the time or patience to read a full letter. Keeping the message brief will keep the communication clear.

Messages should be formatted for easy reading. Separating sentences, bulleting points, and using short paragraphs are all ways to improve the readability of e-mail messages.

Titles and subject headings should be descriptive. It is not polite to leave readers guessing what the body of the e-mail might be about. Subject headings should communicate what information the e-mail contains.

Writers of e-mails should take care when using emotive language (such as sarcasm, humor, anger, confusion, etc.). Although e-mail is more informal than other written forms of communication, it does not communicate nonverbal cues, and expressions can be misunderstood.

BUSINESS BLOGGING

Web Logs, or blogs, were once used as online journals and private forums. Now, the blogging industry has exploded,

with hundreds of blogging sites adding information and articles daily. According to the blog-tracking company Technorati, approximately 175,000 new blogs are created daily, along with the millions of updates to existing blogs. So, how can a business profit from the blogging world? Can blogs be used as effective marketing and communication tools?

Peter Alexander, with *Enterprise.com*, believes they can. In his 2007 article, "Should You Start a Business Blog?" he gives several reasons why companies should consider the "blogosphere." A business blog can be much more personal, easy to access, and attractive than other marketing techniques. Customers do not feel as pressured by a blog as by other forms of sales media. A blog can be updated daily, giving the business an active, adaptive face—and at a low cost, since most blogs cost little to no money to begin and run.

There are several ways to approach blogging as a business. First, goals and core ideas should be established: what does the business want to communicate with their blog? What image does it want to show? What is the best tone and subject matter to enforce that image? With specific goals in mind, a blog can be tailored to the company's desires.

Blogs should be both relevant and useful. Updating blogs is vital for a company, and even minor posts concerning new products or leadership can communicate the friendliness and personal aspects of the blog. Customers will also want ways to find more information, so links to a company's Web site, ordering information, and any tips or extra information are great additional items to include in a business blog.

As with other types of marketing, the communications on a business blog should make readers eager to learn more about the company and its product or service. Different writers should create a variety of posts to keep the customers' attention, and the use of more than one voice on a blog can be engaging. Key words the company wants to associate itself with—*dedicated*, *freelance*, or *invested*, for example—should be used frequently on the blog so customers naturally pick up the idea. Videos (even vlogs, video-oriented blogs), pictures, and pdfs can also increase the attraction and usefulness of business blogs.

SMS, OR PHONE TEXT MESSAGING

Short message service (SMS), referred to usually as TM or text messaging, is sometimes considered a standby for teenagers and those with time to learn how to type on their cell phones; however, it is also starting to have many business applications. From a global perspective, America has been slow to accept TM as a form of business and social communication. According to a 2006 article in *Business 2.0*, Ecuador sends four times more text messages per person than the United States does, despite economic differences. Europeans, such as the Irish or the Danes, send approximately 100 texts per month, compared to people in the United States, whose average is not quite 50 texts.

How can a business make use of TM communication? There are several possibilities, and for some organizations TM can be an asset, enabling instant and direct communication that is more reliable than other electronic contact.

Companies that work a great deal in internet or intranet-based information might want to use text messaging as a failsafe, in case a network fails. Managers and employees may not be able to receive updates if e-mail and IM services are down, but TM notifications can be sent immediately to a widespread audience, explaining a system failure and giving updates on repairs.

There are also a number of people who work away from computers, without access points to check e-mail and receive important communication. Workers, those traveling on marketing tasks, or simply people who frequently move in their jobs can all benefit from a TM system where they can receive key information as they work.

There are several other, more specific uses of text messaging being attempted in the business world. Some marketing ploys use TM to advertise, certain companies announce events or orders over phone texting, and some security organizations (such as banks) use TM to transfer temporary, private security codes. Like other new methods of communication, TM is proving to have a number of uses throughout many industries.

INSTANT MESSAGING FOR BUSINESSES

Instant messaging (IM) works in much the same way as e-mail, but it provides a continuous flow of communication (constantly updated) and resembles a normal conversation stripped of nonverbal communication. Many businesses already use IM for training, helpdesk service, and updates. An organization can approach IM use in many different ways. The Microsoft Small Business Center has a helpful guideline for companies considering adopting IM for business use, offering key concepts to keep in mind

First, the organization should create a clear policy regarding IM use, and communicate that policy to all employees. Standards should be set, and parameters should be made on what subjects are allowed for discussion. Employees should be aware that excessive instant messaging will not be tolerated, and that all IM conversations are saved in case of potential misuse. Sensitive information should not be communicated with IM

technology. Managers should set the standard by being clear, concise users of instant messaging themselves.

Companies should be sure they know the legal precedents established in IM use, and be aware of their own liability in case of fraud, defamation, and other potential problems. Computer viruses can use IM services to hack into networks as well, so companies should be aware of possible security risks, and the dangers of transferring files over their IM system.

VOIP

Voice over Internet protocol, or VoIP, is a recent form of technology allowing audio communication through an Internet provider. Many companies are attracted to VoIP because it allows them to integrate their communication system; for example, department phone networks can be set to use VoIP, avoiding the cost of a phone service provider and allowing some services to become more efficient and integrated, such as conference calling or speaker systems. With broadband services offering high-speed Internet connection capable of high-quality VoIP, companies can consider the technology as a viable alternative.

While VoIP works the same way as a phone service provider, there are several unique points companies should be aware of when looking for VoIP service. Kristin Kiya on *Ezine* offers a short list of such points in her 2008 article, "Identifying the Best Business VoIP Solutions for Your Business:"

- Pay attention to tariffs charged for transferring calls by the VoIP provider. International calls can especially elevate costs.

- The company should always request test calls from the VoIP provider so that the quality of service can be ascertained. No company should accept fuzzy or intermittent service.

- A good VoIP provider should provide enough resources that the company can make the transition from its old phone service easily, without losing any capabilities.

- Many VoIP providers offer training along with their services. If companies desire professional training in the new technology, they should be sure to find a provider that will include it.

There is a growing number of VoIP companies available. The possible providers include Phone Power, Vonage, VoIP Your Life, via-talk, and VoIPGO.

BIBLIOGRAPHY
Alexander, Peter. "Should You Start a Business Blog?" *Entrepreneur.com.* Available from: http://www.entrepreneur.com/technology/techtrendscolumnist peteralexander/article175236.html.

Athos, A.G., and R.C. Coffey. "Time, Space and Things." In *Behavior in Organizations: A Multidimensional View.* Englewood Cliffs, NJ: Prentice Hall, 1975.

Borisoff, Deborah, and David A. Victor. *Conflict Management: A Communication Skills Approach.* Englewood Cliffs, NJ: Prentice Hall, 1989.

Enbysk, Monte. "10 Tips for Using Instant Messaging For Business." *Microsoft Small Business Center.* Available from: http://www.microsoft.com/.

Gargano, Joan. "A Guide to Electronic Communication and Network Etiquette." *dcn.org.* University of California, 2005.

Kedrosky, Paul. "Why We Don't Get the (Text) Message." *Business 2.0,* 2 Oct 2006.

Kiya, Kristen. "Identifying the Best Business VoIP Solution for Your Business." *Ezine Articles.* Available from: http://ezinearticles.com/?Identifying-The-Best-Business-VoIP-Solution-For-Your-Business&id=650073.

Knapp, Mark L., and Judith A. Hall. *Nonverbal Communication In Human Interaction.* Belmont, CA: Wadsworth Publishing, 2001.

Mah, Paul. "Using Text Messaging In Business." *TechRepublic.* Availble from http://blogs.techrepublic.com.com/wireless/?p=183.

Smeltzer, Larry R., and John L. Waltman, et al. *Managerial Communication: A Strategic Approach.* Needham, MA: Ginn Press, 1991.

Timm, Paul R., and Kristen Bell DeTienne. *Managerial Communication.* Englewood Cliffs, NJ: Prentice Hall, Inc., 1991.

COMMUNITIES OF INTEREST, COMMUNITIES OF PRACTICE

A community of interest, or a CoI, is described as a network of people who share the same interests, knowledge, and understanding of the best practices for any given subject matter. A community of interest can be either a live "actual" community of individuals who meet to discuss and exchange information, or it can be a virtual community that meets, discusses, and exchanges information via the Internet and various messaging tools.

A community of practice, or a CoP, generally refers to the communal use and understanding of a specific interest and knowledge of its best practices. In other words, a community of practice can be the very community of interest as described above, or it can be a loosely organized group that simply shares and practices the same understanding and methodology on a given subject matter. The term "community of practice" was originally coined to describe the type of community atmosphere created by apprenticing and mastering a trade. Now, a community of practice can refer to any loose or structured learning environment or situation where mentoring and

the fostering of knowledge of a specific trade or specialized practice or genre of knowledge occurs. As described by authority Etienne Wenger, a community of practice is a communal or joint enterprise; as such, it is consistently progressing as is best for the delivery of information that is important to the community. Engagement in the community is defined by continual negotiation and renegotiation of what the community stands for and the definition and redefinition of the community's resources, vocabulary, philosophies, and anything else which defines the group and the body of information important to its members.

The mission of a community of practice is to hone skills on both a personal as well as communal level. An additional mission for most communities of practice is to further the study and understanding of a given subject matter or theme that all members of the community have a common interest in or passion for. What defines a community of practice and makes it distinct from a common club or simple group of friends is the constant stewardship of new and old data as well as the level of education, competency, and experience of each of a community's members. Members of the community of practice do just that—they practice and are active practitioners of a subject via the sharing of data in the form of facts, stories, problem-solving techniques, and tools of the trade.

COMMUNITIES OF PRACTICE FOR ORGANIZATIONAL LEARNING AND KNOWLEDGE MANAGEMENT

One of the most important advents of communities of practice has been the creation and honing of organizational learning and knowledge management. A community of practice allows for the close proximity of teachers and students (masters and apprentices) in a given field of study. Organizational learning is the practice of learning where the established rules of a trade come to be acknowledged and followed. Additionally, organizational learning begins and follows the process of adapting the established rules and practices to the changing environment in which a given trade is practiced. Organizational learning must be both active and reactive to given environments and circumstances as well as regional, cultural, geographic, and other differences. As a concept, it can truly only be actualized when there is a community to create, use, recreate, and revolutionize the various processes that make up an actual practice, trade, or organized body of information.

Organizational learning within a community of interest or community of practice has been the primary source for the "standard operating procedures" (SOPs) of hundreds of practices, making it perhaps the most important platform for establishing best practices so far.

Knowledge management has been another important innovation created and utilized by communities of practice. Communities of practice, especially those that use the Internet to communicate virtually and constantly, create a place where information can be gathered, stored, challenged, and rethought over and over. In this process, ideas and ways of doing things within a trade can be openly questioned and changed if the occasion arises that the best practice differs from current practice. The management of this collective knowledge in a single place begins to have patterns, and basic, universal principles about best practices can begin to form. A database that is consistently managed because it is vitally important to the members of its community of practice begins to morph from simple information into what is true about the subject matter at hand as well as the community that practices it.

According to Gene Bellinger, author of the 2004 article *Knowledge Management: Emerging Perspectives*, "Information, knowledge, and wisdom are more than simply collections. Rather, the whole represents more than the sum of its parts and has a synergy of its own." Bellinger adds that it is important to remember what knowledge is and why it is important before anyone hurries to categorize and manage it. He and other experts in the field of knowledge management break data down into groups of information, knowledge, and wisdom. The relationship between these three types of data can help users to manage and categorize thoughts. Prioritizing data in this way allows for better management of whole communities of practice and helps determine what is important and why. In addition, a community of interest endeavoring to make use of particular data can do so in a much more effective fashion if the ideas and strategies are created based on information from various perspectives. Putting these new ideas into practice and using them for a time will allow important figures in a given field to establish thoughts and opinions, which will turn into the common wisdom necessary for the progression of the trade or field of study.

ADVANTAGES OF A COMMUNITY OF PRACTICE

Etienne Wenger, author of "Communities of Practice: Learning as a Social System," breaks communities of practice down in terms of their advantages to users and explains why they are effective. Wenger notes that for a community to keep information organized and for data to be maintained effectively, one consistent practice and organizational style are imperative. Ideas and information are not effective or valuable if the ways of discovery compromise the meaning, or if the data itself cannot be used in practice by the community. Wenger emphasizes

the importance of *reification*: the process by which esoteric ideals and unformed ideas become concrete, empirical data that the community can learn and put to use. Wenger discusses the importance of reifying information before it is presented to a group, team, or community so that the contents of the data are not misunderstood or presented in a manner that renders the facts useless. Understanding the more general meaning of new data and learning how to apply new information as new or to existing processes is the main goal of the reification process.

Wenger also emphasizes the importance of participation in the community. Participating in all of the community processes will ensure that all parties involved—and their opinions and perspectives—are represented in the shaping of new information. Wenger notes that participation is also a social practice, and it is therefore important to the cohesiveness of the community and fostering a level of trust amongst its members. Additionally, Wenger explains that reifying abstract ideas and information cannot be truly accomplished without a participative group of members taking part in the process. In short, participation within the community of practice is crucial to the survival of its core as well as to new data that enters and reshapes the patterns and ideals of the group itself.

PROPER CARE AND FEEDING OF A COMMUNITY OF PRACTICE

In order to function properly and to grow, a community of practice needs a common interest, a place to meet, and a means by which to practice and access tools that make that practice possible. The common interest of the group must be defined, and the group must be made up of and maintained by people who have a high level of experience and at least some level of expertise with the subject that is the common interest. The community of practice must be able to engage in activities pertaining to their interest. A true community of practice will allow users to act singularly as well as in group formats to create new ideas and methods of best practices, and to improve and help progress the field of study. Having the place and the means to engage in these activities are crucial to the upkeep of a community of practice and allow for important problem solving, discussions, use of pertinent tools and information, and development of new data into information and wisdom.

THE FUTURE OF COMMUNITIES OF PRACTICE AND INTEREST

Like many other things, today's community of practice is headed the way of the World Wide Web and will rely heavily on the Internet, wireless communication, and mobile devices more and more with each passing day. New ways of communicating more rapidly and from distances farther away allow for larger and more seasoned communities of practice to be developed. Just several decades ago, those with similar interests and practitioners of the same trades would have to live in the same geographic region in order to be a part of the same community of interest. In the twenty-first century, chat rooms, online bulletins, Web sites, and instant messenger systems have all created a virtual atmosphere that makes it possible to be a member of a community regardless of where—or when—that member practices.

BIBLIOGRAPHY

Beck, Klaus. "Organizational Learning." Available from: http://www.sfb504.uni-mannheim.de/glossary/orglearn.htm.

Bellinger, Gene. "Knowledge Management: Emerging Perspectives." Available from: http://www.systems-thinking.org/kmgmt/kmgmt.htm.

Hughes, Jason. *Communities of Practice: Critical Perspectives* London: Routledge Press, 2007.

Wenger, Etienne. "Communities of Practice: A Brief Introduction." Available from: http://www.ewenger.com/theory/.

Wenger, Etienne. "Communities of Practice: Learning as a Social System." Available from: http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml.

COMPETITIVE ADVANTAGE

Many firms strive for a competitive advantage, but few truly understand what it is or how to achieve and keep it. A competitive advantage can be gained by offering the consumer a greater value than the competitors, such as by offering lower prices or providing quality services or other benefits that justify a higher price. The strongest competitive advantage is a strategy that that cannot be imitated by other companies.

Competitive advantage can be also viewed as any activity that creates superior value above its rivals. A company wants the gap between perceived value and cost of the product to be greater than the competition.

Michael Porter defines three generic strategies that firms may use to gain competitive advantage: cost leadership, differentiation, and focus. A firm utilizing a cost leadership strategy seeks to be the low-cost producer relative to its competitors. A differentiation strategy requires that the firm possess a "non-price" attribute that distinguishes the firm as superior to its peers. Firms following a focus approach direct their attention to narrow product lines, buyer segments, or geographic markets. "Focused" firms will use cost or differentiation to gain advantage, but only within a narrow target market.

New businesses should be especially focused on competitive advantage. In the twenty-first century business world, it is considered usual for any starting business to

already understand some advantage that it can use to enter the market, but there are those that do not spend enough time preparing their resources. According to Scott Shane's *The Illusions of Entrepreneurship* (2008), more than one-third of starting businesses say they do not have competitive advantages.

CRITICAL AND CORE TASKS

Plunkett's Almanac of Middle Market Companies 2008 defines critical tasks as parts of the company that are used to gain competitive advantage. These parts are different for every company, based on their markets and concentrations. Many companies use research and development as a critical task, the goal being to find new products for their customers, or new ways to distribute their services. Other critical tasks can include various analyses of the markets, and strategic cooperation with other businesses.

Core tasks, on the other hand, are tasks the company routinely carries out—the normal mechanics of business. Core tasks can include human resources and production. These are tasks that do not necessarily give a competitive advantage, but they are necessary for the business to operate. When seeking competitive advantage, companies should distinguish between critical and core tasks, and allocate resources accordingly.

COST ADVANTAGE RESULTING FROM EFFICIENCY

Efficiency is the ratio of inputs to outputs. Inputs can be any materials, overhead, or labor that is assigned to the product or service. The outputs can be measured as the number of products produced or services performed. The firm that can achieve the highest efficiency for the same service or product can widen the gap between cost and perceived value and may have greater profit margins.

There are many ways a company can increase efficiency. Efficiency is enhanced if, holding outputs constant, inputs are reduced; or if holding inputs constant, outputs are increased. Inputs can be reduced in many ways. Labor inputs can be reduced if employees are better trained so that time spent on each individual output is decreased.

Decreasing waste can decrease materials needed. If a method can be devised to decrease waste, it would increase efficiency. For instance, a bottling plant might determine that 10 gallons of liquid are spilled every day as a result of the bottling process. If the amount of lost liquid can be reduced, efficiency will increase.

Outputs can be increased by increasing the number of units a machine can produce in a given period of time. Decreasing downtime can also increase outputs. For example, if a machine regularly breaks down and is out of order for two hours a day, finding a way to eliminate this downtime would increase the number of outputs.

It is often argued that large companies, by definition, are able to be more efficient because they can achieve economies of scale that others are not able to reach. Large companies usually offer more products in each product line, and their products may help to satisfy many different needs. If a consumer is not sure of the exact product he needs, he can go to the larger producer and be confident that the larger producer has something to offer. The consumer might believe that the smaller producer may be too specialized. Larger companies can cater to a larger population because of sheer size, while smaller companies have fewer resources and must specialize or fall victim to larger, more efficient companies.

THE STUDY OF COMPETITION

How does an organization begin when defining competitive advantages? The study of its market and resources goes hand in hand with the study of its competition. In order to understand what makes an organization special, the managers must study competitors and the competing ways of obtaining supplies, marketing products, and innovating. Only when a company is well aware of how its competitors conduct business will it be able to separate itself and find a niche where it can perform at its best.

Mark Blazey's *Insights to Performance Excellence 2008* gives several examples of what a company should look for when studying its competitors. First, naturally, a company must know who its competitors are. Knowing how many of them exist in the market and in what nations they operate is also useful. What sort of characteristics do such competitors have? How can a company obtain information about competition, short of corporate espionage? Industry journals can be very effective, and public companies release consistent financial reports that are open to be studied. Reading publications on new technology can help a company prepare to accept new software or digital tools that can be used to further its business. Studying the competition can show a company how to create differentiation—unique and beneficial qualities that give competitive advantage.

PRODUCT DIFFERENTIATION

Product differentiation is achieved by offering a valued variation of the physical product. The ability to differentiate a product varies greatly along a continuum depending on the specific product. There are some products that do not lend themselves to much differentiation, such as beef, lumber, and notebook paper. Some products, on the other hand, can be highly differentiated. Appliances, restaurants, automobiles, and even batteries can all be customized and highly differentiated to meet various consumer needs. In *Principles of Marketing* (1999), authors Gary Armstrong and Philip Kotler note that

differentiation can occur by manipulating many characteristics, including features, performance, style, design, consistency, durability, reliability, or reparability. Differentiation allows a company to target specific populations.

It is easy to think of companies that have used these characteristics to promote their products. Maytag has differentiated itself by presenting "Old reliable," the Maytag repairman who never has any work to do because Maytag's products purportedly function without any problems and do not require repairs. The Eveready Battery Co./Energizer has promoted their products' performance with the Energizer Bunny ® that "keeps going and going."

Many chain restaurants differentiate themselves with consistency and style. If a consumer has a favorite dish at her local Applebee's restaurant, she can be assured it will look and taste the same at any Applebee's restaurant anywhere in the country.

In the auto industry, durability is promoted by Chevrolet's "Like a Rock" advertising campaign.

SERVICE DIFFERENTIATION

Companies can also differentiate the services that accompany the physical product. Two companies can offer a similar physical product, but the company that offers additional services can charge a premium for the product. Mary Kay cosmetics offers skin-care and glamour cosmetics that are very similar to those offered by many other cosmetic companies; but these products are usually accompanied with an informational, instructional training session provided by the consultant. This additional service allows Mary Kay to charge more for their product than if they sold the product through more traditional channels.

In the personal computer business, Dell claims to provide excellent technical support services to handle any glitches that may occur once a consumer has bought their product. This 24-hour-a-day tech support provides a very important advantage over other PC makers, who may be perceived as less reliable when a customer needs immediate assistance with a problem.

PEOPLE DIFFERENTIATION

Hiring and training better people than the competitor can become an immeasurable competitive advantage for a company. A company's employees are often overlooked, but should be given careful consideration. This human resource-based advantage is difficult for a competitor to imitate because the source of the advantage may not be very apparent to an outsider. As a *Money* magazine article reported, Herb Kelleher, CEO of Southwest Airlines, explains that the culture, attitudes, beliefs, and actions of his employees constitute his strongest competitive advantage: "The intangibles are more important than

the tangibles because you can always imitate the tangibles; you can buy the airplane, you can rent the ticket counter space. But the hardest thing for someone to emulate is the spirit of your people."

This competitive advantage can encompass many areas. Employers who pay attention to employees, monitoring their performance and commitment, may find themselves with a very strong competitive advantage. A well-trained production staff will generate a better quality product. Yet a competitor may not be able to distinguish if the advantage is due to superior materials, equipment, or employees.

People differentiation is important when consumers deal directly with employees. Employees are the frontline defense against waning customer satisfaction. The associate at Wal-Mart who helps a customer locate a product may result in the customer returning numerous times, generating hundreds of dollars in revenue. Home Depot prides itself on having a knowledgeable sales staff in their home improvement warehouses. The consumer knows that the staff will be helpful and courteous, and this is very important to the consumer who may be trying a new home improvement technique with limited knowledge on the subject.

Another way a company can differentiate itself through people is by having a recognizable person at the top of the company. A recognizable CEO can make a company stand out. Some CEOs are such charismatic public figures that to the consumer, the CEO is the company. If the CEO is considered reputable and is well liked, it speaks very well for the company, and consumers pay attention. Not surprisingly, national media coverage of CEOs has increased tremendously over the past two decades.

IMAGE DIFFERENTIATION

Armstrong and Kotler pointed out in *Principles of Marketing* that when competing products or services are similar, buyers may perceive a difference based on company or brand image. Thus companies should work to establish images that differentiate them from competitors. A favorable brand image takes a significant amount of time to build. Unfortunately, one negative impression can kill the image practically overnight. Everything that a company does must support their image. Ford Motor Co.'s former "Quality is Job 1" slogan needed to be supported in every aspect, including advertisements, production, sales floor presentation, and customer service.

Often, a company will try giving a product a personality. It can be done through a story, symbol, or other identifying means. Most consumers are familiar with the Keebler Elves and the magic tree where they do all of the Keebler baking. This story of the elves and the tree gives Keebler cookies a personality. When consumers

purchase Keebler cookies, they are not just purchasing cookies, but the story of the elves and the magic tree as well. A symbol can be an easily recognizable trademark of a company that reminds the consumer of the brand image. The Nike "swoosh" is a symbol that carries prestige and makes the Nike label recognizable.

QUALITY DIFFERENTIATION

Quality is the idea that something is reliable in the sense that it does the job it is designed to do. When considering competitive advantage, one cannot just view quality as it relates to the product. The quality of the material going into the product and the quality of production operations should also be scrutinized. Materials quality is very important. The manufacturer that can get the best material at a given price will widen the gap between perceived quality and cost. Greater quality materials decrease the number of returns, reworks, and repairs necessary. Quality labor also reduces the costs associated with these three expenses.

INNOVATION DIFFERENTIATION

When people think of innovation, they usually have a narrow view that encompasses only product innovation. Product innovation is very important to remain competitive, but just as important is process innovation. Process innovation is anything new or novel about the way a company operates. Process innovations are important because they often reduce costs, and it may take competitors a significant amount of time to discover and imitate them.

Some process innovations can completely revolutionize the way a product is produced. When the assembly line was first gaining popularity in the early twentieth century, it was an innovation that significantly reduced costs. The first companies to use this innovation had a competitive advantage over the companies that were slow or reluctant to change.

As one of the first Internet service providers, America Online offered a unique innovation for accessing the nascent Internet—its unique and user-friendly interface. The company grew at a massive rate, leading the rapidly developing Internet sector as a force in American business. While most innovations are not going to revolutionize the way that all firms operate, small innovations can reduce costs by thousands or even millions of dollars, and large innovations may save billions over time.

COMPETITIVE ADVANTAGE THROUGH STRATEGIC COOPERATION

In Jeschke's 2008 guide, *Gaining Competitive Advantage through Strategic Partnerships in the Supply Chain*, three different kinds of partnerships are outlined as possible ways to increase market value and gain competitive advantages through cooperation by businesses.

Jeschke's first type of cooperation is vertical cooperation, a partnership along supply or production lines. Two companies agree to sell to or buy from each other in a particular relationship from which they both profit, usually through a contract.

The second type of advantageous partnership is horizontal cooperation, the most common cooperation sought to increase competitive advantage. Two companies in the same market combine their strengths in a particular area to gain more of that market, successfully creating a gap between them and the competition. However, the two companies do not merge; instead, they remain in competition themselves, with individual interests, cooperating for the sake of the benefits they both receive.

The third type of cooperation is the conglomerate partnership. Businesses which are related neither on the vertical nor the horizontal field cooperate for a specific reason in a conglomerate relationship. Often, the companies serve complementary goods, such as two foods often served together. Though their supply and production lines do not intersect, they are both selling to the same market, and so they gain an advantage over their separate competitors through cooperation.

COMPETITIVE ADVANTAGE IN THE GLOBAL MARKET

Many organizations focus on differentiation and gaining competitive advantage internationally. This has become more common as globalization has increased. Anthony Henry, in his 2008 *Understanding Strategic Management*, gives several ways companies seek to gain advantage in international markets, capitalizing on the differences between their nation and rival nations.

Wage differences are often utilized to give international competitive advantage. One country might be able to do the same amount of work as another but at a lesser wage for its workers, saving money that can be used to develop more products or market services. Outsourcing is one common way of using this cost-difference in order to raise competitive advantage. Resource costs can also differ in the global market, allowing some companies to save on production costs in the same manner.

Henry also points out that policies across nations are often in flux, changing based on governmental decision. Sharp-eyed companies will watch for a change in policy in competing nations that it can use for its benefit. The risks of various investments are often affected. Watchful organizations can also use societal factors as advantages. Knowledge of the way business is practiced, the rules and mores that control its behavior, is very useful to companies looking for gains in other countries.

SUSTAINABLE COMPETITIVE ADVANTAGE

The achievement of competitive advantage is not always permanent or even long lasting. Once a firm establishes itself in an area of advantage, other firms will follow suit in an effort to capitalize on their similarities. A firm is said to have a "sustainable" competitive advantage when its competitors are unable to duplicate the benefits of the firm's strategy. In order for a firm to attain a "sustainable" competitive advantage, its generic strategy must be grounded in an attribute that meets four criteria. It must be:

- Valuable—it is of value to consumers.

- Rare—it is not commonplace or easily obtained.

- Inimitable—it cannot be easily imitated or copied by competitors.

- Non-substitutable—consumers cannot or will not substitute another product or attribute for the one providing the firm with competitive advantage.

SELECTING A COMPETITIVE ADVANTAGE

A company may be lucky enough to identify several potential competitive advantages, and it must be able to determine which are worth pursuing. Not all differentiation is important. Some differences are too subtle, too easily mimicked by competitors, and many are too expensive. A company must be sure the consumer wants, understands, and appreciates the difference offered.

The maker of expensive suits may offer its suits in the widest array of colors, but if 95 percent of the consumers wear only black and navy blue suits, then the wide array of colors adds little perceived value to the product. Variety would not become a competitive advantage, and would be a waste of resources. A difference may be worth developing and promoting, advise Armstrong and Kotler, if it is important, distinctive, superior, communicable, preemptive, affordable, and profitable.

A competitive advantage can make or break a firm, so it is crucial that all managers are familiar with competitive advantages and how to create, maintain, and benefit from them.

SEE ALSO *Economies of Scale and Economies of Scope; Porter's Five-Forces Model*

BIBLIOGRAPHY
Armstrong, Gary, and Philip Kotler. *Principles of Marketing.* 8th ed. Upper Saddle River, NJ: Prentice Hall, 1999.
Blazey, Mark L. *Insights into Performance Excellence 2008: An Inside Look at 2008.* American Society for Quality. Available from: http://www.asq.org/quality-press/display-item/index.pl?item=E1321, 2008.
Dess, Gregory G., G.T. Lumpkin, and Alan B. Eisner. *Strategic Management: Text and Cases.* Boston: McGraw-Hill Irwin, 2006.
Gaines-Ross, Leslie, and Chris Komisarjevsky. "The Brand Name CEO." *Across the Board* 36, no. 6, (1999): 26–29.
Henry, Anthony. *Understanding Strategic Managment.* Oxford: Oxford University Press, 2008.
Jeschke, Niklas. *Gaining Competitive Advantage through Strategic Partnerships in the Supply Chain.* GRIN Verlag, 2008.
Kelleher, Herb, and Sarah Rose. "How Herb Keeps Southwest Hopping." *Money* 28 (1999): 61–62.
Plunkett, Jack W. *Plunkett's Almanac of Middle Market Companies 2008.* Plunkett Research, Ltd., 2008.
Raturi, Amitabh S., and James R. Evans. *Principles of Operations Management.* Mason, OH: Thomson South-Western, 2005.
Shane, Scott A. *The Illusions of Entrepreneurship.* New Haven: Yale University Press, 2008.

COMPETITIVE INTELLIGENCE

Intelligence is information that has been analyzed for decision making. It is important to understand the difference between information and intelligence. Information is the starting point; it is readily available numbers, statistics, bits of data about people, companies, products, and strategies. As a matter of fact, information overload is one of the leading problems of today's executive and the top reason for needing a competitive intelligence expert. Information becomes intelligence when it is distilled and analyzed. Combining this idea with those of competition or competitors leads to the concept of gathering and analyzing information about competitors for use in making management decisions. Competitive intelligence provides a link between information and business strategies and decisions. It is the process of turning vast quantities of information into action.

The field of competitive intelligence, as a profession, is relatively new in the United States. An indication of the importance of competitive intelligence is the growth, since 1986, of the Society of Competitive Intelligence Professionals (SCIP), an organization committed to developing, improving, and promulgating the methods, techniques, and ethical standards of the group. SCIP defines competitive intelligence as "the legal and ethical collection and analysis of information regarding the capabilities, vulnerabilities, and intentions of business competitors conducted by using information databases and other 'open sources' and through ethical inquiry." A major research firm in the field, Fuld & Company, Inc., defines it as "information that has been analyzed to the point where you can make a decision and a tool to alert management to early warning of both threats and opportunities. Competitive intelligence offers approximations and

best views of the market and the competition. It is not a peek at the rival's financial books." Competitive intelligence can help managers discover new markets or businesses, beat the competition to market, foresee competitors' actions, determine which companies to acquire, learn about new products and technologies that will affect the industry, and forecast political or legislative changes that will affect the company.

EXAMPLES

Examples of competitive intelligence include stock traders who analyze the data on prices and price movements to determine the best investments. These stock traders have the same data as other traders, but analysis of the data separates them from others. Another example is the Japanese automobile industry's analysis of the U.S. automobile market in the 1970s. High gasoline prices and smaller families created a demand in the United States for smaller, more fuel-efficient cars. Japanese automakers employed competitive intelligence methods to determine this trend and then made manufacturing decisions based on it, beating the U.S. Big Three to market with high quality, fuel-efficient cars. In the late 2000s, this situation is being replayed in a fashion, as high gas prices again have people turning away from large American-made SUVs and trucks and toward smaller, more fuel-efficient Asian (Japanese and Korean) cars.

ETHICAL METHODS

Competitive intelligence is not spying on the competition. It has been associated in the past with the political and military intelligence used during the Cold War era. Because of this association, many people think that competitive intelligence uses illegal, shady, or unethical means to gather information about competitors. Visions of wiretapping, bribing competitors' employees, or stealing information come to mind. This is not true today. Such techniques can damage the reputation and image of corporations and are not worth the risk. SCIP takes a strong position on the importance of ethics and developed a code of ethics for members. Note the words, "legal and ethical," and the emphasis on retrieving data from "open sources." Competitive intelligence experts use openly available information. They do dig into public records and government databases and use the latest technology (such as satellite photoreconnaissance and software tools such as spiders) to help gather and analyze large datasets. However, the professionals and companies for which they work do not use illegal methods.

THE PROCESS

The wide availability of information on the Web makes competitive intelligence more accessible to medium-size and small firms. Software tools to analyze and disseminate intelligence also make it easier to implement competitive intelligence tools. The process of competitive intelligence is outlined in the following steps:

1. Setting intelligence objectives (i.e., designing the requirements)
2. Collecting and organizing data about the industry and competitors
3. Analyzing and interpreting the data
4. Disseminating the intelligence

Setting the objectives. A clear statement of the intelligence needs of the organization should be outlined by management. If this step is ignored, the competitive intelligence department will be bogged down with too much information and possibly distracted by ad-hoc requests for data. This step is necessary regardless of where in the organization the competitive intelligence department is located. Some corporations have competitive intelligence report directly to the CEO; in others, it is located in marketing or in research and development. The role of any competitive intelligence program should be driven by the needs of the corporation, especially areas that have key performance consequences.

Collecting and organizing the data. The online revolution has enhanced ease in collecting and obtaining information, but the competitive intelligence expert must constantly be alert to new sources and places for finding information. The most obvious data collection sources include trade magazine and newspaper articles, company Web sites, newswires, chat forums, and Web search engines. Free information on industries is available via census data on government Web pages. Similarly, free public company information from U.S. Securities and Exchange Commission (SEC) filings, such as the 10-K and 10-Q report, can be easily obtained on the Web. These corporate reports yield detailed financial and product information and also identify mergers, acquisitions, and legal proceedings against the company. Other channels for fee-based data are information aggregators such as Factiva, Lexis Nexis, Hoover's Online, MergentOnline, and Standard and Poors' databases. Analyst reports and market research reports from companies such as Jupiter, Forrester Research, and Frost and Sullivan, although usually quite expensive to acquire, provide detailed analyses on companies and industries.

Analyzing and interpreting the data. Analysis and interpretation is the real core of competitive intelligence. Collected data must be transformed into "qualitative" information (i.e., intelligence). Two of the most popular

web-search tools for businesses are ComScore and Hitwise. ComScore uses a panel of people who are trained in web searches; they constantly monitor the Internet for relevant information. Hitwise uses a data-collection program to automatically search and download certain Web pages.

Regardless of what tool is used, the next step is to interpret the information. Lehmann and Winer outline four important aspects competitive intelligence professionals need to interpret about competitors: their current and future objectives, their current strategies, their resources, and their future strategies. Once this assessment is complete, competitive intelligence professionals measure their companies in comparison to competitors; this is known as benchmarking. From the benchmarking process, trend identification and prediction can be made.

Disseminating the information. Dissemination is the delivery of current, real-time intelligence to the decision makers in the firm at the time they need it. Timely dissemination is essential if the intelligence is to be perceived as trustworthy. The current philosophy is that delivering to people at all levels in the organization enhances competitive advantages.

HISTORY AND LITERATURE

Competitive intelligence is, in part, an outgrowth of the military intelligence field. Within corporations, it is a direct outgrowth, or evolution, of market research, which uses investigation (especially understanding the strategies, capabilities, and options of competitors or rivals) to examine the marketplace. Examining marketing research books at the time competitive intelligence emerged helps identify the shift. Market research differs from competitive intelligence in that it is usually conducted when a new product is in the planning or development stage and often utilizes surveys, focus groups, and other research tools to study the market. Competitive intelligence requires a more continuous and structured scanning of competitors and the environment. William T. Kelly's work introduced the field of intelligence in his 1965 text. Michael E. Porter's books, aimed at practitioners, identify competitive intelligence as a needed business function. Porter's books outline the tools for analyzing competitors and evaluating their strengths and weaknesses, which can then lead to opportunities. Leonard Fuld's work helped revolutionize and define the field. Fuld is a key writer and the founder of a major consulting firm that trains people in competitive intelligence methods and techniques.

THE COMPETITIVE INTELLIGENCE EXPERT

The competitive intelligence expert or analyst usually has a strong business background, combined with experience in the company. Likely candidates for the assignment are generally research-oriented people in sales, marketing, or research and development. Combining research skills with communication and writing skills is essential. Because of the research orientation of the job, people with library or information science backgrounds in the company are logical choices.

ORGANIZATIONS

The Society of Competitive Intelligence Professionals (SCIP). The Society of Competitive Intelligence Professionals (SCIP), established in 1986, is a global, nonprofit, membership organization for everyone involved in creating and managing business knowledge. The mission of SCIP is to enhance the skills of knowledge professionals to help their companies achieve and maintain a competitive advantage. SCIP publishes the following influential periodicals:

- *Competitive Intelligence Magazine.* A bimonthly publication with articles by peers in the competitive intelligence profession.

- *Journal of Competitive Intelligence and Management.* A quarterly, international, blind-refereed journal covering all aspects of competitive intelligence and related management fields. This journal seeks to further the development of competitive intelligence and to encourage greater understanding of the management of competition.

- *Competitive Intelligence Review.* A journal archive for peer-reviewed research and case studies focused on the practice of competitive intelligence. The archive includes contents listings, summaries, and articles from past journal issues.

- *SCIP Online.* SCIP's e-mail newsletter, sent free to all members twice a month.

Competitive Intelligence Division of The Special Libraries Association (SLA). This organization was formed in 2004 as an association for corporate librarians and information professionals who have evolved beyond collecting and managing information, to provide examination of data that can help their organizations succeed. The Competitive Intelligence Division encompasses all aspects of competitive intelligence including: (1) planning, (2) identifying decision makers' intelligence needs, (3) collecting and analyzing information, (4) disseminating intelligence products and services, (5) evaluating intelligence activities, (6) promoting intelligence services among a client base, and (7) additional industry-specific issues. Competitive Intelligence Division members concentrate on developing their competitive intelligence skills to assist them in functioning more effectively as intelligence professionals within their

respective organizations. Held in Seattle, the CI division's 2008 conference entertained such speakers as Vinton Cerf, VP of Google, and Seth Godin, business author.

Fuld & Company, Inc. Fuld & Company, Inc., is a research and consulting firm in the field of business and competitive intelligence. This company, founded by Leonard Fuld in 1979, is a full-service business intelligence firm providing: (1) research and analysis, (2) strategic consulting, (3) business intelligence process consulting, and (4) training to help clients understand the external competitive environment.

The Institute for Strategy and Competitiveness at Harvard School of Business. This institute, led by Michael E. Porter, studies competition and its implications for company strategy; the competitiveness of nations, regions and cities; and solutions to social problems. Based at Harvard Business School, the Institute is dedicated to extending the research pioneered by Professor Porter and disseminating it to scholars and practitioners on a global basis.

Strategic Insights. Strategic Insights is a company that conducts competitive intelligence research on a global level, offering companies a thorough and legal way to gain their information.

SIS International Research. SIS is a competitive intelligence firm that does extensive research and conducts interviews with relevant people, including customers, government officials, executives, and suppliers.

The Mind Company. Based in Argentina, the Mind Company utilizes teams of trained experts in competitive intelligence to help organizations across the world. They pride themselves on being internationally capable.

Competitive Intelligence Services, Inc. CIS is an American competitive intelligence company that works to establish connections with organizations, learn their goals and markets, and then aid them in gaining competitive advantage through their intelligence services. To avoid any conflict of interest, CIS only takes one business per particular industry or immediate market.

BIBLIOGRAPHY
Boncella, Robert J. "Competitive Intelligence on the Web." *Communications of AIS* 12 (2003): 327–340.

Burwell, Helen P. *Online Competitive Intelligence: Increase Your Profits Using Cyber-Intelligence.* Tempe, AZ: Facts on Demand Press, 1999.

Chen, Hsinchun. "CI Spider." *Decision Support Systems* 34, no. 1 (2002): 1–17.

———. *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* New York: Free Press, 1980.

"Corporate CI 'Eagles.'" *Competitive Intelligence Magazine* January 1998. Available from: http://www.scip.org.

Fuld, Leonard M. *Competitive Intelligence: How To Get It; How To Use It.* New York: Wiley, 1985.

Gilad, Benjamin, and Tamar Gilad. *The Business Intelligence System: A New Tool for Competitive Advantage.* New York: American Management Association, 1988.

Kahaner, Larry. *Competitive Intelligence: How To Gather, Analyze, and Use Information to Move Your Business to the Top.* New York: Simon & Schuster, 1997.

Kaushik, Avinash. "Competitive Analysis: Why, What, and How to Choose." *Occam's Razor* 2006. Available from: http://www.kaushik.net/avinash/.

Kelley, William Thomas. *Marketing Intelligence: The Management of Marketing Information.* London: Staples, 1968.

Lehmann, Donald R., and Russell S. Winer. *Analysis for Marketing Planning.* 4th ed. Boston: Irwin, 1997.

Miller, Jerry, et al. *Millennium Intelligence: Understanding and Conducting Competitive Intelligence in the Digital Age.* Medford, NJ: CyberAge Books, 2000.

———. *Monitoring The Competition: Find Out What's Really Going on Over There.* New York: Wiley, 1988.

———. *The New Competitor Intelligence: The Complete Resource for Finding, Analyzing, and Using Information about Your Competitors.* New York: Wiley, 1995.

Porter, Michael E. *Competitive Advantage: Creating and Sustaining Superior Performance.* New York: Free Press, 1985.

"SIS International Custom Research." *SIS: International Research* 2007. Available from: http://www.sisinternational.com/custom/.

Snow, C.C. ed. *Strategy, Organization Design and Human Resources Management.* Greenwich, CT: JAI Press, 1989.

"Sophisticated Research for Leading Companies." *Competitive Intelligence Services,* 2007. Available from:www.compintel.net/competitive-intelligence-about.htm.

"Strategic Insight Launches Next Generation of Competitive Intelligence." *Competitive Intelligence.* competitive-intelligence.mirum.net. Updated May 7 2007.

Tyson, Kirk W.M. *The Complete Guide to Competitive Intelligence.* 2nd ed. Chicago: Leading Edge, 2002.

"Value Proposition." *The Mind Company* 2008. Available from: http://www.themindco.com/value.html.

Vibert, Conor, ed. *Introduction to Online Competitive Intelligence Research: Search Strategies, Research Case Study, Research Problems, and Data Source Evaluations and Reviews.* Mason, Ohio: Thomson/Texere, 2004.

Walle, Alf H. "From Marketing Research to Competitive Intelligence: Useful Generalization or Loss of Focus?" *Management Decision* 37, no. 5/6 (1999): 519–525.

West, Chris. *Competitive Intelligence.* New York: Palgrave, 2001.

COMPLEXITY THEORY

The basic premise of complexity theory is that there is a hidden order to the behavior (and evolution) of complex systems, whether that system is a national economy, an ecosystem, an organization, or a production line. In business and finance, complexity theory places its focus on the

ways a factory or company resemble an ecosystem or market, rather than a machine "whose parts and functions have been plucked out in advance," according to David Berreby. He maintains that the organization of systems is no accident, but "the results of laws of nature that we don't yet fully understand." Once understood, managers will learn that if left to function on their own, systems organize themselves, bringing about "order for free."

Proponents of complexity theory believe specific traits are shared by most complex systems. These systems are the combination of many independent actors behaving as a single unit. These actors respond to their environment, much as stock markets respond to news of changing economies, genes respond to natural selection, or the human brain responds to sensory input. All of these "networks" also act as a single system made of many interacting components. Complexity theory attempts to explain how even millions of independent actors can unintentionally demonstrate patterned behavior and properties that, while present in the overall system, are not present in any individual component of that system.

Complexity theory was founded on researchers' attempts to rationalize the behavior of large and complex systems, believing they cannot be explained by usual rules of nature. It attempts to discover how the many disparate elements of a system work with each other to shape the system and its outcomes, as well as how each component changes over time. It is also one way to express the perceived domination of systems over their myriad smaller influences.

While complexity theory is strikingly similar to chaos theory, complexity theorists maintain that chaos, by itself, does not account for the coherence of self-organizing, complex systems. Rather, complex systems reside at the edge of chaos—the actors or components of a system are never locked in to a particular position or role within the system, but they never fall completely out of control. As M. Mitchell Waldrop states in *Complexity*, "The edge of chaos is the constantly shifting battle zone between stagnation and anarchy, the one place where a complex system can be spontaneous, adaptive, and alive."

Sherry Turkle, author of *Life on the Screen* and professor of sociology of science at the Massachusetts Institute of Technology (MIT), feels that technology has helped bring the issues of complexity theory to life. She asserts that computers helped persuade us that knowing all the parts of a system (or a computer) cannot give anyone the ability to foresee all the complexity that can arise as all of those parts interact.

ORIGINS OF COMPLEXITY THEORY

Much of the research on complexity theory originates from the Santa Fe Institute in New Mexico, a mecca for those studying complexity theory. George A. Cowan,

head of research at the Los Alamos nuclear laboratory, founded the Santa Fe Institute in the mid-1980s. Scientists at the institute claim that through the study of complexity theory, one can see not only the laws of chaos, but also those of order—through which a powerful explanation for how any collection of components will organize itself can be generated.

One of complexity theory's leading proponents is Stuart Kauffman, author of *At Home in the Universe: The Search for the Laws of Self-Organization and Complexity*. Also a member of the Santa Fe Institute, Kauffman states, "Life exists at the edge of chaos. I suspect that the fate of all complex adapting systems in the biosphere—from single cells to economies—is to evolve to a natural state between order and chaos, a grand compromise between structure and surprise." Kauffman's theories originated during his pre-medicine days, when his studies of genetics began to inspire questions about DNA and genetic structures. Kauffman felt that there had to be some kind of built-in order, that trial and error was too much of a long shot to be responsible for the perfect biomolecular structure of the human genome.

Other researchers with a stronger focus on the business side of complexity theory are Howard Sherman and Ron Schultz, authors of *Open Boundaries* and fellows at Santa Fe Center for Emergent Strategies in collaboration with the Santa Fe Institute. They believe business today is faster and nonlinear (effects are not proportional to their causes), and that "experts" cannot predict which products or companies will succeed. Sherman and Schultz assert that competitive advantage is fleeting, and that change can rapidly turn assets into dead weight.

Another major contributor to complexity theory is John Holland, a computer scientist and professor at the University of Michigan. Holland designed the genetic algorithm based on the idea that components of complex systems can be broken down into building blocks, whose characteristics can then be represented in code. In simulations, units of code recombine to make "offspring"; the best of these offspring are allowed to reproduce, while the worst are discarded. As the algorithm works, better code evolves, and the results can be translated into real-world applications.

DETAILS OF COMPLEXITY THEORY

A complex system is defined as one in which many independent agents interact with each other in multiple (sometimes infinite) ways. This variety of actors also allows for the "spontaneous self-organization" that sometimes takes place in a system. This self-organization occurs without anyone being in charge or planning the organization. Rather, it is more a result of organisms/agents constantly adapting to each other. The complex

systems are also adaptive (i.e., they always adapt in a way that benefits them). Waldrop suggests an analogy to the way the human brain adapts to learn from experience.

Another important concept in complexity theory is that there is no master controller of any system. Rather, coherent system behavior is generated by the competition and cooperation between actors that is always present. The components of a system do have different levels of organization—like an organization made up of divisions, which contain different departments, which are in comprised of different workers. However, the important differentiation from this "organization," made by John Holland in *Complexity*, is that "complex adaptive systems are constantly revising and rearranging their building blocks as they gain experience. A firm will promote individuals who do well and (more rarely) will reshuffle its organizational chart for greater efficiency. Countries will make new trading agreements or realign themselves into whole new alliances."

Far From Equilibrium. A complex system is often considered to be under the rules of chaos theory, giving it the same unpredictability that is found in weather patterns and wildfire. Most large organizations and markets fall in this category—they are not fully definable or repetitive. The *CIMA Learning System 2007* guide calls this being "far from equilibrium." Complex systems are all far from equilibrium, straddling, as it has been mentioned before, the edge of chaos. Equilibrium, an inherently predictable and static condition, is not possible or even desirable for complex systems. Instead, managers and leaders of the organization should look for regularities, patterns of behavior that resurface in the complex interactions they deal with. These regularities occur because the system has not reached complete chaos, though it is far from equilibrium.

Emergence. Another important part of complexity theory is its assumption that there are principles underlying all "emergent properties," or traits that emerge from the interactions of many different actors. David Berreby uses the analogy of an ant colony that switches to a better food source. No individual ant made the decision; it was a result of their interactions.

In organizations, negative emergence usually requires some sort of action on the part of the managers, such as new guidelines or innovation. In complex systems, emergence often generates patterns of change, which can best be thought of as friction between different organization structures. Xu, Tjoa, and Chaudhry, in their 2007 book *Research and Practical Issues of Enterprise Information Systems II*, call this friction "temporal conflicts." They are temporal because they exist as a phenomenon of emergence and are usually dealt with by the organization,

through a cooperation mechanism which brings enough order to the conflict to end it. Positive emergence can occur as well, usually through interconnectivity, and is often used as an example of the benefits of complex systems. Positive emergence requires no reaction on the part of the managers of the organization, except to seize the opportunities presented.

Connectivity. Bogg and Geyer, in their book *Complexity, Science, and Society* (2007), point out that the more complex systems become, the more they are subject to connectivity and interconnectivity. Connectivity is the sum of the multiple, often irregular, connections found in complex systems. A good example in the business world is a publicly traded company. Each of the stockholders has a personal history and a set of particular desires for the stock he or she holds, while each of the employees and managers in the company has a personal history that affects how he or she approaches his or her work. The many different desires of these individuals, though not necessarily communicated, often contradict. However, since everyone is united in trying to make the company successful, they are connected along certain common goals, while opposed along other lines. This means that the company has a vast resource—a collection of talent, skill, contacts, funds, and experience—that it can use for its benefit through the state of connectivity. If left alone this resource might work against itself, but with connectivity the actions of the company and its stockholders are all related, giving the company a powerful tool to use, if it can. Connectivity generally leads to the positive emergence such as co-evolution and creativity.

Co-evolution. Former CEO Gerard Fairtlough calls co-evolution "heterarchical...a process of learning for all involved," in his 2007 book, *The Three Ways of Getting Things Done: Hierarchy, Heterarchy, and Responsible Autonomy*. According to Fairtlough, co-evolution is superior to adaptation, because it involves more the one party. Adaptation is a one-way, close to equilibrium, a type of reaction; co-evolution occurs when there are multiple entities in the complex system, supporting each other and trying to reach common goals. Innovation is met with innovation, and every change for the better influences another positive change. Co-evolution occurs in most growing, complex systems, from the healthy internal workings of an organization to the competition seen in certain markets.

According to Fairtlough, organizations can foster co-evolution through several different approaches. Some companies may prefer to encourage organic structures, letting employees use their creativity. Others may wish to create programs through which teams and departments learn to trust each other more, leading to a greater

occurrence of connectivity and more chances for positive emergences such as co-evolution. Other companies may encourage co-evolution through negotiations with their markets or competitors.

Path-dependent and Path-creative. As analysts have studied complex systems and the types of emergence that occur within them, a behavior has been observed which was called *path-dependence*. As Uhl-Bien and Marion observe in their *Complexity Leadership* (2007), path-dependence occurs when complex systems go through the same series of actions regardless of most outside circumstances. They are stuck, in other words, in a routine neither planned nor consciously chosen—a natural result of complexity. For this reason, path-dependence is a pitfall seen in most organizations globally, regardless of government policy or even company intent. Some analysts look at path-dependence as a complex system's urge to correct itself into equilibrium, to leave the edge of chaos and assume a repetitive, predictable existence. The complex, in other words, has an inherent desire to become simple again. This can be dangerous for organizations that thrive on innovation, so Uhl-Bien and Marion advise instead that companies aim to become "path-creative" so that the state of evolution may avoid getting stuck in ruts. How an organization does this is a debated question.

Change in Complex Systems. One of the defining characteristics of complex systems is the inability to predict the outcome of any given change to the system. Because a system depends on so many intricate interactions, the number of possible reactions to any given change is infinite. Minor events can have enormous consequences because of the chain of reactions they might incite. Conversely, major changes may have an almost insignificant effect on the system as a whole. Because of this, strong control of any complex system may be impossible. While it may have order, no one absolutely governs a complex system.

Scientists create computer simulations that enable them to better identify emerging patterns in a system. They also write modification programs allowing system components to adapt to changes in the environment without the absolute necessity of radical changes to the overall structure. Computers can use these simulations to design production schedules and optimize assembly line performance.

COMPLEXITY THEORY IN BUSINESS

Complexity theory is used in business as a way to encourage innovative thinking and real-time responses to change by allowing business units to self-organize. Sherman and Schultz (as related by Hout) argue that modern business

moves in a nonlinear fashion, with no continuity in the flow of competitive events, except when observed from hindsight. In order to effectively put complexity theory to work, however, organization leaders need to give up rigid control of these systems from above. Far more can be learned by stepping back from the day-to-day running of the organization and watching for emergent properties and organizational patterns. Those conditions or patterns that bring about the best solutions should be preserved whenever possible. Managers also need to allow organizations to evolve in response to ongoing messages from customers. As Hout states:

> No intelligence from on high can match the quality of solutions to market problems that arise from players who are constantly communicating with one another on the ground level. The invisible hand of the marketplace should displace the visible hand of the manager. The markets can determine where one team or initiative or company ends and another begins. Managers interfere at their peril.

Efforts to downplay management, as related by Hout, claim that "management as we have known it is too cumbersome for today's fast, unpredictable pace. A new kind of company wins now. The best management models don't adapt to the new economy; they emerge from it. It's no longer the survival of the fittest; it's the arrival of the fittest." Even so, putting the ideas of complexity theory to work does not mean management need rest on its laurels. Hout asserts that organizations' leaders retain an obligation to formulate a guiding vision for the company, provide effective leadership, express and encourage strong values and organizational beliefs, and provide avenues for open communication. Managers need to manage the way that accident and law interact, knowing how and where to push to keep the system from neither descending into chaos nor becoming rigidly ordered.

Letting an organization self-organize does not negate the need for strategy. Rather, it means that organizational strategy should evolve based on feedback and change as it occurs. By establishing a corporate strategy first, an organization defines itself through conditions that were previously in place, and becomes non-adaptive to continuously-evolving market conditions. Sherman and Schultz recommend the "try something and see what happens" mentality.

CONTRARY BELIEFS

The idea that allowing complex systems to self-organize will yield the best solutions has validity, but complexity theory is not a panacea for all organizations. The notions of complexity theory assume that people in these companies

are enthusiastic, intelligent, and can effectively work in teams—requiring less management than workers in more traditional, hierarchical, rigidly-controlled environments. Unfortunately, however, these fast-growing, evolutionary companies with bright, ambitious workers may need more management rather than less. Companies that are shaped and reshaped on such a frequent basis—constantly adapting to a changing business environment—lose some of the stability found at traditional corporate giants such as the industrial and automotive behemoths.

Uhl-Bien and Marion suggest that one of the main tenants of complexity theory (in relation to business) is that outside help is not required to maintain order. Complex systems, indeed, are capable of evolving within themselves, coming up with their own order and innovation through emergence and connectivity. Managers practicing the hands-off style of leadership hope that their organization will develop these natural patterns of order, but encouragement and maintenance is also needed. As is seen from the studies of path-dependence and negative emergence, complexity can result in the failing of businesses as easily as success. The wise manager will be aware of both benefits and drawbacks to trusting in complexity theory.

The modern corporation has a lot at stake. There are difficulties in teamwork and collaboration, with potential issues such as nonperforming team members, personality conflicts, opposing business styles, and the effects of stress on job performance. Organizational leaders need to effectively manage personnel and job performance, reward and groom talented performers, develop business relationships and networks, resolve conflict, and divest the company of nonperformers who may be holding the company back from adapting well to emerging trends and technologies. Other business leaders see emergent strategy as a problem, rather than a cure. According to Alan Kay, head of research and development at Disney Imaginering, "Most businesses do not move so fast that foresight, commitment, preemption, deterrence, and other traditional elements of strategy have lost their ability to build value. The best way to predict the future is to invent it."

Bernard Fingleton, in his 2007 book *New Direction in Economic Geography*, postulates that complexity theory provides a meeting place for mathematical analysis and more immediate, verbal models of business practice. He calls the two separate fields *complexity modeling* and *relational dialectics*. What complexity theory needs, Fingleton suggests, is a lexicon that can unite it with studies of business markets and practical applications for organizations. Complexity theory appears to be in the process of acquiring this definition, necessary for more practical uses, and time will tell if it reaches a point where businesses will be able to use common analysis and decision-making tools derived from complexity theory.

Some of complexity theory's leading experts, such as J. Doyne Farmer and Norman Packard, make a living advising companies and practically applying the ideas behind complexity theory to business areas such as corporate investment. Organizations putting the theory into practice include Xerox's Palo Alto Research Center (PARC), Applied Biosystems, and the United States Marine Corps. Complexity theory offers companies the opportunity to create new markets and establish new ways to spread emerging knowledge throughout the company—enabling the organization, as a whole, to respond faster and better to ongoing change.

SEE ALSO *Chaos Theory; Managing Change; Organizational Behavior; Trends in Organizational Change*

BIBLIOGRAPHY

Battram, Arthur. *Navigating Complexity: The Essential Guide to Complexity Theory in Business and Management.* London: Spiro Press, 2002.

Bogg, Jan, and Robert Geyer. *Complexity, Science, and Society.* Radcliffe Publishing, 2007.

Caldart, Adrián A., and Joan E. Ricart. "Corporate Strategy Revisited: A View from Complexity Theory." *European Management Review* 1, no. 1 (2004): 96–104.

Casti, John L. *Complexification: Explaining a Paradoxical World Through the Science of Surprise.* New York: HarperCollins, 1994.

Gowthroy, Catherine. *CIMA Learning System 2007 Financial Analysis.* Butterworth-Heinemann, 2006.

Hout, Thomas M. "Books in Review: Are Managers Obsolete?" *Harvard Business Review* 77, no. 2 (1999): 161–168.

Fairtlough, Gerard. *The Three Ways of Getting Things Done: Hierarchy, Heterarchy, and Responsible Autonomy in Organizations.* Triarchy Press, 2007.

Fingleton, Bernard. *New Directions in Economic Geography.* Edward Elgar Publishing, 2007.

Okes, Duke. "Complexity Theory Simplifies Choices." *Quality Progress* 36, no. 7 (2003): 35–38.

Olsen, Edwin E., et al. *Facilitating Organization Change: Lessons from Complexity Science.* San Francisco: Pfeiffer, 2001.

Sherman, Howard J., and Ralph Schultz. *Open Boundaries: Creating Business Innovation Through Complexity.* Reading, MA: Perseus Books, 1998.

Uhl-Bien, Mary and Marion, Russ. *Complexity Leadership: Conceptual Foundations.* IAP, 2008.

Waldrop, Mitchell M. *Complexity: The Emerging Science at the Edge of Order and Chaos.* New York: Simon and Schuster, 1992.

Xu, Li, Tjoa, A. Min., and Chaudhry, Sohail. *Research and Practical Issues of Enterprise Information Systems II, Vol 2.* Springer, 2007.

COMPUTER-AIDED DESIGN AND MANUFACTURING

Computer-aided design (CAD), also known as computer-aided design and drafting (CADD), involves the entire spectrum of drawing with the aid of a computer—from straight lines to custom animation. In practice, CAD refers to software for the design of engineering and architectural solutions, complete with two- and three-dimensional modeling capabilities.

Computer-aided manufacturing (CAM) involves the use of computers to aid in any manufacturing process, including flexible manufacturing and robotics. Often outputs from CAD systems serve as inputs to CAM systems. When these two systems work in conjunction, the result is called CADCAM, and becomes part of a firm's computer-integrated manufacturing (CIM) process.

CADCAM systems are intended to assist in many, if not all, of the steps of a typical product life cycle. The product life cycle involves a design phase and an implementation phase. The design phase includes identifying the design needs and specifications; performing a feasibility study, design documentation, evaluation, analysis, and optimization; and completing the design itself. The implementation phase includes process planning, production planning, quality control, packaging, marketing, and shipping.

CAD systems can help with most of the design phase processes, while CAM systems can help with most of the implementation processes. The contributions of CAD and CAM systems are described below.

CAD SYSTEMS

CAD systems are a specialized form of graphics software, and thus must adhere to basic principles of graphics programming. All graphics programs work in the context of a graphics device (e.g., a window on a monitor, a printer, or a plotter). Graphics images are drawn in relation to a 2-D or 3-D coordinate system, of which there are several types.

A device coordinate system is 2-D and maps images directly to the points (pixels) of the hardware device. In order to facilitate device-independent graphics, a virtual device coordinate system abstracts the 2-D points into a logical framework.

Of course, the devices being designed are generally 3-D objects, which also require a world coordinate system for representing the space in which the objects reside, and a model coordinate system for representing each of the objects in that space. CAD software includes algorithms for projecting the 3-D models onto the 2-D device coordinate systems and vice versa.

CAD systems include several primitive drawing functions, including lines, polygons, circles and arcs, rectangles, and other simple shapes. From these primitives, 3-D composites can be constructed, and include cubes, pyramids, cones, wedges, cylinders, and spheres. These shapes can be drawn in any color, and filled with solid colors or other patterns (called hatching). In addition, basic shapes can be altered by filleting (rounding) or chamfering (line segmentation).

Based on the manipulation of basic shapes, designers construct models of objects. A skeletal wire form model is a 3-D representation that shows all edges and features as lines. A more realistic-looking model is called a solid model, which is a 3-D model of the object being designed as a unitary whole showing no hidden features. The solid model represents a closed volume. It includes surface information and data determining if the closed volume contains other objects or features.

Solid modeling involves functions for creating 3-D shapes, combining shapes (via union, intersection, and difference operations), sweeping (translational and rotational) for converting simple shapes into more complex ones, skinning (for creation of surface textures), and various boundary creation functions. Solid modeling also includes parameterization, in which the CAD system maintains a set of relationships between the components of an object so that changes can be propagated to following constructions.

Common shapes are constructed into features (e.g., slots, holes, pockets), which can then be included in a solid model of an object. Feature representation helps the user define parts. It also simplifies CAD software design because features are easier to parameterize than explicit interactions. Objects built from features are called parts. Since a product being designed is composed of several parts, many CAD systems include a useful assembly model, in which the parts are referenced and their geometric and functional relationships are stored.

CAD models can be manipulated and viewed in a wide variety of contexts. They can be viewed from any angle and perspective desired, broken apart or sliced, and even put through simulation tests to analyze for strengths and defects of design. Parts can be moved within their coordinate systems via rotation operations, which provide different perspectives of a part, and translation, which allows the part to move to different locations in the view space. In addition, CAD systems provide valuable dimensioning functionality, which assigns size values based on the designer's drawing.

The movement of these images is a form of animation. Often, CAD systems include virtual reality technology, which produces animated images that simulate a real-world interaction with the object being designed. For

example, if the object is a building, the virtual reality system may allow you to visualize the scene as if you were walking around the inside and the outside of the building, enabling you to dynamically view the building from a multitude of perspectives. In order to produce realistic effects, the system must depict the expected effects of light reflecting on the surface as it moves through the user's view space. This process is called rendering.

Rendering technology includes facilities for shading, reflection, and ray tracing. This technique, which is also used in sophisticated video games, provides a realistic image of the object and often helps users make decisions prior to investing money in building construction. Some virtual reality interfaces involve more than just visual stimuli. In fact, they allow the designer to be completely immersed in the virtual environment, experiencing kinesthetic interaction with the designed device.

Some CAD systems go beyond assisting in parts design and actually include functionality for testing a product against stresses in the environment. Using a technique called finite element method (FEM), these systems determine stress, deformation, heat transfer, magnetic field distribution, fluid flow, and other continuous field problems.

Finite element analysis is not concerned with all design details, so instead of the complete solid model, a mesh is used. Mesh generation involves computing a set of simple elements giving a good approximation of the designed part. A good meshing must result in an analytical model of sufficient precision for the FEM computation, but with a minimum number of elements in order to avoid unnecessary complexity.

In addition to FEM, some CAD systems provide a variety of optimization techniques, including simulated annealing and genetic algorithms (borrowed from the field of artificial intelligence). These methods help to improve the shape, thickness, and other parameters of a designed object while satisfying user-defined constraints (e.g., allowable stress levels or cost limitations).

When a designer uses CAD to develop a product design, this data is stored into a CAD database. CAD systems allow for a design process in which objects are composed of sub-objects, which are composed of smaller components, and so on. Thus CAD databases tend to be object-oriented. Since CAD designs may need to be used in CAM systems, or shared with other CAD designers using a variety of software packages, most CAD packages ensure that their databases conform to one of the standard CAD data formats. One such standard, developed by the American National Standards Institute (ANSI), is called Initial Graphics Exchange Specification (IGES).

Modern CAD systems offer a number of advantages to designers and companies. For example, they enable users to save time, money, and other resources by automatically generating standard components of a design, allowing the reuse of previously designed components, and facilitating design modification. Such systems also provide for the verification of designs against specifications, the simulation and testing of designs, and the output of designs and engineering documentation directly to manufacturing facilities. While some designers complain that the limitations of CAD systems sometimes serve to curb their creativity, there is no doubt that they have become an indispensable tool in electrical, mechanical, and architectural design.

CAM SYSTEMS

The manufacturing process includes process planning, production planning (involving tool procurement, materials ordering, and numerical control programming), production, quality control, packaging, marketing, and shipping. CAM systems assist in all but the last two steps of this process. In CAM systems, the computer interfaces directly or indirectly with the plant's production resources.

Process planning is a manufacturing function that establishes which processes and parameters are to be used, as well as the machines performing these processes. This often involves preparing detailed work instructions to machines for assembling or manufacturing parts. Computer-aided process planning (CAPP) systems help to automate the planning process by developing, based on the family classification of the part being produced, a sequence of operations required for producing this part (sometimes called a routing), together with text descriptions of the work to be done at each step in the sequence. Sometimes these process plans are constructed based on data from the CAD databases.

Process planning is a difficult scheduling problem. For a complex manufacturing procedure, there could be a huge number of possible permutations of tasks in a process requiring the use of sophisticated optimization methods to obtain the best process plan. Techniques such as genetic algorithms and heuristic search (based on artificial intelligence) are often employed to solve this problem.

The most common CAM application is numerical control (NC), in which programmed instructions control machine tools that grind, cut, mill, punch, or bend raw stock into finished products. Often the NC inputs specifications from a CAD database, together with additional information from the machine tool operator. A typical NC machine tool includes a machine control unit (MCU) and the machine tool itself. The MCU includes a data processing unit (DPU), which reads and decodes instructions from a part program, and a control loop unit (CLU), which converts the instructions into control signals and operates the drive mechanisms of the machine tool.

The part program is a set of statements that contain geometric information about the part and motion information about how the cutting tool should move with respect to the workpiece. Cutting speed, feed rate, and other information are also specified to meet the required part tolerances. Part programming is an entire technical discipline in itself, requiring a sophisticated programming language and coordinate system reference points. Sometimes parts programs can be generated automatically from CAD databases, where the geometric and functional specifications of the CAD design automatically translate into the parts program instructions.

Numerical control systems are evolving into a more sophisticated technology called rapid prototyping and manufacturing (RP&M). This technology involves three steps: forming cross sections of the objects to be manufactured, laying cross sections layer by layer, and combining the layers. This is a tool-less approach to manufacturing made possible by the availability of solid modeling CAD systems. RP&M is often used for evaluating designs, verifying functional specifications, and reverse engineering.

Of course, machine control systems are often used in conjunction with robotics technology, making use of artificial intelligence and computer controlled humanoid physical capabilities (e.g., dexterity, movement, and vision). These "steel-collar workers" increase productivity and reduce costs by replacing human workers in repetitive, mundane, and hazardous environments.

CAM systems often include components for automating the quality control function. This involves evaluating product and process specifications, testing incoming materials and outgoing products, and testing the production process in progress. Quality control systems often measure the products that are coming off the assembly line to ensure that they are meeting the tolerance specifications established in the CAD databases. They produce exception reports for the assembly line managers when products are not meeting specifications.

In summary, CAM systems increase manufacturing efficiency by simplifying and automating production processes, improve the utilization of production facilities, reduce investment in production inventories, and ultimately improve customer service by drastically reducing out-of-stock situations.

PUTTING IT ALL TOGETHER: COMPUTER INTEGRATED MANUFACTURING

In a CADCAM system, a part is designed on the computer (via CAD) then transmitted directly to the computer-driven machine tools that manufacture the part via CAM. Within this process, there will be many other computerized steps along the way. The entire realm of design, material handling, manufacturing, and packaging is often referred to as computer-integrated manufacturing (CIM).

CIM includes all aspects of CAD and CAM, as well as inventory management. To keep costs down, companies have a strong motivation to minimize stock volumes in their warehouses. Just-in-time (JIT) inventory policies are becoming the norm. To facilitate this, CIM includes material requirements planning (MRP) as part of its overall configuration. MRP systems help to plan the types and quantities of materials that will be needed for the manufacturing process. The merger of MRP with CAM's production scheduling and shop floor control is called manufacturing resource planning (MRPII). Thus, the merger of MRP with CADCAM systems integrates the production and the inventory control functions of an organization.

One interesting application of CADCAM technology is its use in dental procedures. Manufactured by Sirona Dental Systems Inc., the CEREC product allows dentists to create a 3D model of the tooth and then carve a restoration based on that model. As a result, patients can have a crown put into place in less time with fewer anesthetic injections.

Today's industries cannot survive unless they can introduce new products with high quality, low cost, and short lead time. CADCAM systems apply computing technology to make these requirements a reality, and promise to exert a major influence on design, engineering, and manufacturing processes for the foreseeable future.

SEE ALSO *Computer-Integrated Manufacturing; Manufacturing Resources Planning; Robotics*

BIBLIOGRAPHY

Bean, Robert. "CAD Should Enable Design Creativity: Engineers Need CAD Tools as Easy as the 'Paper Napkin.'" *Design News* 10 January 2005.

"CAD/CAM Systems." Sirona Dental Systems Inc. Available from: http://www.sirona.com/ecomaXL/index.php?site=SIRONA_COM_cadcam_systems.

Grabowski, Ralph, and R. Huber. *The Successful CAD Manager's Handbook.* Albany, NY: Delmar Publishers, 1994.

Groover, Mikell P. *Automation, Production Systems, and Computer-Integrated Manufacturing.* 3rd ed. Indianapolis, IN: Prentice Hall, 2007.

Lee, Kunwoo. *Principles of CAD/CAM/CAE Systems.* Reading, MA: Addison Wesley, 1999.

McMahon, Chris, and Jimmie Browne. *CAD/CAM: Principles, Practice, and Manufacturing Management.* 2nd ed. Upper Saddle River, NJ: Prentice-Hall, 1999.

Port, Otis. "Design Tools Move into the Fast Lane." *Business Week* 2 June 2003.

Sheh, Mike. "A Quantum Leap in Engineering Design." *Business Week* 2 June 2003.

COMPUTER-AIDED MANUFACTURING

SEE *Computer-Aided Design and Manufacturing*

COMPUTER-INTEGRATED MANUFACTURING

As its name implies, computer-integrated manufacturing (CIM) uses computer techniques to integrate manufacturing activities. These activities encompass all functions necessary to translate customer needs into a final product. CIM starts with the development of a product concept that may exist in the marketing organization; includes product design and specification, usually the responsibility of an engineering organization; and extends through production into delivery and after-sales activities that reside in a field service or sales organization. Integration of these activities requires that accurate information be available when needed and in the format required by the person or group requesting the data. Data may come directly from the originating source or through an intermediate database, according to Jorgensen and Krause. CIM systems have emerged as a result of the developments in manufacturing and computer technology. According to Kusiak, the computer plays an important role integrating the following functional areas of a CIM system:

- **Part and product design.** There are four phases that are crucial in part and product design. They include preliminary design, refinement, analysis, and implementation.

- **Tool and fixture design.** Tooling engineers using computer-aided design (CAD) tools to develop the systems or fixtures that produce the parts.

- **Process planning.** The process planner designs a plan that outlines the routes, operations, machines, and tools required. He or she also attempts to minimize cost, manufacturing time, and machine idle time while maximizing productivity and quality.

- Programming of numerically controlled machines and material handling systems.

- **Production planning.** There are two concepts used here, including materials requirement planning (MRP) and machine loading and scheduling.

- **Machining.** This is part of the actual manufacturing process, including turning, drilling, and face milling for metal removal operations.

- **Assembly.** After they are manufactured, parts and subassemblies are put together with other parts to create a finished product or subassembly.

- **Maintenance.** Computers can monitor, intervene, and even correct machine malfunctions as well as quality issues within manufacturing.

- **Quality control.** This involves three steps, including system design, parameter design, and tolerance design.

- **Inspection.** This stage determines if there have been errors and quality issues during the manufacturing of the product.

- **Storage and retrieval.** These tasks involve raw materials, work-in-process inventory, finished goods, and equipment.

CIM ORIGIN

The term *computer-integrated manufacturing* was coined by Dr. Joseph Harrington in his 1974 book bearing that name. Until the 1970s, the most aggressive and successful automation was seen in production operations. Discrete parts manufacturing used highly mechanized machines that were driven and controlled by cams and complex devices such as automatic screw machines. Process manufacturers made use of these cam-driven controllers and limit switches for operations such as heat treating, filling and canning, bottling, and weaving, states Robert Thacker of the Society of Manufacturing Engineers. The historical approach to automation focused on individual activities that result in the incorporation of large amounts of computerized activities. In the 1980s, managing information became an important issue.

CIM BENEFITS

According to the U.S. National Research Council, CIM improves production productivity by 40 to 70 percent, as well as enhances engineering productivity and quality. CIM can also decrease design costs by 15 to 30 percent, reduce overall lead time by 20 to 60 percent, and cut work-in-process inventory by 30 to 60 percent. Managers who use CIM believe that there is a direct relationship between the efficiency of information management and the efficiency and overall effectiveness of the manufacturing enterprise. Thacker's view is that many CIM programs focus attention on the efficiency of information management and the problems that come with it instead of developing new and more sophisticated manufacturing machines, material transformation processes, manufacturing management processes, and production facilities.

Computer-integrated manufacturing can be applied to nonmanufacturing organizations by changing the manufacturing focus toward a service orientation. For

instance, CIM and Job Definition Format (JDF) are becoming increasingly beneficial to printing companies to streamline their production process.

Elanchezhian, Selwyn, and Sundar give several benefits of CIM in their 2008 guide *Computer Aided Manufacturing*, especially as it relates to factory manufacturing:

- CIM can control variables that remained out of reach by the company before implementation. Analysis that may have been left out of human communication by simple error is not missed by computer programming.

- CIM improves responsiveness of the systems in the short-run. Problems or errors result in immediate notification to employees and supervisors.

- CIM improves long-run accommodations by making product volume more efficient and production lines smaller. CIM analysis often results in more streamlined production, even when the company is not going to a lean manufacturing model. Simulations can spot areas that can be sped up and processes that waste time, leading to increased speed.

- CIM reduces inventory for a number of reasons. More efficient processes lead to fewer mistakes, creating a more streamlined process that gives the company a higher turnover rate. Also, most companies using a fully CIM system are moving to a lean manufacturing state (possible just-in-time or a similar practice) that naturally reduces inventory.

- CIM on the factory floor automatically sets up and winds down machinery—at least to a certain extent. When the systems prepares itself, the workers do not need to take the extra time themselves.

THE CIM PLAN

A plan for a CIM system should provide a description of projects for automating activities, assisting activities with technology, and integrating the information flows among these activities. The planning process includes six crucial steps:

- Project activation
- Business assessment
- Business modeling
- Needs analysis
- Conceptual design
- CIM plan consolidation and economic analysis

This process, according to Jorgensen and Krause, also acts as a building block for the future of the organization integrating these functions in order to diminish them as an impediment to integration.

CONCEPTUAL DESIGN

The conceptual design of a CIM environment consists of: individual systems that fulfill the required capabilities; an overall architecture incorporating the systems and the communication links; and a migration path from the current systems architecture. Functional requirements must be compared to the current inventory of systems and available technology to determine system availability. Jorgensen and Krause state that the following techniques are used in satisfying system requirements:

- Exploiting unused and available functional capabilities of current systems.

- Identifying functional capabilities available for, but not installed on, current in-house systems.

- Locating systems that are commercially available but not currently in-house.

- Recognizing state-of-the-art technology that is not immediately commercially available on a system.

- Foreseeing functional capabilities of systems on the technical horizon.

- Determining whether the requirement is beyond the capabilities of systems on the technical horizon.

MANAGING A CIM

Managers must understand that short-term goals must support the long-term goal of implementing a CIM. Top management establishes long-term goals for the company and envisions the general direction of the company. The middle management then creates objectives to achieve this goal. Upper management sees the focus as being very broad, whereas middle management must have a more narrow focus.

In deciding to implement a CIM, there are three perspectives that must be considered: the conceptual plan, the logical plan, and the physical plan. The conceptual plan is used to demonstrate a knowledgeable understanding of the elements of CIM and how they are related and managed. Thacker goes on to say that the conceptual plan states that by integrating the elements of a business, a manager will produce results better and faster than those same elements working independently.

The logical plan organizes the functional elements and logically demonstrates the relationships and dependencies between the elements. Thacker details that it further shows how to plan and control the business.

The physical plan contains the actual requirements for setting the CIM system in place. These requirements can include equipment such as hardware, software, and work cells. The plan is a layout of where the computers, work stations, robots, applications, and databases are located in order to optimize their use within the CIM

and within the company. According to Thacker, sooner or later it becomes the CIM implementation plan for the enterprise.

CIM is challenged by technical and cultural boundaries. The technical challenge is first complicated by the varying applications involved. Thacker claims that it is also complicated by the number of vendors that the CIM serves as well as incompatibility problems among systems and lack of standards for data storage, formatting, and communications. Companies must also have people who are well-trained in the various aspects of CIM. They must be able to understand the applications, technology, and communications and integration requirements of the technology.

CIM cultural problems begin within the division of functional units within the company such as engineering design, manufacturing engineering, process planning, marketing, finance, operations, information systems, materials control, field service, distribution, quality, and production planning. CIM requires these functional units to act as whole and not separate entities. The planning process represents a significant commitment by the company implementing it. Although the costs of implementing the environment are substantial, the benefits once the system is in place greatly outweigh the costs. The implementation process should ensure that there is a common goal and a common understanding of the company's objectives and that the priority functions are being accomplished by all areas of the company according to Jorgensen and Krause.

SEE ALSO *Computer-Aided Design and Manufacturing; Flexible Manufacturing; Management Information Systems; Robotics*

BIBLIOGRAPHY

Cagle, E. "Awaiting the Big Payoff." *Printing Impressions* 47, no. 6 (November 2004): 54–56.

Kusiak, Andrew. *Intelligent Manufacturing Systems.* Englewood Cliffs, NJ: Prentice Hall, 1990.

Mahmood, T. "Real-time Computer Integrated Manufacturing." *Circuits Assembly* 6, no. 3 (March 1995): 58–60.

Rehg, James A., and Henry W. Kraebber. *Computer Integrated Manufacturing.* Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Ruey-Chyi, W., C. Ruey-Shun, and C.R. Fan. "Design an Intelligent CIM System Based on Data Mining Technology for New Manufacturing Processes." *International Journal of Materials and Product Technology* 2, no. 6 (2004): 487–504.

Thacker, Robert M. *A New CIM Model.* Dearborn, MI: Society of Manufacturing Engineers, 1989.

COMPUTER NETWORKS

Computers are an essential part of daily operations for most business in developed countries. Businesses rely on their computers to store and track information, commu-nicate with customers and suppliers, design and manufacture products, and more. Businesses, therefore, typically have multiple computers in an office and throughout their company. These computers are connected through networks that allow information to be shared between computers.

A computer network, as defined in the Merriam-Webster dictionary, is "a system of computers, peripherals, terminals, and databases connected by communications lines." In other words, networks are used to connect computers to other computers, as well as to other devices such as printers, scanners, and fax machines. Networks can be used to connect devices in the same building or they can be used to connect devices that are miles apart. By far, the most well-known network in use today is the Internet. Many individuals and businesses around the world connect to the Internet on a daily basis. Other examples of networks include library card catalogs, the displays of flight arrival and departure times used at airports, and credit card readers at retail stores.

Networking technology advances, namely the Internet, allow a business to be available 24 hours a day, seven days a week. This immediate nature of business places tremendous pressure on the underlying network infrastructure. In the twenty-first century, organizations must understand and carefully manage a very large volume and a wide variety of network devices to protect the health and performance of these real-time processes. Organizations must also make sure that configuration policies comply with both internal and external standards.

NETWORK BASICS

Basic networks have nodes connected together using hubs. As a network grows, this configuration begins to present challenges of scalability, latency, and network failure. Scalability affects the hub; hub networks have limited shared bandwidth, which makes it difficult to grow significantly and maintain performance. Hub networks keep the IT (information technology) department busy, requiring frequent redesign as organizations grow.

Latency, another issue of the hub network, is the time it takes a packet to get to its destination. Each node has to wait to transmit to avoid collisions, which happen when more than one device transmits data at the same time. Therefore, as more nodes are added to the hub, the latency effect increases.

Network failure is a huge threat for hubs. Just one device on a hub can cause problems for other devices attached to the hub due to incorrect speed settings or excessive broadcasts.

NETWORK CLASSIFICATIONS

Computer networks are classified in a variety of ways. Some of the more standard methods include the following:

- Networks are classified according to scale. These include the personal area network (PAN), local area network (LAN), campus area network (CAN), metropolitan area network (MAN), and the wide area network (WAN)).

- The network is classified according to connection method such as optical fiber, Ethernet, wireless LAN, HomePNA, or power line communication.

- The network is classified by functional relationship, such as active networking, client-server, and peer-to-peer.

- The network is classified according to network topology. These types of networks include the bus network, star network, ring network, mesh network, star-bus network, and tree or hierarchical topology network.

NETWORK CONFIGURATIONS

A solid network configuration strategy ensures the proper configuration of routers and switches. The IT department is charged with defining and carefully managing a specific set of device configurations designed to protect the enterprise. The implementation of this network configuration management strategy and solution can help to effectively manage compliance-related tasks and all configuration changes, such as moves, adds, and deletes, as well as automate the typical auditing activities.

Networks can be set up many different ways depending on the number of devices, the distances between those devices, the transmission speed requirements, and other factors. The topology is how computers, printers, and other devices are connected over a network. It describes the layout of wires, devices, and routing paths. The most popular configurations, or topologies, include the bus, token ring, star, and star bus topologies.

Bus. With a bus configuration, each node is connected sequentially along the network backbone. A node is any device connected to the network, such as a computer, printer, or scanner. Backbone is the term used to describe the main cables to which the network segments are connected. Resistors are placed at each end of the network to ensure that the signal is terminated when it reaches the end. When one node sends information to another node through the network, the information travels along the backbone until it reaches the desired receiving node.

Ethernet bus topologies are relatively easy to install and don't require much cabling compared to the alternatives. Bus networks work best with a limited number of devices. If more than a few dozen computers are added to

Figure 1
A Bus Topology
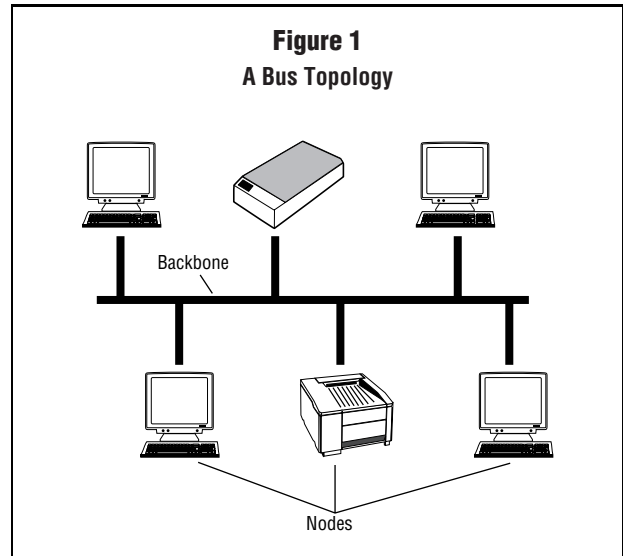
a network bus, performance problems will likely result. In addition, if the backbone cable fails, the entire network basically becomes unusable.

Token Ring. With a ring configuration, each node is connected sequentially along the network backbone. However, unlike the bus configuration, the end of the network connects to the first node, forming a circuit. Nodes on a token ring take turns sending and receiving information. In the token ring topology, a token travels along the backbone with the information being sent. The node with the token sends information to the next node along the backbone. The receiving node reads the information addressed to it and then passes the token and any additional information to

Figure 2
A Token Ring Topology

Figure 3
A Star Topology
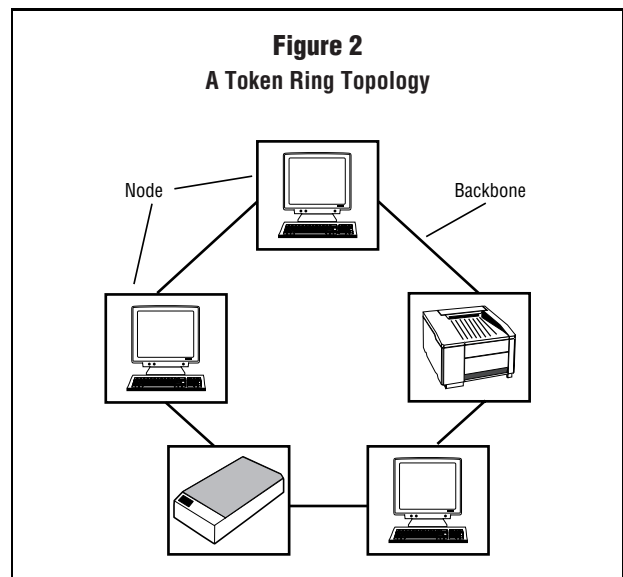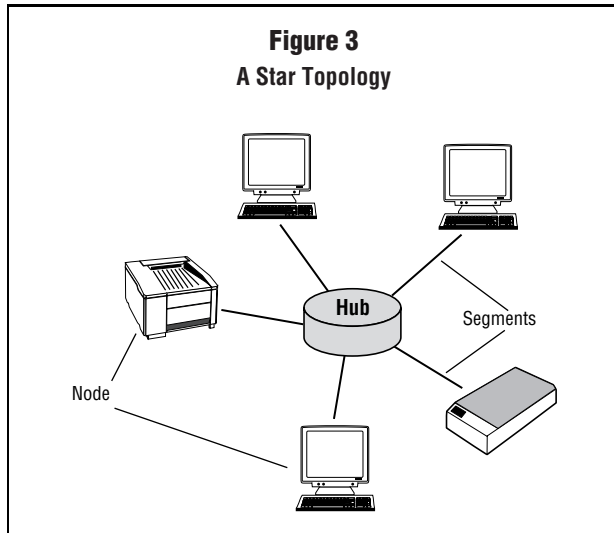
the next node. This continues until the token and data make it back to the first node in the network.

To implement a ring network, one typically uses FDDI, SONET, or Token Ring technology. Ring topologies are found in some office buildings or school campuses.

Star. With a star configuration, each node is connected to a central hub via network segments. When one node sends information to another node, the information passes through the hub. The hub does not filter or route the information in any way; it simply serves as a connector between network segments. Many home networks use the star topology.

Star bus. With a star bus configuration, the hubs of multiple star networks are connected together via the backbone. This is the most common network configuration in use.

Tree topology. In a tree topology, multiple star topologies are integrated onto a bus. Only hub devices connect directly to the tree bus. Each hub is considered the root of a tree of devices. This approach is considered a bus/star hybrid; it supports future expandability of the network much better than a bus or a star alone.

Mesh topology. Mesh topologies take messages on any of several possible paths from source to destination. The Internet, and some other WANS, employ mesh routing. A full mesh is a mesh network where every device connects to every other.

LOCAL AREA NETWORKS AND WIDE AREA NETWORKS

A LAN, as the name implies, is a network that connects devices that are local, or relatively close to each other. Nodes on a LAN are usually in the same building. In TCP/

IP networking, a LAN is often but not always implemented as a single IP subnet. A WAN, on the other hand, is used to connect nodes that could be miles apart. LANs generally transmit data faster than WANs, and are usually more reliable. A WAN is a geographically-dispersed collection of LANs. A network device called a router connects LANs to a WAN. In IP networking, the router maintains both a LAN address and a WAN address.

A WAN is different from a LAN. Most WANs, like the Internet, are not owned by any one organization but exist under collective or distributed ownership and management. WANs tend to use technology like ATM, Frame Relay, and X.25 for connectivity over the longer distances. Fiber-optic cables are used for both LANs and WANs.

While LANs and WANs are the most popular network types, other networks include:

• The Wireless Local Area Network, which is a LAN based on WiFi wireless network technology.

• A Metropolitan Area Network is a network spanning a physical area larger than a LAN but smaller than a WAN, such as a city. A MAN is typically owned and

Figure 4
A Star Bus Topology
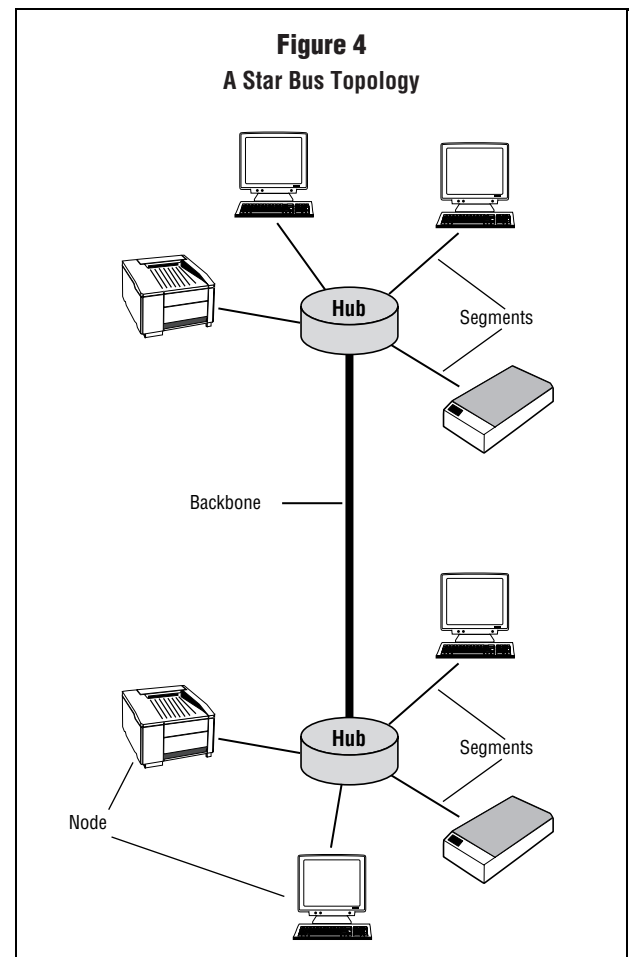
operated by a single entity such as a government body or a large corporation.

- A Campus Area Network is a network spanning multiple LANs but smaller than a MAN, such as on a university or local business campus.

- A Storage Area Network connects servers to data storage devices through a technology like fiber channel.

- A System Area Network links high-performance computers with high-speed connections in a cluster configuration. This network is also known as Cluster Area Network.

Ethernet networking. Ethernet is a LAN protocol (i.e., a set of rules that governs communications) developed in the mid-1970s by Bob Metcalfe and David Boggs at Xerox Corporation's Palo Alto Research Center. Today, Ethernet is the most widely used network technology in the world. The original Ethernet used a bus topology and provided for transfer rates of up to 10 million bits per second (Mbps). This Ethernet specification was modified slightly and became the Institute of Electrical and Electronics Engineering (IEEE) 802.3 standard, which helped solidify Ethernet as a widely-recognized, open international standard.

Although networks using Ethernet protocol generally connect devices over short distances, technological advances now allow Ethernet to connect devices that are miles apart. Ethernet is widely accepted and largely installed because it is simple and efficient and because network interface cards (NIC) for Ethernet can be easily installed in personal computers, workstations, or high-end computers. Furthermore, it can run on a variety of media, including fiber optic, twisted-pair, cable, and wireless connections.

Repeaters. When Ethernet was first implemented, most people used a copper coaxial cable. However, the maximum length of this cable was 500 meters, which was not long enough for some networks. To address this problem, network engineers used repeaters to connect several Ethernet segments.

Actual network devices that serve as repeaters usually have some other name. Active hubs, for example, are repeaters and are also called multiport repeaters. Most often, they are referred to as hubs.

Bridges. Bridges provide a simple means for connecting LANs. A bridge is a device that connects physically separate LAN segments (such as different Ethernet cables) into one logical LAN segment. Bridges filter data traffic at a network boundary. Bridges, which operate at the data link layer of the OSI model, reduce the amount of traffic on a LAN by dividing it into two segments.

There are four categories of bridges: transparent, source routing, encapsulating, and translating. Transparent bridges are used for Ethernet, whereas source routing bridges are used for token ring networks. Encapsulating bridges connect two segments of the same media (such as token ring to token ring) over a medium. The receiving bridge removes the envelope, checks the destination, and sends the frame to the destination device. Translating bridges are used to connect different types of network media such as Ethernet and FDDI (fiber distributed data interface). FDDI is a set of protocols that uses a modified form of the token-passing method over fiber-optic cable.

An Ethernet bridge, for example, inspects each incoming Ethernet frame—including the source and destination MAC addresses, and sometimes the frame size—to make individual forwarding decisions.

Routers. LAN segments joined by a router are physically and logically separate networks. In contrast to a bridge, when multiple network segments are joined by a router they maintain their separate logical identities (network address space), but constitute an internetwork.

Routers specify the destination and route for each packet, and they can be used to direct packets and interconnect a variety of network architectures. A major difference between a bridge and a router is that the bridge distinguishes packets by source and destination address, whereas a router can also distinguish packets by protocol type. Routers provide for the interfaces to WANs such as frame relay and packet switching services. Some new bridge products have added router capabilities; hence, the practical distinction is becoming blurred, giving rise to the term "brouter."

Routers can also be used to limit access to a network by the type of application (e.g., allowing electronic mail to pass, but not file transfer traffic). This capability provides a measure of security for the network, and is used extensively when creating firewalls. Firewalls are implemented to secure an organization's network when it is linked to the Internet.

Switches. Ethernet communicates across the network using the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) process. A protocol using CSMA/CD monitors, or listens to, the media for network traffic, or information traveling through the network from one node to another. If a node does not sense any traffic, it will send frames or packets of information onto the media. A network frame is like a mailed letter. The letter is put in an envelope that has a return address and the

address of its destination. Data are like the letter and the frame is like the envelope. The data is placed in the frame and the frame has the addressing information and error-checking code. Each protocol has its distinctive frame. The device continues sending until it finishes or until a collision occurs.

A collision happens when more than one device transmits data at the same time. When a collision occurs, each device waits a random amount of time before trying to retransmit the data. By having each node wait a random amount of time, there is only a slim chance that the two devices will send out the data at the same time again. The collision detection and frame retransmission are part of the protocol.

One way to reduce the number of collisions is to add switches to the network. A switch, like a hub, connects nodes to each other. Switches speed things up by allowing different nodes of a network to communicate directly with one another in a smooth and efficient manner. However, while a hub requires each node to share the bandwidth (i.e., the amount of simultaneous data traffic the network can support), a switch allows each node to use the full bandwidth.

Switches that make a separate connection for each node in a company's internal network are called LAN switches. These types of switches develop a series of instant networks that contain only the two devices communicating with each other at that particular moment.

In a fully switched network, each node is connected to a dedicated segment of the network, which in turn is connected to a switch. Each switch supports multiple dedicated segments. When a node sends a signal, the switch picks it up and sends it through the appropriate segment to the receiving node. Ethernet protocol in a fully switched environment does not require collision detection because the switches can send and receive data simultaneously, thus eliminating the chance of collision.

Most companies do not use fully switched networks, as the cost of replacing each hub with a switch can be expensive. Instead, most use a mixed network configuration in which a combination of hubs and switches are used. For example, all of the computers in each department may be connected to their own departmental hub, and then all of the departmental hubs may be connected to a switch.

ETHERNET ADVANCES

The Ethernet has become a data transmission standard. Its dominance of Ethernet as a LAN technology for desktop PCs has made it difficult for other technologies to gain acceptance. The installed base of Ethernet networks is larger than any other alternative technology deployment in the upper spectrum of data rates. This is credited to the simplicity of Ethernet standards and the cost-effective equipment. Bandwidth requirements are growing with more interest and demand for IP applications and streaming video. Some experts believe that will replace voice as the dominating traffic type.

In May 1996 eleven network vendors (including Cisco Systems and Sun Microsystems) formed the Gigabit Ethernet Alliance. The goal of the alliance was to develop a standard for 1 Gigabit per second (Gbps) Ethernet transmissions. Soon thereafter, network vendors were successful in designing networks that achieved the 1 Gbps transmissions goal, and in 2002 the IEEE approved the fibre-only 10 Gbps Ethernet. Throughout 2004 great progress was made in the development of l0 Gbps Ethernet technology and its infrastructure. The increased speed of the 10 Gbps Ethernet in terms of data storage, system backup, teleconferencing, and surveillance systems will prove beneficial to blade servers, networked enterprise switches, video servers, and other applications. The higher density, reduced power, and improved cost-effectiveness appeal to all of the major system developers.

The IEEE has worked to continuously update a standard for the Ethernet. In developing the IEEE 802.3ba spec, two different standards were supported by the IEEE standards committee. One group wanted faster server-to-switch applications, and supported a 40 Gbps standard. Other members were more interested in developing a more robust network backbone and favored the higher 100 Gbps speed. This higher speed required more costly and power intensive equipment.

Ultimately, the IEEE voted, in December 2007, to standardize both the 40 Gbps and 100 Gbps speeds as part of the IEEE 802.3ba spec. The connection equipment for speed would have different physical specifications.

NETWORK REMOTE ACCESS DEVICES

Network remote access devices are used to connect remote (off-site) users to an organization's network. There are many options available. See Table 1 for some of the common line designations.

Modems. A modem is a device that converts data from digital to analog signals so it can travel over the public switched telephone network (PSTN) to its destination. Once the signal reaches its destination, the modem converts it back to digital. As the PSTN was designed to carry voice (analog signals), it is not the best option for carrying data. Digital data networks (DDNs) are replacing the PSTN. DDNs are used to transmit both data and digitized voice. Because of their slow data transmission speeds, modems are no longer used in most business environments.

Table 1
Common Line Designations

Line Designation	Speed	Equivalents
DS0 (Digital Signal Zero)	64 Kbps	
ISDN	16 Kbps or 128 Kbps	Two DS0 lines plus signaling
T1	1.544 Mbps	24 DS0 lines
T3	43.232 Mbps	28 T1 lines
OC3 (Optical Carrier 3)	155 Mbps	84 T1 lines
OC12	622 Mbps	4 OC3 lines
OC48	2.5 Gbps	4 OC12 lines
OC192	9.6 Gbps	4 OC48 lines

Adapted from "How does a T1 line work?" How Stuff Works, Inc., 2005. Available from http://computer.howstuffworks.com/question372.htm

ISDN. Integrated services digital network (ISDN) is a switched, high-speed data service. ISDN is an international telecommunications standard for transmitting voice, video, and data over digital lines running at 64 Kbps, and reaches 1.5 Mbps in North America and 2 Mbps in Europe. ISDN uses the same copper telephone lines as modems do, but at a rate approximately five times faster. Furthermore, it is extremely reliable.

T1. A T1 line carries data approximately 60 times faster than a modem on a normal telephone line. The higher speed and extreme reliability make this a popular choice for many medium- to large-sized businesses. T1 lines can handle hundreds of users simultaneously for general browsing. However, it cannot handle that many users simultaneously downloading large files, such as MP3 files or video files. For very large companies, T1 lines may not be sufficient.

Cable Modems. A cable modem is a device used to connect a computer to a coaxial cable, such as the kind used for cable television, in order to access online services. This device modulates and demodulates signals like a conventional modem. In addition, a cable modem functions like a router designed for installation on cable television networks. The most popular application for cable modems is high-speed Internet access, which provides much faster service than standard telephone-line modems, thus enabling users to access streaming audio, video, and other services.

Wireless Technology. Mobile telephones, laptop computers, and handheld computers are so affordable that they have become a part of everyday life for many people and businesses around the world. Advances in wireless technology have made it possible for people to access networks without having to physically connect to the network through cables. For example, it is not uncommon for business travelers to access networks on their wireless fidelity (Wi-Fi)-enabled laptop PCs or handheld computers while waiting at an airport.

Bluetooth is a wireless standard developed by a group of electronics manufacturers to allow any electronic device—such as computers, cell phones, keyboards, and headphones—to find and connect to other devices without any direct action from the user. The devices find one another and transmit data without any user input at all. Because Bluetooth technology is inexpensive and does not require the user to do anything special to make it work, it is gaining wide use around the world.

Wireless products are affordable and very reliable. With wireless connections, it is possible for people to move around while connected to a network. This is useful in environments such as hospitals, where health care professionals can access patient records from various locations around the campus. Many home and small-business users also use wireless networks to avoid the need to route twisted-pair wiring around their premises.

SEE ALSO *Computer Security; The Internet*

BIBLIOGRAPHY
Black, Uyless. *ATM Volume III Internetworking with ATM.* Upper Saddle River, NJ: Prentice Hall, 1999.
FitzGerald, Jerry, and Alan Dennis. *Business Data Communications and Networking.* 6th ed. New York: John Wiley & Sons, 1999.
"A Guide to Network Topology." *Learn Networking* 26 Jan 2008. Available from: http://learn-networking.com/network-design/a-guide-to-network-topology.
Horn, Keith. "10-Gbit Ethernet Is Ready, Along with Its Customers." *Electronic Design* 23 Aug 2004, 18.
"How Does a T1 Line Work?" *HowStuffWorks.com* 3 May 2000. Available from: http://computer.howstuffworks.com/question372.htm.
———. "Introduction to Network Types." *About.com* Available from: http://compnetworking.about.com/od/basicnetworkingconcepts/a/network_types.htm.
Layton, Julia, and Curt Franklin. "How Bluetooth Works." *HowStuffWorks.com* 28 June 2000. Available from: http://electronics.howstuffworks.com/bluetooth.htm..
Lunetta, Lawrence F. "How Network Configuration Management Improves Compliance and Productivity." *Enterprise Systems* 22 Jan 2008. Available from: http://esj.com/enterprise/article.aspx?EditorialsID=2975.
Marsh, David. "Ethernet Keeps Pumping the Data." *EDN* 14 Oct 2004, 63.
Mitchell, Bradley. "Network Topologies." *About.com* Available from: http://compnetworking.about.com/od/networkdesign/a/topologies.htm.
———. "Power and Wireless Options Extend Ethernet's Reach." *EDN* 11 November 2004, 67.

Panko, Raymond. *Business Data Communications and Networking.* 2nd ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Pidgeon, Nick. "How Ethernet Works." *HowStuffWorks.com* 1 Apr 2000. Available from: http://computer.howstuffworks.com/ethernet.htm.

Reimer, Jeremy. "New Ethernet standard: not 40Gbps, not 100, but both." *Ars Technica* 24 July 2007. Available from: http://arstechnica.com/news.ars/post/20070724-new-ethernet-standard-not-40-gbps-not-100-but-both.html.

Stamper, David A. *Business Data Communications.* 5th ed. New York: Addison-Wesley, 1999.

Tyson, Jeff. "How LAN Switches Work." *HowStuffWorks.com* 24 Jan 2001. Available from: http://computer.howstuffworks.com/lan-switch.htm.

Vargo, J., and R. Hunt. *Telecommunications in Business.* Chicago: Irwin, 1996.

COMPUTER SECURITY

Computing magazines often define information assurance as "the technical and managerial measures designed to ensure the confidentiality, possession or control, integrity, authenticity, availability, and utility of information and information systems." This information may be in storage, processing, or transit, and the threats to it can be accidental or intentional.

Protecting information resources is not easy. Network technology advances so quickly that IT experts are constantly challenged to keep up. The plethora of valuable information stored on computers and sent through the Web provides great potential for hackers and scammers to infiltrate computer security.

There are two main types of hackers. Some hackers use their computers to break into companies' or other people's computers to steal information, such as credit card numbers. This type of computer criminal uses increasingly sophisticated methods to obtain personal information. Other types of hackers are more interested in damaging the receivers' computers and do this by sending viruses through Web sites or e-mail.

INTERNET CRIME STATISTICS

Between 2005 and the beginning of 2008, the Privacy Rights Clearinghouse said that more than 215 million records of U.S. residents had been compromised because of a security breach. A study conducted by the Ponemon Institute showed that the total average costs for lost or exposed data was $197 for each compromised record. This represents an 8 percent increase in the two years since 2006, and a 43 percent increase since 2005.

Together, the FBI and the National White Collar Crime Center formed the Internet Crime Complaint Center. The Center has received reports of more than 200,000 Internet crimes. These crimes cost nearly $700

per complaint, or $200 million in 2006 and $240 million in 2007.

Some of these crimes are online fraud and phishing scams, which increased 57 percent from 2007 to 2008. In that year, more than 3.5 million Americans were victims of online identity theft and phishing schemes, costing $3.2 billion dollars. The United States hosts the world's greatest number of fraudulent sites, with more than 25 percent.

RECORDS PROTECTION

With the ever-constant advances in the ways that data is exchanged, companies are significantly changing how they deal with data protection and loss. Many companies are investing in security technology, employee education, and comprehensive protocol.

Hackers, too, are changing their methods. They have moved away from targeting individuals and instead are focusing more on targeting entire databases where they can find huge amounts of personal identifying information. This has prompted organizations to focus on database security and invest in technologies that monitor the information and minimize the amount of data leaving their secure networks. According to experts, this may be a problem for large enterprises, which often have numerous databases that are unknown to most security personnel.

The biggest threat to a secure company, however, is human error. Some of the largest security breaches are accidental and actually come from within the company. As companies deal with more and more data, employees leak information by sending work documents to personal e-mail addresses, or accessing e-mail from a personal computer. Insider job shifts are another threat to security. Additionally, contractors, outsourcing and offshoring pose potential security threats.

While companies are increasing the amount of security in their systems, the immense amount of business conducted over the Internet makes stealing information attractive for computer criminals. They employ a number of different methods including spyware, phishing, pharming, viruses, firewalls, and spam. These terms are household words among computer users, especially those who use the Internet.

SPYWARE

Spyware is a term used to describe a program that is put on a computer without the user's permission, and usually without the user's knowledge. A spyware program runs in the background and keeps track of the programs the user runs and the Web sites the user visits. Some spyware tracks the user's keystrokes and extracts passwords and other information as they type. It then uses the information gathered to display certain advertisements or forces

the user's browser to display certain Web sites or search results. Most spyware is written for the Windows operating system.

Spyware can be installed on a computer in any of the following ways:

- **Piggybacked software installation:** Some software applications, and especially free software downloads, install spyware as part of the program installation.

- **Drive-by download:** Some Web sites automatically try to download and install spyware on the user's machine. Users may get a pop-up warning, but not if the security setting is too low.

- **Browser add-ons:** This type of spyware adds enhancements, such as a toolbar, an animated pal, or additional search boxes, to the user's Web browser. Some enhancements, also known as browser hijackers, embed themselves deep in the user's computer, making it very hard to remove them.

- **Masquerading as anti-spyware:** Some spyware advertises that it can remove spyware, when, in reality, they are actually installing additional spyware.

Not only does spyware infringe upon users' privacy, but it can also slow down computers. Many spyware programs use up most of the computer's random access memory (RAM) and processor power, preventing other applications from using these resources. In addition, many spyware programs generate popup advertisements that slow down the user's Web browser, reset the user's homepage to display advertisements every time she opens the Web browser, and redirect the user's Web searches. Some of the more malicious spyware programs modify the user's firewall settings, increasing the opportunities for more spyware and viruses to enter the user's computer.

PHISHING

Phishing is a term used to describe e-mail scams that attempt to trick consumers into disclosing personal and/or financial information. The e-mail messages appear to be from legitimate sources, such as banks, credit card issuers, or well-known Internet sites (such as America Online, Paypal, and eBay). The content of the messages varies, but often they tell the consumer that he needs to update personal information or that there is a problem with the consumer's account. The messages usually contain links to fake Web sites. When the user clicks the link, they are taken to Web sites that look official, and may even include images from the legitimate Web sites. These fake Web sites often instruct the unsuspecting user to enter credit card numbers, social security numbers, bank personal identification numbers (PINs), and other valuable information. Once the user enters that information,

the violators use it or sell it. This leads to what is known as identity theft. The scammers use this information to assume the identity of the victims to make purchases in that person's name.

For example, some of these e-mails come for the IRS. The IRS, by the end of 2007, had been forwarded nearly 35,000 such scam e-mails, which have revealed to the agency more than 1,500 different schemes. In the last six months of 2007, there was a 5 percent increase in the number of phishing messages sent across the Internet, or a total of 207,547. That means that every day, more than 1,100 phishing messages are sent.

Nearly 94 percent of all attacks recorded in August 2007 were against financial services providers. This high number is typical. However, Google is now the target of another kind of phishing. Google customers are tricked into providing their AdWords account login details. By getting their AdWords, the traffic that would go to the site of the person creating the search words are now going to the perpetrator's site. Bigmouthmedia reported a 240 percent monthly average increase in this type of phishing e-mail in 2007.

In 2008, a group of senators, led by Olympia Snowe, introduced the Anti-Phishing Consumer Protection Act of 2008. The bill prohibits tricking recipients into providing their personal information in response to e-mails, instant messages, and misleading Web sites. The bill would also ban related abuses, such as the practice of using fraudulent or misleading domain names.

SPAM

Spam is a term used to describe unsolicited e-mail messages that usually contain an advertisement for some product or service, such as mortgage loans, pornography, or prescription drugs. Spammers send the messages to e-mail addresses on wide-scale mailing lists, which could mean that each message is sent to thousands of people. Spam has become such an annoying problem for so many people that software programmers have developed spam filters to block or delete some e-mail messages before they reach the recipient's e-mail account. Most ISPs offer some level of spam filtering to their customers. However, even with these filters, hundreds of spam messages get through.

Spam messages, according to a May 2008 statistic, account for more than 80 percent of e-mail. Spam often delivers vehicle malware and viruses. Anti-spam e-mail appliances block millions of pieces of spam every day, making these appliances a key defense in IT security. According to the Test Center, e-mail appliances catch more than 96 percent of spam.

Where do spammers get e-mail addresses? Hundreds of companies compile lists of e-mail addresses and put them on CDs, which they sell to anyone who is willing to

pay for them. Each CD can contain millions of e-mail addresses. These companies use programs to pull out screen names and e-mail addresses from newsgroups and chat rooms or the Internet itself. Some spammers use spambots, which are programs that go through the Web and look for the @ symbol and pull the e-mail addresses associated with each one. Another method spammers use to obtain e-mail addresses is to create Web sites specifically designed to attract Web surfers. These Web sites may ask you to enter your e-mail address to see what the site has to offer (for example, large amounts of money).

And finally, perhaps the most common method spammers use to get e-mail addresses is to conduct a dictionary search of the mail servers and large ISPs. Dictionary searches use a program that establishes a connection with the target mail server and then submits millions of random e-mail addresses. Often they will vary these e-mail addresses very slightly (such as by adding a number somewhere in the address). The program then collects the e-mail addresses for which the message actually goes through.

There are hundreds of companies around the world that have formed specifically to cater to spammers. They offer services for sending bulk e-mail. Some of the larger companies can send billions of messages a day. Many of these companies are set up outside the United States to avoid U.S. laws. Some claim to be "spam free." This means that the e-mail addresses they use are taken from the list of users who requested to receive bulk e-mail, or "opt-in" e-mail. A user's e-mail address can be placed on an opt-in list when ordering something online. Many online stores include a checkbox near the bottom of the order page that asks the user to clear the checkbox if they do not want to receive e-mail offers from their partners. If a user does not see that or misinterprets the checkbox, they may be placed on an opt-in list.

As mentioned above, there are many different spam filtering software programs on the market. These filters check e-mail as it arrives in the user's electronic mailbox. The user can set up the filter to check for specific words or specific e-mail addresses or specific types of attachments. If the filter detects any of these, it will either delete the message or place it in a separate folder. Unfortunately, spammers often find ways around these filters. Another problem with filters is that they sometimes filter out legitimate messages.

In 1998, Spamhaus.org was formed to track and stop spammers around the world. Australian-based Spamhaus (http://www.spamhaus.org) calls itself "an international non-profit organization whose mission is to track the Internet's Spam Gangs." Spamhaus.org also says it seeks to provide "dependable realtime anti-spam protection," works with law enforcement agencies to "identify and

pursue spammers worldwide," and lobbies for "effective anti-spam legislation."

Spamhaus continues to fight spam. The group publishes the Register of Known Spam Operations (ROKSO), which lists the Internet Protocol (IP) addresses of the 200 worst spam gangs worldwide. ISPs can use this list to avoid signing up known spammers, and law enforcement agencies can use the list to help target and prosecute spam gangs. Spamhaus also publishes four spam-blocking databases—the Spamhaus Block List (SBL), the Exploits Block List (XBL), the policy block list (PBL) and the ZEN, a new all-in-one DBSBL (DBS Blacklist). As of July 2008, the various Spamhaus products were busy protecting 1.43 billion user mailboxes.

VIRUSES

Computer viruses are programs that spread from one computer to another, causing problems on each computer they touch. As viruses propagate, they use up so much memory that it can slow down computer systems to the point that they are unusable. Some viruses actually attack files on the computer by deleting them or modifying them in some way that renders the computer unusable.

The extent of damage caused by a virus varies. Some affect a relatively small number of computers. Others have been so devastating that they can even cripple large companies. For example, in March 1999, when the Melissa virus hit, it was so destructive that it forced Microsoft and other large companies to completely shut down their e-mail systems until the virus could be contained.

There are four general types of computer viruses:

• **Viruses.** These are small programs that attach themselves to other programs. When a user runs the legitimate program, the virus program runs, too. Once on a computer, some viruses find other vulnerable programs and attach to them as well, causing even more damage. The virus spreads to other computers when the unknowing user shares or passes on an infected program via CD, for example.

• **E-mail viruses.** These are viruses that are transmitted via e-mail. When users open an e-mail message or an e-mail attachment containing a virus, they release it onto their computers. Some e-mail viruses replicate themselves by e-mailing themselves to people listed in a victim's e-mail address book.

• **Worms.** These are small programs that usually take advantage of networks and spread to all computers on the network. Worms scan networks for computers with security holes in programs or operating systems, replicate themselves on those computers, and then start all over from there. Because worms usually spread through networks, they can affect multiple

computers in a very short amount of time. The Slammer worm, released in January 2003, spread more rapidly than any other virus before it. Within 15 minutes, it had shut down cell phone and Internet service for millions of people around the world.

- **Trojan horses.** These are computer programs that claim to be one thing but are actually viruses that damage the computer when the user runs them. Trojan horses cannot replicate automatically.

Because viruses have the potential to wreak havoc on computer networks and individual computers, many virus-protection products have been developed to prevent this. Most virus-protection software scans the computer when it is first turned on and looks for known viruses. As new viruses are discovered, virus protection providers have to update their virus definitions.

FIREWALLS

A firewall is basically a barrier that prevents damaging files or programs from reaching the user's computer. Many operating systems now include a built-in firewall. There are also many after-market firewall products available for purchase. Firewalls filter the data that comes through an Internet connection. If the firewall detects any suspicious information, it does not allow that information through. Most companies and many individuals who have Internet access use firewalls to protect their computers and networks. Although some firewalls protect against computer viruses, many experts recommend that companies and individuals invest in a separate anti-virus software package.

Firewalls control the flow of network traffic using one or more of the following methods:

- **Packet filtering:** The term "packet" is used to describe a small group of data. With the packet filtering method, a firewall compares the packets of incoming and outgoing data against a set of specific rules. If the packets meet the acceptable criteria, the firewall lets the data through. Any data that does not make it through the firewall is discarded.

- **Proxy service:** Proxy servers are used to access Web pages by other computers. When a computer requests a Web page, the proxy server retrieves the information and then sends it to the user's computer. With a proxy server, the computer hosting the Web site does not come into direct contact with the user's computer.

- **Stateful inspection:** This newer method compares only certain key parts of the packet to a database of trusted information. The firewall compares outgoing data against specific criteria and then compares

incoming data against the same criteria. If the two comparisons match, the firewall lets the information through.

Several criteria that firewalls use to compare incoming and outgoing data are listed below:

- **Internet Protocol (IP) addresses:** Each computer on the Internet has a unique IP address, which consists of a 32-bit number. If a firewall detects too many files being read by a certain IP address outside of the company, it may block all traffic to and from that IP address.

- **Domain names:** Each server on the Internet has its own domain name, which is the Web site address most people recognize (as opposed to the IP address). If a company knows that certain domain names are not "safe," they will set up the firewall to block access to that domain name. On the other hand, the company may set up the firewall to allow access to only certain domain names.

- **Protocols:** Protocol is a term used to describe the way a program communicates with a Web browser. Some of the more common protocols include IP (Internet Protocol), which is the main delivery system for information over the Internet; TCP (Transmission Control Protocol), which breaks apart and rebuilds information from the Internet; HTTP (Hyper Text Transfer Protocol), which is used for Web pages; FTP (File Transfer Protocol), which is used to download and upload files; and many more. A company may set up a firewall that allows only one or two machines to handle certain protocol and prohibits that protocol on all other machines.

- **Specific words or phrases:** Companies can set up firewalls to search for specific words or phrases. If the firewall encounters packets containing any of those words, it will not allow the packet through.

INFORMATION ASSURANCE PROVIDES NEW JOBS

The year 2007 marked an active year for online criminal activity. At least part of the reason for the increase is that many companies are now required by state laws to notify affected individuals (such as customers, employees, citizens, students and alumni) when their confidential or personal information is lost, stolen, or otherwise compromised. Experts expect that all fifty states will require such notification by 2010.

Other new trends are emerging concerning stolen data, such as where data is stolen. Hackers have begun to target second tier businesses, rather than financial networks and large companies. At the same time, the

explosive growth of social networking sites, which are often used on workplace PCs, also account for much data loss.

Moving forward, business must invest more in security risk assessment and management. This means that companies will need to create key jobs for security personnel. Companies will also need to develop a system that prioritizes the most sensitive information. This will help determine what data potential attackers are most likely going to target. This might include intellectual property, and other information that could affect the value of corporate stock.

Companies are implementing standardized security risk management plans. ISP/IEC 27001:2005 is a standard specification for an Information Security Management System (ISMS). With it, companies have a roadmap to monitor and control their security. ISP/IEC 27001:2005 covers eight elements to ensure that business risk is minimized. The standard is also intended to highlight corporate, customer and legal requirements that companies are required to meet. The elements of the spec include:

- **Security policy:** This element ensures that business objectives and management direction are in sync, enabling the maintenance of an information security policy across the organization.

- **Organizing information security:** This ensures that information security is properly governed.

- **Information asset management:** In this phase, companies are charged with making sure that information assets are properly inventoried and classified.

- **Communications and operations management:** This phase ensures that technical security controls in systems and networks are properly managed.

- **Access control:** Access controls govern the access rights to networks, systems, applications, functions, and data.

- **Information systems acquisition, development, and maintenance:** This phase ensures that security is built into applications, including user-developed applications to ensure correct processing.

- **Information security incident management:** Here, a plan is developed for anticipating and responding to information security breaches.

- **Policy adherence:** Companies follow this directive to ensure conformance with information security policies and standards.

The ISO/IEC 27001:2005 is providing business and organizations with the plan to combat information security breaches, Still, both enterprises and individual users must become better informed about the dangers that exist, and take precautions. As governments and law enforcement agencies around the world are learning more about these crimes and how to deal with them, they are taking action to prosecute the perpetrators.

SEE ALSO *Computer Networks; Technology Management*

BIBLIOGRAPHY

"Anti-Phishing Consortium Releases New Report." *Credit Union Times* 19 Dec 2007. Available from: http://www.cutimes.com/article.php?article=35578.

Black, Jane. "Before Spam Brings the Web to Its Knees." *BusinessWeek Online* 10 June 2003. Available from: http://www.businessweek.com/technology/content/jun2003/tc20030610_1670_tc104.htm.

Boutin, Paul. "Slammed! An Inside View of the Worm that Crashed the Internet in 15 Minutes." *Wired Magazine* July 2003.

Coustan, Dave. "How Spyware Works." *HowStuffWorks.com* 16 Feb 2005. Available from: http://computer.howstuffworks.com/spyware.htm.

"Google Phishing: The Fastest-Growing Con on the Internet." *bigmouthmedia.com* 23 May 2008. Available from: http://www.bigmouthmedia.com/live/articles/google-phishing-the-fastestgrowing-con-on-the-in.asp/4763/.

Gross, Grant. "U.S. Senator Introduces Phishing Penalties Bill." *IDG News Service* 4 March 2005. Available from: http://www.infoworld.com/article/05/03/04/HNphishingbill_1.html.

Hoffman, Stefanie. "Data Loss Prevention Trends To Watch In 2008." *Channel Web* 02 Jan 2008. Available from: http://www.crn.com/security/205207370?pgno=3.

Jaikumar, Vijayan. "Fight Against Phishing Moves to a New Level: Consortium Brings Together Companies, Law Enforcement to Target e-Mail Scams." *Computerworld* 13 December 2004, 10.

"PC Mag Encyclopedia." *pcmag.com* Available from: http://www.pcmag.com/encyclopedia_term/0,2542,t=information+assurance*amp;ldquo;Phishing Fraud." Available from: http://securities-fraud.org/phishing-attacks.htm.*

Kaneshige, Tom. "Spam Wars Anti-spam Vendors Can't Thwart the Spam Boom. Is it Time for an E-mail Tax?" *InfoWorld* 16 Apr 2008. Available from: http://www.infoworld.com/article/08/04/16/front-street-spam_1.html.

"Phishing Scams, Frivolous Arguments Top the 2008 "Dirty Dozen" Tax Scams." *Internal Revenue Service* 13 Mar 2008. Available from: http://www.irs.gov/newsroom/article/0,,id=180075,00.html.

"Protect Internet Consumers from Fraud and Theft." *The Hill's Congress Blog* 29 Feb 2008. Available from: http://blog.thehill.com/2008/02/29/protect-internet-consumers-from-fraud-and-theft-sen-olympia-snowe/.

"The Spamhaus Project." *Spamhaus.org* Available from: http://www.spamhaus.org/organization/index.lasso.

Tyson, Jeff. "How Firewalls Work." *HowStuffWorks.com* 24 Oct 2000. Available from: http://computer.howstuffworks.com/firewall.htm.

"Win32.Ntldrbot (aka Rustock.C) No Longer a Myth, No Longer a Threat. New Dr. Web Scanner Detects and Cures

It for Real." *PR.com* 8 May 2008. Available from: http://www.pr.com/press-release/84130.

CONCURRENT ENGINEERING AND DESIGN

Practicing concurrent engineering, several teams within an organization work simultaneously to develop new products and services. Concurrently performing multiple aspects of development significantly reduces the amount of time involved in getting a new product. In markets where customers value time compression, fast-cycle developers have a distinct advantage. Additionally, in many high-technology areas such as electronics and telecommunications, product-technology performance is continuously increasing and price levels are dropping almost daily. In such areas, a firm's ability to sustain its competitive edge largely depends on the timely introduction of new or improved products and technologies. More and more, the time parameter makes the difference between mere survival and substantial profit generation. Concurrent engineering is a key method enabling companies to reduce a new product's time-to-market.

Companies employing concurrent engineering value cooperation, trust, and sharing, and they make decisions by consensus throughout the product lifestyle. The concurrent engineering approach is based on five key elements:

- A process
- A multidisciplinary team
- An integrated design model
- A facility
- A software infrastructure

SEQUENTIAL NEW PRODUCT DEVELOPMENT

In the past, commercial success was practically guaranteed for companies that could design, develop, and manufacture high-quality products that satisfied real needs at competitive prices. However, beginning in the early 1990s this traditional formula radically changed as time-to-market became a vital component of commercial success. Studies have demonstrated that being a few months late to market is much worse than having a 50 percent cost overrun when these overruns are related to financial performance over the lifecycle of a new product or service. In other words, time has become a key driver of competitive success, from design and development to the actual launch of a new product or service.

Traditional project planning and execution has been marked by the definition of objectives and milestones. These goals are met through a progression of networked activities, some of which must be performed sequentially, others of which may be conducted in parallel. Planning techniques such as Program Evaluation and Review Technique (PERT), Graphical Evaluation and Review Technique (GERT), and Critical Path Method (CPM) have been used to support this sequencing of tasks and activities. However, until the beginning of the 1990s time compression was not a major issue in the new product development environment. In the planning and scheduling of tasks and activities, any time compression concerns were only implicitly present.

CONCURRENT NEW PRODUCT DEVELOPMENT

Since time has become a competitive weapon, time pressures have become central to the project-based new product development organization. These pressures have led to the explicit understanding that time compression is a driver of project (and subsequent business) performance. As a consequence, methods, techniques, and organizational approaches have been designed and developed that allow for time compression needs to be handled in a proper manner. All time-centered approaches have one principle in common: they attempt to maximize the number of major design or development tasks that are performed concurrently, thus the concept of concurrent engineering.

In a concurrent engineering environment, even if certain tasks cannot be completely executed at the same time, designers and developers are encouraged to achieve maximum overlap between otherwise sequential activities. In other words, concurrent engineering aims at achieving throughput time reductions by planning and executing design and development activities in parallel, or by striving for maximum overlap between activities that cannot be completely executed in parallel (for example, when one of the tasks or activities requires information to be partially generated during a previous task or activity).

Therefore, concurrent engineering is based on the premise that the parallel execution of major design components will decrease the throughput time of projects, thus reducing the time-to-market for new products and services. For example, applying concepts of parallelism during the Boeing 777 transport design resulted in a time compression of 1.5 years as compared to its predecessor, the Boeing 767. Concurrent engineering allowed the Boeing Company to introduce the new airplane in time to limit the advantage of its competitor, Airbus Industrie.

While many companies have benefited from this approach, this trend has not been limited to individual companies. Complete industry sectors also have implemented concurrent engineering principles. At the beginning of the 1990s, the automotive industry pioneered many of the concurrent engineering concepts and their implementation. By the early 2000s, many industries, including electronics and pharmaceuticals, were behaving in much the same manner.

IMPLEMENTING CONCURRENT ENGINEERING

In a concurrent engineering environment, teams of experts from different disciplines are formally encouraged to work together to ensure that design progresses smoothly and that all participants share the same, current information. The project and problem-solving methods—and the technologies utilized—make up the essential elements through which parallelism in new product design and development can be achieved. Following is a discussion of how each of these elements contributes to concurrent engineering implementation.

Project Methods. Project methods based on teamwork, milestone management, and target-oriented work definition and follow-up are paramount. These methods also must be supported by appropriate senior management commitment and incentive systems. Each team is granted a large degree of autonomy to solve design problems where and when they occur, without much hierarchical intervention. However, management must ensure that the transfer of information between different activities or tasks is smooth and transparent. Also, the means of experimentation must allow the experts involved to rule out differences in interpretation on the functional and technical design parameters. In other words, for concurrent engineering to be successful, information and interpretation asymmetries between the experts involved must be avoided whenever possible.

Problem-Solving Methods. During design and development projects, methods are utilized that foster and support smooth interdisciplinary problem definition and problem solving. Methodologies such as brainstorming open the boundaries of the team to allow for wider ranges of alternative design definitions and solutions to be considered. The use of methodologies like Quality Function Deployment (QFD) further aids experts from different disciplinary backgrounds to jointly define a product's functional and technical requirements. Activity flow chart methods such as IDEF3 allow for detailed planning and monitoring of the different parallel and overlapping activities involved in project execution. Failure Mode and Effects Analysis (FMEA) allows for a systematic investigation of the occurrence and impact of possible flaws in the new product design. The use of Design of Experiments (DOE) enables the systematic identification of critical product/process parameters that influence performance. These are just a few of the many supportive methods that can be used in a concurrent engineering environment. The sources listed at the end of this essay provide more detailed and exhaustive overviews on these and other methodologies supporting concurrent engineering.

TECHNOLOGIES

In concurrent engineering, design technologies are utilized that foster efficient cross-disciplinary analysis, experimentation, and representation of new product designs. Some examples of these technologies include: three-dimensional (3-D) computer-aided design (CAD) systems, rapid prototyping techniques, rapid tooling and rapid testing techniques, as well as techniques that enable the representation of product designs in a virtual context. These design technologies are important because of the key information they convey: their 3-D character allows the expert to interpret design features in a more effective and efficient way.

All of these technologies contribute to the reduction of interpretation asymmetries between the experts involved, as well as to fast-cycle design and development, because they allow for high-speed iterations of analysis and experimentation on both concepts and models of the product. Thus, they modify traditional project management approaches by allowing for more systematic and flexible experimentation and iteration to be included throughout the project's design and development process. In fact, the time and cost incurred by the development and construction of prototypes generally are reduced by factors of 2 to 5 when using digital (e.g., 3-D CAD) and physical (e.g., rapid prototyping) technologies. These tools have become an important enabling factor in the concurrent engineering environment. Without their implementation and further upgrading, concurrent engineering might never be able to realize its full potential in terms of design cost and lead-time optimization.

CE AND INTEGRATED DESIGN

All downstream activities that will likely affect the product's life cycle must be considered during the design of the product. The product design team should be aware of all stages and of the implications that their decisions have in the final manufacturing specification.

For example, designers working in a conventional design-to-manufacture environment are often unaware of the potential effect of design decisions from a corporate and industry-wide perspective. The reason for this is often poor communication. Designers—working on an

integrated design on a team with employees who focus on manufacturing, assembly, materials used, attributed costs, and marketing—are provided with numerous perspectives as the product is being produced. By identifying potentially damaging downstream aspects of a product's life cycle at an early stage, companies avoid delays and costs. Companies adopting this approach design the product right the first time. These products improve their quality and enable a competitive edge over competitors.

Likewise, concurrent design involves collaboration, coordination, and co-decision making within and between cross-functional teams. These teams share information, synchronize activity, and create an environment that supports a concurrent design approach. This approach must support individual cross-functional teams and allow them to work in different styles in different situations. These teams may work in the same place, or at different locations; they may work together or individually. Cross-functional teams cooperate to facilitate complex interdependencies between activities that different teams are working on.

This brief overview has provided a summary of the why, what, and how involved in implementing a concurrent engineering philosophy for the development of new products, services, and processes. It has outlined how introducing overlap during the execution of innovation project tasks and activities has become vital because of competitive pressures that force new product developers to be more time-conscious.

However, a final caveat is warranted. Although concurrent engineering is an important method for handling the time pressures that occur during new product development, rushing products to the market can sometimes be a mistake. First, markets need time to develop. Numerous examples exist where a new product was too early for the market to absorb it or where product variety has reached limits beyond which the product choice decision becomes too complicated for customers. Second, more revolutionary new product development, which often is based on significant technological advances, typically requires longer time horizons to reach completion. Putting too much emphasis on time compression may blind an organization to this basic fact. Third, the conceptual development of new product ideas requires time or "slack." In a high-speed development organization, time-compression imperatives may undermine this need. Therefore, both managers and new product developers need to find a balance between the paradoxical needs for speed and slack in their organizations. Despite its efficiency, concurrent engineering will only prove to be effective when this balance is achieved through the experience and leadership of an organization's senior management.

SEE ALSO *New Product Development; Time-Based Competition*

BIBLIOGRAPHY

Boothroyd, Geoffrey, Peter Dewhurst, and Winston Knight. *Product Design for Manufacture and Assembly.* 2nd ed. New York: Marcel Dekker, 2002.

Cooper, Robert G., and Scott J. Edgett. "Portfolio Management in New Product Development: Lessons from the Leaders–I." *Research Technology Management* 40, no. 5 (1997): 16–52.

Debackere, K. "Technologies to Develop Technology." *Nijmegen Innovation Lectures Monograph Series.* Antwerp: Maklu Publishers, 1999.

ElMaraghy, H.A. and N. Mahmoudi. "Concurrent Design of Product Modules Structure and Global Supply Chain Configuration." *Concurrent Design of Product Modules Structure and Global Supply Chain Configuration.* Available from: http://s.i-techonline.com/Book/Supply-Chain/ISBN987-3-902613-22-6-spc16.pdf.

Iansiti, Marco. *Technology Integration: Making Critical Choices in a Dynamic World.* Boston: Harvard Business School Press, 1998.

Miao, Yongwu and Jorg Haake. "Supporting Concurrent Design in SCOPE." *Concurrent Engineering* 7, no. 1 (1999): 55–65. Available from: http://cer.sagepub.com/cgi/content/abstract/7/1/55.

Parkinson, B., P. Hudson, and R. Senior. "A Virtual Environment for Concurrent Engineering using Artificial Intelligent Techniques." Available from: http://www.ider.herts.ac.uk/ider/DESCON.HTM.

"Re-engineering Concurrent Design." *Cambridge Engineering Design Centre.* Available from: http://www-edc.eng.cam.ac.uk/research/processmanagement/pm1/concurrentdesign/.

ReVelle, Jack B., John W. Moran, and Charles A. Cox. *The QFD Handbook.* New York: John Wiley and Sons, 1998.

Ribbens, Jack. *Simultaneous Engineering for New Product Development: Manufacturing Applications.* New York: John Wiley and Sons, 2000.

Skalak, Susan Carlson. *Implementing Concurrent Engineering in Small Companies.* New York: Marcel Dekker, 2002.

Stalk, George, and Thomas M. Hout. *Competing against Time: How Time-Based Competition Is Reshaping Global Markets.* New York: The Free Press, 1990.

Tseng, Mitchell M. and Jianxin Jiao. "Concurrent Design for Mass Customization." Available from: http://ami.ust.hk/Archived%20Journals/Concurrent%20Design%20for%20MC.pdf.

Ulrich, Karl T., and Steven D. Eppinger. *Product Design and Development.* 3rd ed. Boston: McGraw-Hill/Irwin, 2004.

Utpal, Roy, John M. Usher, and Hamid R. Parsaei, eds. *Simultaneous Engineering: Methodologies and Applications.* Amsterdam: Gordon and Breach Science Publishers, 1999.

"What is Concurrent Engineering?" *Concurrent Design Facility.* 19 May 2004. Available from: http://www.esa.int/esaMI/CDF/SEM1OF1P4HD_0.html.

CONFLICT MANAGEMENT AND NEGOTIATION

The term "conflict" refers to perceived incompatibilities resulting typically from some form of interference or opposition. Conflict management, then, is the employment of

strategies to correct these perceived differences in a positive manner. For many decades, managers had been taught to view conflict as a negative force. However, conflict may actually be either functional or dysfunctional. Whereas dysfunctional conflict is destructive and leads to decreased productivity, functional conflict may actually encourage greater work effort and help task performance. Borisoff and Victor point out, "We have come to recognize and to acknowledge the benefits dealing with conflict affords. Because of our differences, we communicate, we are challenged, and we are driven to find creative solutions to problems."

THE EVOLUTION OF CONFLICT MANAGEMENT

The early approach to conflict management was based on the assumption that all conflict was bad and would always be counterproductive to organizational goals. Conflict management, therefore, was synonymous with conflict avoidance. This left the people experiencing the conflict with essentially only one outcome: a win-lose scenario. In such cases, the loser would feel slighted and this, in turn, would lead to renewed belligerence. Therefore, most managers viewed conflict as something they must eliminate from their organization. This avoidance approach to conflict management was prevalent during the latter part of the nineteenth century and continued until the mid-1940s.

In most cases, conflict avoidance is not a satisfactory strategy for dealing with conflict. Conflict avoidance usually leaves those people who are being avoided feeling as if they are being neglected. Also, conflict avoidance usually fails to reconcile the perceived differences that originally caused the conflict. As a result, the original basis for the conflict continues unabated, held in check only temporarily until another confrontation arises to set the same unresolved tensions into motion again. Therefore, conflict avoidance strategies are not especially useful in the long run.

The human relations view of conflict management dominated from the late 1940s through the mid-1970s. This viewpoint argued that conflict was a natural and inevitable occurrence in any organizational setting. Because conflict was considered unavoidable, the human relations approach recommended acceptance of conflict. In other words, conflict cannot be eliminated and may even benefit the organization. It was during this time period that the term "conflict management" was introduced, according to Nurmi and Darling.

Since the mid-1970s a new position on organizational conflict has emerged. This theoretical perspective is the interactionist approach. This viewpoint espouses not only accepting conflict, but also encouraging it. Theorists are of the opinion that a conflict-free, harmonious,

and cooperative organization tends to become stagnant and nonreponsive to market change and advancement. Therefore, it is necessary for managers to interject a minimum level of conflict to maintain an optimal level of organizational performance. For example, Shelton and Darling suggest conflict is a necessary condition for both individual and organizational progression. They encourage managers to "embrace conflict and use it for continuous transformation."

In the twenty-first century, conflict management is commonly viewed in the context of organizational culture. In "The Conflict Skilled Organization," Lynne Elsaguirre describes how companies that operate with a clear purpose can benefit from conflict. A business team in a successful corporate culture is able to engage in a high level of debate regarding substantive issues while avoiding disputes. Creating an organizational culture that encourages opposition can diversify a company's knowledge and maintain a balanced power structure.

SOURCES OF CONFLICT

According to both Daft and Terry, several factors may create organizational conflict. They are as follows:

- **Scarce Resources.** Resources may include money, supplies, people, or information. Often, organizational units are in competition for scarce or declining resources. This creates a situation where conflict is inevitable.

- **Jurisdictional Ambiguities.** Conflicts may also surface when job boundaries and task responsibilities are unclear. Individuals may disagree about who has the responsibility for tasks and resources.

- **Personality Clashes.** A personality conflict emerges when two people simply do not get along or do not view things similarly. Personality tensions are caused by differences in personality, attitudes, values, and beliefs.

- **Power and Status Differences.** Power and status conflict may occur when one individual has questionable influence over another. People might engage in conflict to increase their power or status in an organization.

- **Goal Differences.** Conflict may occur because people are pursuing different goals. Goal conflicts in individual work units are a natural part of any organization.

- **Communication Breakdown.** Communication-based barriers may be derived from differences in speaking styles, writing styles, and nonverbal communication styles. These stylistic differences frequently distort the communication process. Faulty communication leads

to misperceptions and misunderstandings that can lead to long-standing conflict. Additional barriers to communication may emerge from the cross-gender and cross-cultural differences of participants. Such fundamental differences may affect both the ways in which the parties express themselves and how they are likely to interpret the communication they receive. These distortions, in turn, frequently result in misreading by the parties involved. Moreover, it is common for the parties involved to be oblivious to these false impressions. The resultant misunderstandings subsequently lead the parties involved to believe that a conflict based on misunderstood behavior exists when, in fact, no conflict actually does exist. Miller and Steinberg call this misreading "pseudo-conflict," that is, perceived conflict rather than actual conflict. Much of what managers take to be an actual conflict is the product of such pseudo-conflict.

CONFLICT MANAGEMENT METHODOLOGIES

Management theorists have developed and suggested a range of options for handling organizational conflict. Figure 1 outlines the various components of the Conflict Resolution Grid, which is the result of widely accepted research presented by Thomas and Kilmann.

Thomas and Kilmann identified a conflict-handling grid comprised of five conflict management styles based on two dimensions: assertiveness and cooperativeness. Assertiveness is the motivation of an individual to achieve his/her own goals, objectives, and outcomes, while cooperativeness assesses the willingness to allow or help the other party to achieve its goals or outcomes. Any of the

five conflict resolution styles might be appropriate based on the circumstances of the situation and the personalities of the individuals involved.

1. **Avoiding Conflict Resolution Style.** The avoiding style is low on both assertiveness and cooperativeness. In other words, the manager is not very cooperative in helping the other individuals to achieve their goals, but neither is he/she aggressively pursuing his/her own preferred outcomes in the situation. The original problem, conflict, or situation is never directly addressed or resolved. However, avoiding behavior might be appropriate when the issue is perceived by the manager to be trivial. It might also be an appropriate approach to use when there is no chance of winning or when disruption would be very costly.

2. **Competing Conflict Resolution Style.** The competing style of resolving conflict is also known as the win-lose approach. A manager using this style, characterized by high assertiveness and low cooperativeness, seeks to reach his/her own preferred outcomes at the expense of other individuals. This approach may be appropriate when quick, decisive action is needed, such as during emergencies. It can also be used to confront unpopular actions, such as urgent cost cutting.

3. **Accommodating Conflict Resolution Style.** This style reflects a high degree of cooperativeness. It has also been labeled as obliging. A manager using this style subjugates his/her own goals, objectives, and desired outcomes to allow other individuals to achieve their goals and outcomes. This behavior is appropriate when people realize that they are in the wrong or when an issue is more important to one side than the other. This conflict resolution style is important for preserving future relations between the parties.

4. **Compromising Conflict Resolution Style.** This style is characterized by moderate levels of both assertiveness and cooperativeness. Compromise can also be referred to as bargaining or trading. It generally produces suboptimal results. This behavior can be used when the goals of both sides are of equal importance, when both sides have equal power, or when it is necessary to find a temporary, timely solution. It should not be used when there is a complex problem requiring a problem-solving approach.

5. **Collaborating Conflict Resolution Style.** This approach, high on both assertiveness and cooperativeness, is often described as the win-win scenario. Both sides creatively work towards achieving the goals and desired outcomes of all parties involved. The collaboration style is appropriate when the concerns are complex and a creative or novel synthesis of

Figure 1

Based on Thomas-Kilmann Conflict Mode Instrument

Conflict Management Styles
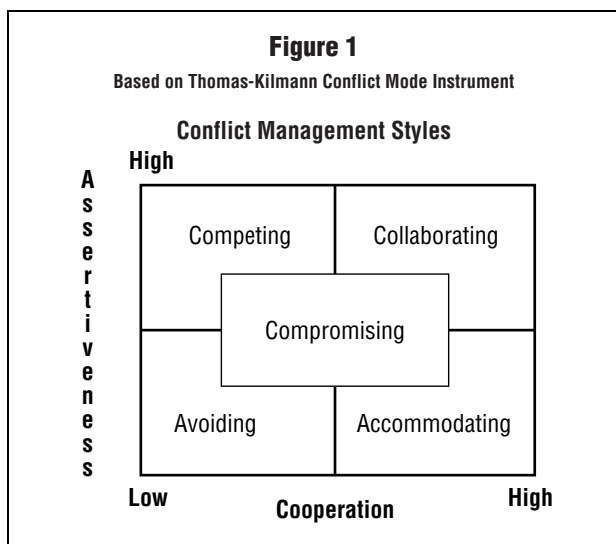
ideas is required. The downside of this approach is that the process of collaborating mandates sincere effort by all parties involved and it may require a lot of time to reach a consensus.

Of the five modes described in the matrix, only the strategy employing collaboration as a mode of conflict management breaks free of the win-lose paradigm. It has become almost habitual to fall back on the win-win alternative, but this was not the authors' original intention. They did not reject win-lose configurations out of hand. Instead, strategic considerations for managing conflict according to varied circumstances were identified. For instance, in a conflict centered on bids by two alternative suppliers, the best choice might well be a competing strategy with a winner and loser. After all, the objective in such a situation is to win the contract for one's own company. In most cases, winning the contract can be accomplished only at the expense of the competing supplier, who by definition becomes the loser.

In contrast, a competing approach almost never works well in the interpersonal conflict of people working in the same office (or even the same organization). Unlike the case of competing suppliers, coworkers—both the winner and the loser—must go on working together. Indeed, in many conflicts revolving around office politics, an accommodating strategy may actually enable individuals to strengthen their future negotiating position through allowing themselves to lose in conflicts over issues they do not feel particularly strongly about. In such situations, accommodating can be seen as a form of winning through losing. For instance, a manager may choose to concede an issue to an employee who is experiencing considerable stress as a means to motivate him or her. Similarly, an individual might choose an accommodating strategy to add balance to negotiations in which one's counterpart has already had to give up several other points. Indeed, a winner in a win-lose scenario who fails to put forth some effort to accommodate the other party may even provoke a backlash in the form of lack of commitment or open resistance.

Even the traditional approach of conflict avoidance has its place as an occasionally acceptable strategy. While conflict avoidance has justly been the subject of considerable condemnation, it can be rather useful in allowing both parties to cool off or in buying time until all the facts of a matter have been gathered. A manager might choose to avoid an employee in the throes of an emotional outburst, for example, until the employee has had sufficient time to calm down.

Finally, compromise is often a useful strategy when dealing with relatively small concerns. This differs from an accommodating strategy, in which the conceding party finds an issue unimportant that the opposing party considers comparatively important. A manager might enlist a compromise approach most effectively when both parties consider the issue to be of moderate or little importance. In such cases, compromising saves both parties the time required to employ problem-solving techniques to address the fundamental core of the conflict.

While all of these modes have their place among the strategies available to the manager, the collaborating approach to conflict management represents the most beneficial mode for most types of conflict management. In the collaborating mode, conflict itself acts as a managerial tool. The manager utilizes the conflict to guide the conflicting parties to address what essentially are obstacles faced by the organization. Through collaborative behavior, the conflicting parties pool their creative energies to find innovative answers to old problems.

It is in this key respect that the collaborative mode of conflict management differs from the other four conflict-handling modes. Accommodating, avoiding, competing, and compromising—as permutations of the win-lose scenario—are simply forms of conflict interventions. Collaboration as a conflict-handling mode, on the other hand, represents an attempt to channel conflict in a positive direction, thus enabling the manager to use conflict as a tool to resolve otherwise incompatible objectives within the organization. In other words, this method of handling conflict acts less as a conflict intervention and more as true conflict management.

However, any of the five conflict resolution styles may be appropriate and effective depending on the specific situation, the parties' personality styles, the desired outcomes, and the time available, The key to becoming more prepared is to understand the advantages and disadvantages of each method.

THE FIVE A'S TECHNIQUE

Borisoff and Victor identify five steps in the conflict management process that they call the "five A's" of conflict management: assessment, acknowledgement, attitude, action, and analysis. They assert that these five steps allow for a sustained, ongoing process of problem-solving-oriented conflict management.

Assessment. In the assessment step, the parties involved collect appropriate information regarding the problem. The parties involved also choose which of the conflict-handling modes is most appropriate for the situation. The parties collectively decide what is and what is not central to the problem. The parties involved also indicate areas in which they may be willing to compromise, and what each party actually wants.

Acknowledgement. The acknowledgement step is one in which each party attempts to hear out the other.

Acknowledgement allows both parties to build the empathy needed for the motivation of a synergistic solution to the problem. The acknowledgement acts as feedback to the other party and it demonstrates that one understands (without necessarily agreeing with) the other party's position. Acknowledgement goes beyond merely responding to what is said, however; it involves actively encouraging the other party to openly communicate its concerns. This is aided by the use of active listening techniques and overt, nonverbal encouragement.

Attitude. The attitude step tries to remove the foundation for pseudo-conflict. Stereotypical assumptions about different, culturally-based behaviors are uncovered. For example, a member of a high-context culture may misinterpret what a member of a low-context culture says as being needlessly blunt or even rude. Conversely, a member of a low-context culture may misinterpret what a person from a high-context culture says as being needlessly indirect or even outright deceptive. Such communication variations (as the works of Edward Hall have explained) have little to do with the actual intent or content of the messages, but represent instead culturally learned approaches to using implicit versus explicit communication styles. Similarly, in the attitude step, one acknowledges differences in the way that men and women are generally conditioned to communicate. Experts such as Borisoff and Merrill, for example, have delineated clearly differentiated communication styles between men and women, which are compounded by sex-trait stereotyping regarding issues of assertiveness, interruptive behavior, and perceptions of politeness. Finally, in the attitude step, one analyzes potentially problematic variations in styles of writing, speaking, and nonverbal mannerisms. Such differences may blur meanings. It is the role of the effective conflict participant to maintain an open mind toward all parties involved.

Action. The action step begins to actively implement the chosen conflict-handling mode. If the selected mode is the problem-solving approach, the manager conveys the opportunity for a conflict resolution based on trust and ongoing feedback on those points on which the parties have already agreed. Simultaneously, each individual evaluates the behavior of the other parties (often, little more than subtle hints) to ascertain where potential trouble spots might arise. Also, each individual must remain aware of his or her own communication style and general behavior. Finally, all parties must stay alert to new issues that are raised and look for productive solutions.

Analysis. In this last step participants decide on what they will do, and then summarize and review what they have agreed upon. Part of the analysis step is to ascertain whether every participant's requirements have been addressed (and met, if possible). Finally, the analysis step initiates the impetus for approaching conflict management as an ongoing process. Analysis enables participants to monitor both the short-term and long-term results of the conflict resolution.

QUANTUM SKILLS

Shelton and Darling suggest a new set of management skills, more appropriate for the ever-changing, conflict-ridden contemporary organization. They refer to these skills as the quantum skills. The suggested managerial skills are derived from the field of quantum physics. They are as follows:

1. **Quantum seeing.** This skill is defined as the ability to see intentionally. When conflict occurs, managers must explore their own assumptions about the parties and search for the underlying intentions that are creating the conflict. Each party must then come to recognize the relationship between individual thought processes and perceptions, and set clear intentions for positively resolving the situation.

2. **Quantum thinking.** This skill involves the ability to think paradoxically. Effective conflict resolution is a paradoxical process. "Win-win solutions require paradoxical thinking. They require the ability to find a fully acceptable solution to divergent points of view" (Shelton and Darling 2004, p. 30). In other words, collaborative solutions to conflicts that involve diametrically-opposed positions are unlikely to be achieved through linear problem-solving processes and thus require more unorthodox thinking.

3. **Quantum feeling.** This skill is defined as the ability to feel vitally alive. It is based on the premise that the level of organizational conflict is influenced by the negative emotions pervasive throughout the business world. As schedules have become more fast-paced and jobs have become more stressful, the level of organizational conflict has increased. Managers committed to the quantum feeling technique of conflict management must train themselves to view even negative events positively. They must challenge all parties in conflict to utilize creative, brain-storming techniques in an effort to construct "impossible" win-win solutions.

4. **Quantum knowing.** This skill is the ability to know intuitively. Managers wishing to develop this skill must integrate times of relaxation and reflection into their work routines. This skill focuses on staying mindful or aware of the organizational environment. Managers involved in conflict situations must guide

all parties towards a more centered response to the negative emotions.

5. **Quantum acting.** This skill is based on the ability to act responsibly. Quantum acting is predicated on the belief that everything in the universe is a part of a complex whole in which each part is influenced by every other part. Therefore, a manager's thoughts affect the entire organizational unit. Thus, if managers want to encourage more creative responses to conflict, they must begin by modeling this behavior themselves.

6. **Quantum trusting.** This skill is the ability to trust life's process. It is derived from chaos theory. This theory suggests that without chaos organizations will become stagnant and, if left alone, they will return to a non-chaotic state. This skill may be appealing to managers experiencing conflict. It suggests that managers must simply "ride the rapids of conflict, fully participating in the dance without attempting to actively manage the course of resolution" (Shelton and Darling 2004, p. 37). The organizational unit will eventually self-organize.

7. **Quantum being.** This skill is the ability to be in a relationship, specifically, "the ability to literally become so connected to another that one can see the world through the other's eyes" (Shelton and Darling 2004, p.38). This skill provides the foundation for all parties to learn from and understand each other. It is a relationship of continuous learning.

This set of skills is grounded in a new science: worldview. These skills provide a whole-brained alternative for managing people and conflict.

Conflict management is an ongoing procedure. It entails continual communication and supervision. "Conflict-handling behavior is not a static procedure; rather it is a process that requires flexibility and constant evaluation to truly be productive and effective" (Borisoff and Victor 1998).

SEE ALSO *Diversity; Management Styles*

BIBLIOGRAPHY
Borisoff, D., and D.A. Victor. *Conflict Management: A Communication Skills Approach.* 2nd ed. Boston: Allyn and Bacon, 1998.

Borisoff, D., and L. Merrill. *The Power to Communicate: Gender Differences and Barriers.* 3rd ed. Prospect Heights, IL: Waveland, 1998.

Daft, R.L. *Organizational Theory and Design.* St. Paul, MN: West, 1992.

Elsaguirre, Lynne. "The Conflict Skilled Organization." *Mediate,* November 2007. Available from: http://www.mediate.com/articles/eisaguirreL2.cfm.

Emmons, Garry. "Encouraging Dissent in Decision Making." *Working Knowledge* Cambridge: Harvard Business School, 1 October 2007. Available from: http://hbswk.hbs.edu/item/5746.html.

Miller, G.R., and M. Steinberg. *Between People: A New Analysis of Interpersonal Communication.* Chicago: Science Research Associates, 1974.

Nurmi, R., and J. Darling. *International Management Leadership.* New York: International Business Press, 1997.

Shelton, C.D., and J.R. Darling. "From Chaos to Order: Exploring New Frontiers in Conflict Management." *Organization Development Journal* 22, no. 3 (2004): 22–41.

Terry, P.M. "Conflict Management." *Journal of Leadership Studies* 3, no. 2 (1996): 3–21.

Thomas, K.W., and R.H. Kilmann. *Thomas-Kilmann Conflict Mode Instrument.* Sterling Forest, NY: Xicom, Inc., 1974.

CONSULTING

Management consulting is generally a contract advisory service provided to organizations in order to identify management problems, analyze them, recommend solutions to these problems, and (when requested) help implement the solutions. Although there are few formal educational or professional requirements to be a consultant, these services are ideally provided by individuals who are specially trained or qualified in a particular field, such as information technology or organizational change, and who strive to provide independent, objective advice to the client organization.

Only a moderate amount of research has been done on the management consulting industry, although the industry has experienced a phenomenal growth rate since essentially emerging during the 1980s. Management consultants perform a variety of services and use many different methods to complete their tasks. These external consultants do not take the place of managers and have no formal authority, although they are responsible for the value of their advice—occasionally in a legal sense.

The practice itself has existed since the early twentieth century. Management consulting pioneers such as Arthur D. Little and Harrington Emerson contributed much to the foundations of the concept. The two were also involved with the founding of the first consulting firms. In the first half of the twentieth century, consultants began to expand on the earlier work. They began offering what was termed "business research" and introduced such business practices as budgeting, divisionalized organization, merit-based compensation schemes, and forecasting methods.

During the early postwar years (and in many cases growing out of wartime experience), consulting experienced a big rush, with the formation of such firms as Cresap, McCormick & Paget, William E. Hill, Hay

Associates, and Towers Perrin. In the 1960s, major accounting firms began to take notice of the growing market for consulting and began to offer consulting services of their own. (However, by the late 1990s charges of conflicts of interest would cause some of these firms to distance their accounting practices from their consulting activities). Also at this time, with the formation of the Cambridge Research Institute and Management Analysis Center, consulting firms began to integrate methodology of the bigger firms and consolidate practices.

In the early 1980s, there were an estimated 18,000 management consultants; about 30 to 40 percent were employed in the large, institutionally organized firms. For the next decade, the industry experienced phenomenal growth, finally plateauing with the U.S. stock market bust of 2000 and the bursting of the dot-com bubble. Worldwide, the consulting industry also declined at that time, as many of the developed countries were suffering from a global economic downturn.

The industry bounced back in 2005, and again experienced significant growth. Plunkett Research estimates that consulting services—management, scientific, and technical—generated about $160.3 billion in revenues in the U.S. during 2007, a 3 percent increase over 2006. According to Kennedy Information, the global consulting market reached about $310 billion in 2007. Outside the United States the consulting industry has experienced a similar growth pattern.

The year 2008 posed a new challenge to American and global consultants, when the economic crisis ushered in another downturn. However, analysts advised those in the industry not to be alarmed, predicting a promising outlook for management consulting through 2010.

CONSULTING AREAS AND CATEGORIES

The consulting industry has four basic areas. Management consulting consists of looking at a company's organization to assess its ability to achieve its goals. Strategic consulting focuses on the direction and goals of a company as they relate to their specific industry. Information technology (IT) consulting brings technology advice to a company to improve its effectiveness and efficiency. Industry specific consulting brings expertise to highly specialized businesses.

E.H. Schein has divided the role of the management consultant into three categories. These roles are classified as purchase of expertise, doctor-patient, and process consultation. The purchase of expertise role is considered a "hands-off" approach in which the consultant brings his/her own views or opinions into the situation. The doctor-patient role is a more personal relationship between the client and consultant in which the consultant analyzes

and assesses the threats to the company. In the process-consultation method, the consultant plays more of a facilitator role. The client provides the information necessary while the consultant defines the problems and creates the possible solutions. The client makes the final decision on how to resolve the problem.

D.B. Nees and L.E. Greiner have also divided the interaction between consultants and clients into five similar categories. The "mental adventurer" assesses long-term scenarios by using economic models and personal experience. The "strategic navigator" makes decisions based on quantitative data of the industry and makes choices without input from the client. The "management physician" makes decisions based on knowledge of the organization as opposed to the industry as a whole. The "system architect" directs the client by redefining and improving the routines and processes of the organization. Lastly, the "friendly copilot" acts as a counselor to senior management and does not offer any new ideas or knowledge to the client. The mental adventurer role correlates to Schein's expert model; the strategic navigator, management physician, and system architect to Schein's doctor-patient model; and the friendly co-pilot to Schein's process-consultation model.

Over the years, the relationship between the client and consultant has evolved into an intimate partnership. A.N. Turner has developed several task categories to describe management consulting approaches. These categories include supplying information to the client; figuring out clients' problems; making a diagnosis of problems; producing proposals based on the diagnosis; aiding with the implementation of recommended actions; providing client learning; and perpetually improving organizational effectiveness. The first categories represent traditional roles of consultants, while the last represent newer, evolving tasks. Although the relationship is becoming more sophisticated and complex, it still has a long way to go. An executive is still more likely to be influenced by his or her own instincts—followed by the advice of the planning staff, board of directors, and investment bankers—before he or she is persuaded by management consultants.

Often, companies seek management consultants for specific areas of their businesses. Analysts predict that the following areas will seek increased consultant services through the year 2013:

1. **Infrastructure:** Services will be requested in physical asset management, capital spending optimization, project management, and commissioning services.

2. **Learning and development:** Consultancies with a proven track record in training and employee development will thrive, including areas such as Internet

training technologies and remote consulting techniques.

3. **Communication:** Companies will seek help with writing, including technical writing, blogging, and copywriting; speaking in front of groups, communicating ideas to a team; and public relations.

4. **SaaS (Software as a Service):** Enterprises seek assistance with business processes, delivery of niche programs, or integrating business processes that accompany IT advances.

5. **Recruitment:** Consultants with innovative recruiting methods and the ability to deliver hard-to-find skills for openings will continue to be in demand.

The existence and phenomenal growth rate of the management consulting industry cannot be easily explained. However, Marvin Bower of McKinsey & Company, a large consulting firm, offers six reasons why companies should hire consultants. First, consultants offer extensive knowledge and access to resources not available internally. Consultants also contribute broad experience in the field. Next, consultants possess the time to research and analyze the problem. Consultants are also professionals. They are also independent of their clients and are able to make objective decisions the client might not be able to make. Lastly, consultants have the ability to implement the recommendations they provide to their clients. In large organizations, many of the problems encountered should be able to be handled internally because they have dealt with them in the past. In this case, time would be the deciding factor on whether the problems were handled internally or outsourced to management consultants.

Depending on the respective firms, consultants most often have certain requirements for targeting potential clients. The level of engagement or difficulty is one factor to be considered. Some firms such as Gemini Consulting, another major player, are looking for "multidimensional engagements that address bottom-line business issues." These companies would rather deal with "high-end engagements" as opposed to routine supply chain work. The length of time involved is another factor to be considered. Some firms like to work with long-term engagements, where strategy can be developed and implemented over time. Other firms are content with taking on short-term discrete jobs. Larger firms tend to focus their attention on larger companies, and companies like McKinsey & Company tend to focus on engagements that "excite" their consultants. They enjoy making transformations and radical changes not only to the companies themselves, but to the industry as a whole.

Management consultants are becoming increasingly discriminating about the clients they accept in order to protect their reputations and ensure the success of the engagements. Some consultants base their evaluations on whether the proposed project will have a profound impact on the company. Some will only accept a client if they believe the project will be successful, while others look for clients that share their core values. It is not uncommon for prospective clients to ask for a proposal over the telephone. A work session is usually conducted to gather information and address problems. If the prospect states it does not have the time for a work session, the case is usually not taken. Consultants clearly avoid prospective clients who have already decided what they want to do before soliciting the consultant. It is estimated that up to 70 percent of clients begin the consulting process by asking the wrong questions. It is the consultant's responsibility to get the client's priorities in line and have the management focus on problems facing the company. This may explain the current rise in "relationship consulting," whereby a consultant works with a company for several years to see strategies implemented and changed as new challenges are faced by the company.

Meanwhile, many types of consulting and accounting projects are being offshored. Initially North American firms did this as a cost advantage. Offshoring, however, has become necessary as multinational companies continue to open offices, factories, and research facilities in other nations.

Information Technology (IT) is one of the fastest-growing segments of consulting; it includes consultants focused on e-commerce; telecommunications; intranet and Internet strategies and functionality; hardware systems design and implementation; software design, acquisition and implementation; and Web site design and operations. Successful consultancies that started with an IT focus have evolved into full-service companies. In many cases, they are integral departments within larger technology-based companies. The IBM Global Services unit is a good example.

BIBLIOGRAPHY

Biswas, Sugata, and Daryl Twitchell. *Management Consulting: A Complete Guide to the Industry.* New York: John Wiley & Sons, 2002.

Canback, Staffan. "The Logic of Management Consulting." *Journal of Management Consulting* November 1998, 3–11.

Fletcher, Winston. "The Grass Really Isn't Greener for the Consultants." *Marketing* 26 November 1998, 7–8.

Mather, Darryl. "Trends and Consulting Growth Areas." *Consulting Pulse* 2 Dec 2007. Available from: http://www.consultingpulse.com/2007/12/trends-consulting-growth-areas.html.

Plunkett, Jack W. *Plunkett's Consulting Industry Almanac.* Houston: Plunkett Research, Ltd., 2003.

Plunkett Research, Ltd. Available from: http://www.plunkettresearch.com/Industries/Consulting/ConsultingTrends/tabid/178/Default.aspx.

CONSUMER BEHAVIOR

A consumer is the ultimate user of a product or service. The overall consumer market consists of all buyers of goods and services for personal or family use, more than 300 million people (including children) spending trillions of dollars in the United States as of the early twenty-first century.

Consumer behavior essentially refers to how and why people make the purchase decisions they do. Marketers strive to understand this behavior so they can better formulate appropriate marketing stimuli that will result in increased sales and brand loyalty. There are a vast number of goods available for purchase, but consumers tend to attribute this volume to the industrial world's massive production capacity. Rather, the giant known as the marketing profession is responsible for the variety of goods on the market. The science of evaluating and influencing consumer behavior is foremost in determining which marketing efforts will be used and when.

To understand consumer behavior, experts examine purchase decision processes, especially any particular triggers that compel consumers to buy a certain product. For example, one study revealed that the average shopper took less than 21 minutes to purchase groceries and covered only 23 percent of the store, giving marketers a very limited amount of time to influence consumers. And 59 percent of all supermarket purchases were unplanned. Marketers spend a great deal of time and money discovering what compels consumers to make such on-the-spot purchases. Market researchers obtain some of the best information through in-store research, and will often launch new products only in select small venues where they expect a reasonable test of the product's success can be executed. In this manner, they can determine whether a product's success is likely before investing excessive company resources to introduce that product nationally or even internationally.

CONSUMER NEEDS

Consumers adjust purchasing behavior based on their individual needs and interpersonal factors. To understand these influences, researchers try to ascertain what happens inside consumers' minds and to identify physical and social exterior influences on purchase decisions.

On some levels, consumer choice can appear to be quite random. However, each decision that is made has some meaning behind it, even if that choice does not always appear to be rational. Purchase decisions depend on personal emotions, social situations, goals, and values.

People buy to satisfy all types of needs, not just for utilitarian purposes. These needs, as identified by Abraham Maslow in the early 1940s, may be physical or biological, for safety and security, for love and affiliation, to obtain prestige and esteem, or for self-fulfillment. For example, connecting products with love or belonging has been a success for several wildly popular campaigns such as "Reach Out and Touch Someone," "Fly the Friendly Skies," and "Gentlemen Prefer Hanes." This type of focus might link products either to the attainment of love and belonging, or by linking those products with people similar to those with whom people would like to associate.

Prestige is another intangible need, and those concerned with status will pay for it. However, goods appealing to this type of need must be viewed as high-profile products that others will see in use. One benefit of targeting this type of market is that the demand curve for luxury products is typically the reverse of the standard; high-status products sell better with higher prices.

Some equate the type of need to be met with certain classes of goods. For instance, a need for achievement might drive people to perform difficult tasks, to exercise skills and talents, and to invest in products such as tools, do-it-yourself materials, and self-improvement programs, among others. The need to nurture or for nurturing leads consumers to buy products associated with things such as parenthood, cooking, pets, houseplants, and charitable service appeals.

Personality traits and characteristics are also important to establish how consumers meet their needs. Pragmatists will buy what is practical or useful, and they make purchases based more on quality and durability than on physical beauty. The aesthetically inclined consumer, on the other hand, is drawn to objects that project symmetry, harmony, and beauty. Intellectuals are more interested in obtaining knowledge and truth and tend to be more critical. They also like to compare and contrast similar products before making the decision to buy. Politically motivated people seek out products and services that will give them an "edge," enhancing power and social position. And people who are more social can best be motivated by appealing to their fondness for humanity with advertising that suggests empathy, kindness, and nurturing behavior. One successful way an insurance company targeted this market was through its "You're in good hands with Allstate" campaign.

Consumers also vary in how they determine whose needs they want to satisfy when purchasing products and services. Are they more concerned with meeting their own needs and buying what they want to, for their own happiness? Or do they rely on the opinions of others to determine what products and services they should be using? This determines, for example, whether or not they will make a purchase just because it's the newest, most popular item available or because it is truly what they need and/or want.

This also influences the way marketers will advertise products. For example, a wine distributor trying to appeal to people looking to satisfy their personal taste will emphasize its superior vintage and fine bouquet; that same distributor, marketing to those who want to please others, will emphasize how sharing the wine can improve gatherings with friends and family.

Cultural and social values also play large roles in determining what products will be successful in a given market. If great value is placed on characteristics such as activity, hard work, and materialism, then companies who suggest their products represent those values are more likely to be successful. Social values are equally important. If a manufacturer suggests their product will make the consumer appear more romantic or competitive in a place where those values are highly regarded, it is more likely consumers will respond.

PURCHASE PATTERNS

While all of this information might be helpful to marketers, it is equally important to understand what compels the consumer to actually make a purchase, as opposed to just generating interest. For example, some consumers respond based on how they are feeling, while some are focused on making the wisest economic decision. Knowing the different elements that stimulate consumer purchase activity can help marketers design appropriate sales techniques and responses.

A 1999 study conducted by Susan Powell Mantel focused on analyzing the roles of "attribute-based processing" and "attitude-based processing" when analyzing consumer preference. According to the study, product attributes (qualities such as price, size, nutritional value, durability, etc.) are often compared disproportionately, i.e., one is the more focal subject of comparison, thus eliciting more consideration when the consumer decides which brand is the "best." The order of brand presentation in these cases is particularly important.

Adding to the complexity of the issue is the fact that purchase decisions are not always made on the basis of an "attribute-by-attribute" comparison (attribute-based processing). Consumers also make decisions based on an overall evaluation of their impressions, intuition, and knowledge based on past experience, or attitude-based processing. Learned attitudes also influence these decisions. For example, parents who drank Kool-Aid as children often buy it for their kids, either because they associate it with fond memories or just because of brand familiarity or loyalty.

There is time and effort associated with each of these strategies, though attribute-based processing requires significantly more effort on the consumer's part. To dedicate the time required for an attribute-by-attribute comparison, consumers need the combination of motivation and the time or opportunity to use such a strategy.

Other contributing factors were discussed in Mantel's study, such as personality differences and each individual's "need for cognition." Need for cognition reflects to what extent individuals "engage in and enjoy thinking." People with a high need for cognition tend to evaluate more and make more optimal in-store purchase decisions. This is in part because they do not react to displays and in-store promotions unless significant price reductions are offered. Low-need cognition people react easily when a product is put on promotion regardless of the discount offered.

Consumers are also affected by their perceived roles, which are acquired through social processes. These roles create individuals' needs for things that will enable them to perform those roles, improve their performance in those roles, facilitate reaching their goals, or symbolize a role/relationship, much in the way a woman's engagement ring symbolizes her taking on the role of a wife.

Other factors that influence purchase decisions include the importance attributed to the decision. People are not likely to take as much time doing brand comparisons of mouthwash as they are a new car. The importance of the purchase, as well as the risk involved, adds to how much time and effort will be spent evaluating the merits of each product or service under consideration. In cases of importance such as the purchase of a car or home appliance, consumers are more likely to use rational, attribute-based comparisons, in order to make the most informed decision possible.

In some cases, consumers make very little effort to evaluate product choices. "Habitual evaluation" refers to a state in which the consumer disregards marketing materials placed in a store, whether because of brand loyalty, lack of time, or some other reason. Indeed, evaluating all relevant marketing information can become time consuming if it is done every time a person shops.

On the opposite side of the coin, "extensive evaluation" is the state in which consumers consider the prices and promotions of all brands before making a choice. There are also in-between states of evaluation, depending again on the importance of the purchase and the time available to make a decision. Some consumers, usually those who earn higher incomes, value their time more than the cost savings they would incur. Decisions on whether to compare various products at any given time may be a factor of the anticipated economic returns, search costs or time constraints, and individual household purchasing patterns.

When it comes time to actually make purchases, however, one person in the family often acts as an "information filter" for the family, depending on what type of purchase is being made and that person's expertise and

interest. The information filter passes along information he or she considers most relevant when making a purchase decision, filtering out what is considered unimportant and regulating the flow of information. For example, men are more often the family members who evaluate which tools to purchase, while children pass along what they consider to be seminal information about toys. At times, family members may take on additional roles such as an "influencer," contributing to the overall evaluation of goods being considered for purchase. Or one person may act as the "decider," or the final decision-maker. Ultimately, purchase decisions are not made until consumers feel they know enough about the product, they feel good about what they're buying, and they want it enough to act on the decision.

INTERPRETING CONSUMER BEHAVIOR

When market researchers begin evaluating the behavior of consumers, it is a mistake to rely on conventional wisdom, especially when it is possible to study the actual activity in which consumers are engaged when using a product or service. Where are they when they buy certain items? When do they use it? Who is with them when they make the purchase? Why do they buy under certain circumstances and not others? Researchers need to determine the major needs being satisfied by that good or service in order to effectively sell it.

There are two principal ways to evaluate the motivation behind consumer purchases. These are by direction (what they want) and intensity (how much they want it). Direction refers to what the customer wants from a product. For example, customers selecting a pain reliever may like the idea that one pain reliever is cheaper than another, but what they really want is fast pain relief, and will probably pay more if they think the more expensive brand can do that more effectively. Marketers need to understand the principal motivation behind each type of product to correctly target potential customers.

The other way to evaluate consumer behavior, intensity, refers to whether a customer's interest in a product is compelling enough that she will go out and make the purchase. Good marketing can create that kind of intensity. A successful example of such a campaign was Burger King's "Aren't You Hungry?" campaign, which aired on late-night television and was compelling enough for people to leave their homes late at night to go out and buy hamburgers. Understanding consumer motivation is the best way to learn how to increase buyer incentive, as well as a better alternative to the easy incentive—decreasing the price.

While it is easy to speculate on all these elements of consumer motivation, it is much harder to actively research motivating factors for any given product. It is rare that a consumer's reasons for buying a product or service can be accurately determined through direct questioning. Researchers have had to develop other ways to get real responses. These include asking consumers "How do you think a friend of yours would react to this marketing material?" While consumers do not like to admit that marketing affects them at all, they are often willing to speculate on how it would affect someone else. And most often they answer with what would be their own responses.

Another tactic that has proven successful is to ask consumers "What kind of person would use this type of product?" By asking this question, market researchers can determine what the consumer believes buying the product would say about them, as well as whether or not they would want to be seen as that type of person.

INFLUENCING CONSUMER BEHAVIOR

One of the best ways to influence consumer behavior is to give buyers an acceptable motive. This is somewhat related to the idea of asking what type of person would buy a certain product in evaluating consumer behavior. Consumers want to feel they're doing something good, being a good person, eating healthy, making contacts, keeping up appearances, or that they just deserve to be spoiled a little bit. If marketers can convince consumers that they need a product or service for some "legitimate" reason, customers will be more likely to make a purchase.

In addition, sensory stimuli are important to marketing. When food packages are appealing or associated with other positive qualities, people often find that they "taste" better. For example, people often "taste" with their eyes, discerning differences in products where they do not see any difference during a blind taste test. One of the best examples of this was a test of loyal Coca-Cola customers who were totally unwilling to concede that any other soda was its equal. While able to see what they were drinking, they maintained this position. But during blind testing, some were unable to tell the difference between Coke and root beer.

Finally, another alternative for influencing customer behavior is by offering specialized goods. Marketers have exploited the trend toward specialized products by creating the illusion that a product is available in limited supply in order to stimulate demand. On a Harvard Business Online blog, professor John Quelch discusses how publicity for the iPhone and the seventh Harry Potter book both gave customers the impression that supplies were scarce to encourage people to buy sooner, when in fact the marketers had gauged demand fairly accurately.

PREFERENCES CHANGE

While commonality was once popular, more and more people are seeking diversity in taste, personal preferences, and lifestyle. In 2004 Chris Anderson coined the term "The Long Tail" to refer to the consumer demographic that contributes to the success of niche businesses, such as Amazon, which sell small volumes of hard-to-find items to a wide customer base, rather than large volumes of a small number of popular items.

In fact, marketers are quite successful at targeting "rebels" and the "counterculture," as it is referred to in *Commodify Your Dissent*. As Thomas Frank writes, "Consumerism is no longer about 'conformity' but about difference. It counsels not rigid adherence to the taste of the herd but vigilant and constantly updated individualism. We consume not to fit in, but to prove, on the surface at least, that we are rock 'n' roll rebels, each one of us as rule-breaking and hierarchy-defying as our heroes of the 60s, who now pitch cars, shoes, and beer. This imperative of endless difference is today the genius at the heart of American capitalism, an eternal fleeing from 'sameness' that satiates our thirst for the New with such achievements of civilization as the infinite brands of identical cola, the myriad colors and irrepressible variety of the cigarette rack at 7-Eleven."

BIBLIOGRAPHY

Anderson, Chris. *The Long Tail: Why the Future of Business is Selling Less of More.* New York: Hyperion, 2006.

Cone Inc. "2007 Cone Cause Evolution Survey." Boston: Cone, Inc., 2007. Available from: http://www.coneinc.com/files/2007ConeSurveyReport.pdf.

Environmental Leader. "Green Awareness Remains High, Green Purchases Up." Clarkston, Michigan: Intellitrends Market Research, 2007. Available from: http://www.environmental leader.com/2007/12/04/green-awareness-remains-high-green-purchases-up/

Frank, Thomas. "Why Johnny Can't Dissent." In *Commodify Your Dissent: Salvos from the Baffler.* Thomas Frank and Matt Weiland, eds. New York: W.W. Norton & Co., 1997.

Hawkins, Delbert, Roger Best, and Kenneth Coney. *Consumer Behavior: Building Marketing Strategy.* 9th ed. New York: McGraw-Hill/Irwin, 2003.

Lack, Jennifer. "Meet You in Aisle Three." *American Demographics* April 1999.

Mantel, Susan Powell, and Frank R. Kardes. "The Role of Direction of Comparison, Attribute-Based Processing, and Attitude-Based Processing in Consumer Preference." *Journal of Consumer Research* March 1999.

Murthi, B.P.S., and Kannan Srinivasan. "Consumers' Extent of Evaluation in Brand Choice." *Journal of Business* April 1999.

Quelch, John. Marketing Know: How Cambridge: Harvard Business School: Working Knowledge, 2007. Available from: http://hbswk.hbs.edu/item/5776.html.

Solomon, Michael R. *Consumer Behavior.* New York: Prentice Hall 6th Edition, September 2003.

CONTENT MANAGEMENT SYSTEM

A content management system (CMS) is a program used to provide a structure for material featured on a Web site or enterprise portal. A CMS is data-driven, meaning that it uses a database and templates to create and manage pages. The CMS allows the designers to define both the graphical user interface and the functionality of the site.

There are hundreds of content management systems available. Some are based on open-source software, or software with code that is publicly available. Others are proprietary, meaning that they use code that is not public. Prices for a CMS can range from free (for some open-source systems) to hundreds of thousands of dollars.

BENEFITS OF USING A CONTENT MANAGEMENT SYSTEM

There are many reasons businesses choose a CMS to run their organization's Web site.

- **Efficiency.** A CMS makes updating a site faster and easier. Due to the data-driven nature of the CMS, content creators and site designers will not have to touch every page when making an update. Instead, the site's designers and editors can make a single change that can then be pushed out sitewide. This saves time and money.

- **Process.** A CMS also offers a process for publication. This drastically reduces the chance that something unintended will be published. Usually, a CMS has permissions set so that only authorized individuals can publish content. A CMS also generally provides documentation of what was published, by whom, and when.

- **Definition of roles.** Many content management systems allow for an improved workflow, which in turn makes staffing more efficient. Each person is able to focus on his or her area of expertise. For example, an editor can focus on creating content, while a Web designer can create a global look and feel that will easily be applied. Each of these specialists can work separately within the CMS to maintain a professional Web site.

TRENDS IN CONTENT MANAGEMENT SYSTEMS

There is a dramatic trend toward consolidation of CMS vendors, especially among enterprise content management systems providers. Large software companies—including Oracle and IBM—have acquired multiple smaller vendors at a rapid pace over the last decade. The overall goal of

these acquisitions has been to assemble and provide CMS customers with a comprehensive package of services.

Partially as a result of this consolidation, companies often can find a solution that addresses all aspects of content within the company, including such items as internal document management, Web content, and security and business-process management. Buyers should take into account the most important features for their organization and ensure that any system they choose will seamlessly integrate with their existing technology processes.

In summary, a CMS can provide important data-management services for almost any organization. Choosing a CMS can be one of the most challenging decisions made by an organization but one that will typically reap rewards in terms of efficiency and productivity. It is important to understand the overall content management vision and, especially, the issues most important to overcome when selecting a CMS.

BIBLIOGRAPHY

CMS Watch. http://www.cmswatch.com/

Heck, Michael. "InfoWorld Test Center Guide: Content Management Systems." *Infoworld*. Available from:<http://www.infoworld.com/article/08/02/29/09TC-tcguide-cms_1.html<

Johns Hopkins Institutions Content Management System. Johns Hopkins Institutions. http://jhmcis.jhmi.edu/standards/webguidelines/CMS.cfm

OSCOM: Open Source Content Management. Available from: http://www.oscom.org

Robertson, James. "Top Ten Mistakes When Selecting a CMS." *OpenSourceCMS*, May 2008. Available from:<http://www.opensourcecms.com>

CONTINGENCY APPROACH TO MANAGEMENT

The contingency approach to management is based on the idea that there is no single best way to manage. Contingency refers to the immediate contingent circumstances. Effective organizations must tailor their planning, organizing, leading, and controlling to their particular circumstances. In other words, managers should identify the conditions of a task, the requirements of the management job, and people involved as parts of a complete management situation. The leaders must then work to integrate all these facets into a solution that is most appropriate for a specific circumstance.

The contingency approach to management assumes that there is no universal answer to many questions because organizations, people, and situations vary and change over time. Often there is no one right answer when managers ask: "What is the right thing to do? Should we have a mechanistic or an organic structure? A functional or divisional structure? Wide or narrow spans of management? Tall or flat organizational structures? Simple or complex control and coordination mechanisms? Should we be centralized or decentralized? Should we use task or people oriented leadership styles? What motivational approaches and incentive programs should we use?" Thus, the answer depends on a complex variety of critical environmental and internal contingencies.

The contingency theory is similar to situation theory in that there is an assumption that no simple way is always right. Situation theory, however, focuses more on the behaviors that the leader should use. The contingency theory takes a broader view that includes contingent factors about leader capability and also includes other variables within the situation.

Factors that influence the contingency theory are numerous. These include the following:

- The size of the organization
- How the firm adapts itself to its environment
- Differences among resources and operations activities
- Assumption of managers about employees
- Strategies
- Technologies being used

HISTORICAL OVERVIEW

Classical management theorists such as Henri Fayol and Frederick Taylor identified and emphasized management principles that they believed would make companies more successful. However, the classicists came under fire in the 1950s and 1960s from management thinkers who believed that their approach was inflexible and did not consider environmental contingencies. Taylor, however, emphasized the importance of choosing the general type of management best suited to a particular case. Fayol also found that there is nothing rigid or absolute in management affairs. So while the criticisms were largely invalid, they created the contingency school of management.

It is relevant to note here that similar ideas were expressed three decades earlier. In the 1920s, Mary Parker Follett related individual experience to general principles. Her concept of the "law of the situation" referred to the necessity of acting in accordance with the specific requirements of a given situation. She noted that requirements were constantly changing and continuous efforts were needed to maintain effective working relationships.

Nonetheless, research in the 1960s and 1970s focused on situational factors that affected the appropriate structure of organizations and the appropriate leadership styles for different situations. Although the contingency

perspective purports to apply to all aspects of management, and not just organizing and leading, there has been little development of contingency approaches outside organization theory and leadership theory. The following sections provide brief overviews of the contingency perspective as relevant to organization theory and leadership.

CONTINGENCY PERSPECTIVE AND ORGANIZATION THEORY

Environmental change and uncertainty, work technology, and the size of a company are all identified as environmental factors impacting the effectiveness of different organizational forms. According to the contingency perspective, stable environments suggest mechanistic structures that emphasize centralization, formalization, standardization, and specialization to achieve efficiency and consistency. Certainty and predictability permit the use of policies, rules, and procedures to guide decision making for routine tasks and problems. On the other hand, unstable environments suggest organic structures that emphasize decentralization to achieve flexibility and adaptability. Uncertainty and unpredictability require general problem solving methods for nonroutine tasks and problems.

Paul Lawrence and Jay Lorsch suggest that organizations have developed separate departments to confront differing environmental segments. Organizational units operating in differing environments develop different internal unit characteristics. The researchers say that as internal difference become greater, additional coordination between units is needed.

Joan Woodward found that financially successful manufacturing organizations with different types of work technologies (such as unit or small batch; large-batch or mass-production; or continuous-process) differed in the number of management levels, span of management, and the degree of worker specialization. She linked differences in organization to firm performance and suggested that certain organizational forms were appropriate for certain types of work technologies.

For some time, there also existed a business myth that blue collar workers should be able to do their jobs without thinking, thus taking away the need for contingency management when dealing with assembly line employees. However, theorists quickly recognized that there are many very participative initiatives in manufacturing plants throughout the world. For example, in Japan, manufacturing companies have had great success engaging workers in shop-floor decision making, which has resulted in large positive productivity and quality results.

Organizational size is another contingency variable thought to impact the effectiveness of different organizational forms. Small organizations can behave informally while larger organizations tend to become more formalized. The owner of a small organization may directly control most things, but large organizations require more complex and indirect control mechanisms. Large organizations can have more specialized staff, units, and jobs. Hence, a divisional structure is not appropriate for a small organization but may be for a large organization.

In addition to the contingencies identified above, customer diversity and the globalization of business may require product or service diversity, employee diversity, and even the creation of special units or divisions. Organizations operating within the United States may have to adapt to variations in local, state, and federal laws and regulations. Organizations operating internationally may have to adapt their organizational structures, managerial practices, and products or services to differing cultural values, expectations, and preferences.

The availability of support institutions and the availability and cost of financial resources may influence an organization's decision to produce or purchase new products. Economic conditions can affect an organization's hiring and layoff practices as well as wage, salary, and incentive structures.

Technological change can significantly affect an organization. The use of robotics affects the level and types of skills needed in employees. Modern information technology both permits and requires changes in communication and interaction patterns within and between organizations. For example, advanced information and communication technologies have changed the way businesses operate and conduct commerce. The more secure Internet and new transmission standards make it easier and cheaper for businesses to conduct inter-organizational commerce. Managers have implemented new technologies such as Electronic Data Interchange (EDI) and Web-based e-commerce to enhance communication exchanges throughout the company.

CONTINGENCY PERSPECTIVE AND LEADERSHIP

Dissatisfaction with trait-based theories of leadership effectiveness led to the development of contingency leadership theories. Fred Fiedler, in the 1960s and 1970s, was an early pioneer in this area. Various aspects of the situation have been identified as impacting the effectiveness of different leadership styles. For example, Fiedler suggests that the degree to which subordinates like or trust the leader, the degree to which the task is structured, and the formal authority possessed by the leader are key determinants of the leadership situation. Task-oriented or relationship oriented leadership should each work if they fit the characteristics of the situation. Other

contingency leadership theories were developed as well. However, empirical research has been mixed as to the validity of these theories.

SEE ALSO *Leadership Styles and Bases of Power; Management Styles; Organizational Structure*

BIBLIOGRAPHY

Burns, Tom, and G.M. Stalker. *The Management of Innovation.* London: Tavistock, 1961.

"Contingency Approach to Management." *Bizcovering* 20 Mar 2007. Available from: http://www.bizcovering.com/Business-and-Society/Contingency-Approach-to-Management.27102.

Contingency Theory. Available from: http://faculty.babson.edu/krollag/org_site/encyclop/contingency.html.

"Contingency Theory." *12 Manage: The Executive Fast Track.* Available from: http://www.12manage.com/methods_contingency_theory.html.

Fiedler, Fred E. *A Theory of Leadership Effectiveness.* New York: McGraw-Hill, 1967.

Gresov, Christopher, and Robert Drazin. "Equifinality: Functional Equivalence in Organizational Design." *Academy of Management Review* April 1997.

Khazanchi, Deepak. "Information Technology (IT) Appropriateness: The Contingency Theory of Fit and Its Implementation in Small and Medium Enterprises." *Journal of Computer Information Systems* April 2005. Available from: http://www.iacis.org/jcis/index.htm.

Lawrence, Paul R., and Jay Lorsch. *Organizations and Environment: Managing Differentiation and Integration.* Homewood: Irwin, 1967.

Winfrey, Frank L., and James L. Budd. "Reframing Strategic Risk." *SAM Advanced Management Journal* Autumn 1997.

Woodward, Joan. *Industrial Organization: Theory and Practice.* London: Oxford University Press, 1965.

Wren, Daniel A. *The Evolution of Management Thought.* 4th ed. New York: Wiley & Sons, 1994.

CONTINUING EDUCATION AND LIFELONG LEARNING TRENDS

"Continuing education," "professional development," and "lifelong learning" are all terms used to describe an educational or training process that is a key component for successful organizations. The term *continuing education* often elicits several definitions, however one of the most comprehensive and applicable is Liveright and Haygood's 1969 version, "a process whereby persons who no longer attend school on a regular full-time basis . . . undertake sequential and organized activities with the conscious intention of bringing about changes in information, knowledge undertaking, skill appreciation and attitudes or for the purpose of identifying or solving personal or community problems."

Continuing education and the adult education movement began with the twentieth century. As the world moved to an industrialized economy, the need for continued education and improved access for adults challenged traditional educational venues and created opportunities for both professional and personal skill enhancement and enrichment. Several environmental factors are driving the demand for lifelong learning in the twenty-first century: abundant access to information, rapid technology changes, increased global interactions, industry shifts, as well as increasing entry-level-credentials and skill requirements.

Employers depend on continuing education as a tool for ensuring a highly skilled and knowledgeable workforce. Individuals use continuing education for upward career mobility, job enhancement, and personal enrichment.

The continuing education activity can take place at virtually any time or any place. The format for the continuing education learning should be driven by the content and learning goals. Internet and satellite technology allow employees to engage in educational coursework on the job or at home, which results in a tremendous savings of travel costs and time. Continuing education courses are offered for academic or university level credit, and as non-credit courses. Universities, community colleges, k-12 school districts, private consultants and corporations all participate in offering continuing education content and courses.

CONTINUING EDUCATION UNITS AND ACADEMIC CREDIT

Many industry boards, accreditation agencies, and associations have established mandatory continuing professional education (CPE) requirements for licensure or certification. For example, the American Institute of Certified Public Accountants (AICPA) has established mandatory continuing professional education (CPE) for all members. Most state boards of accountancy have also phased in mandatory CPE as prerequisites for licensure of accounting and auditing practice units. Research has supported this trend. In a 1998 empirical study of the Texas State Board of Public Accountancy, Thomas, Davis, and Seaman found evidence of an association between results of an employee's quality review and levels of continuing professional education in the profession. Other organizations have established a certification process for their respective field such as the Society for Human Resource Management (SHRM), which has partnered with educational institutions to deliver the Professional Human Resource Management (PHRM) content and certification test nationally. Non-credit continuing education courses

often carry state-board or association continuing education units (CEU). Participants generally receive a certificate of completion and should maintain personal records of the units earned.

Post-secondary higher education also falls within the sphere of continuing education. As entry-level requirements continue to increase (such as the demand for graduate level credentials), employers and employees search for flexible degree programs. Many employers offer a tuition reimbursement program for employees enrolled in college-level degree programs when applicable to the workplace. Colleges and universities recognize the growing demand from adult learners for academic degree programs, and many offer academic courses off campus, online or at the workplace in accelerated and non-traditional formats.

CORPORATE UNIVERSITIES

The corporate university is generally some blend of higher education and organizational training and development. Corporate colleges or universities are characterized as institutions that may grant degrees, academic credit or non-credit training and are chartered by a parent company whose primary mission is not education. Some corporate universities have evolved from a mission to serve the corporation's training and development needs to a full-service private higher education institution. Northrop University began in 1942 as a training division of Northrop Aircraft and evolved to an institution offering undergraduate and postgraduate degrees. Kettering Institution (an independent university) grew out of General Motors. Many corporations identify a university or college partner to customize training and academic degree programs specifically to the corporation's business practices. Corporations are using these customized programs as a source for developing future corporate leaders and a means to focus on content areas that are critical to the company's strategic business plans. Multinational companies are developing corporate universities that allow employees around the world to participate in training and educational programs with cost-effective delivery methods. The American Council on Education (ACE) consistently evaluates corporate college or university credits that are offered independent of a regionally accredited institution. ACE establishes recommendations for transfer credit to regionally accredited universities and colleges. Most of the individuals participating in corporate college or university programs are employed full-time which requires that the educational programs are offered in flexible formats. Generally, employees do not have the luxury of attending academic programs on a full-time basis or in a traditional fifteen to eighteen week semester format. Accelerated formats as well as weekend and dis-

tance education designs address the needs of working adult learners.

Companies choose to form corporate universities for many reasons. Different colleges, such as a College of Finance or a College of Manufacturing, can teach employees necessary skills, raise the overall quality of the organization, and give the business a new focus and collective concept. Rob Paton and Geoff Peters define the unique qualities of corporate universities in their 2005 book, *Handbook of Corporate University Development*, listing three features that set such institutions apart:

First, corporate universities—described as "corporate-level initiatives in large, highly complex and differentiated settings,"—clearly separate from the regular departments of the company. Corporate universities (CUs) are usually located near a central office or corporate headquarters, and they strive to give employees skills that they would not receive at normal, local-level posts with normal training. For this reason, CU structure is planned and overseen by the lead managers in the company, and there is often a seat on the board devoted to the education system.

Second, corporate universities serve as an attempt by the organization to follow its strategy and reach its goals. A CU is established as a means to reach a level of education, skill, and ability that the organization has previously planned for in its mission statement. CUs are purpose-driven: they exist only to give the organization particular focus. What that focus is, and how the university achieves it, are decisions made by the lead managers.

Third, corporate universities raise the "standards, expectations, and impact" of the organization's training and development abilities. CUs go beyond human resources services, creating a new kind of training the company did not have previously. This allows employees to evolve and grow into leaders and managers within the organization.

Organizations looking to create a CU must consider its structure carefully. Areas such as the scope of the university, the range of learners to attend, and the nature of the university's contribution to the organizations must all be examined and defined. As Lori Freifeld advises in her 2006 article, "CU There," employees should be aware of any plans to create a corporate university ahead of time. If the employees are not comfortable with the courses and teaching methods of the new CU, then they will not participate fully in the necessary corporate development. Freifeld gives several points to consider when forming—or planning to form—a CU:

- The support of leading managers and board members should be obtained. Full analysis and business plans are required, with supporting evidence that a CU would increase a company's profitability.

- Determine what a CU would accomplish.

- Decide on specific strategies and fund allocations.

- Create a governing board capable of good administration, with representation from all necessary areas of business.

- Hold concept meetings.

- Choose a technology that is easy for employees to use.

Corporate universities have gone through several phases since their inception. Paton and Peters define three different types of CUs. The first and most original is the campus-based CU, created in the classic college structure with centralized buildings, professors, and classes that employees attend. Many of the most notable CUs belong to this classic model. The second type of CU involves CBT (computer based training), most often conducted over a company's intranet. This type of university does not need a centralized campus and can stretch across an organization's borders. The third type of CU is a management-training concept, a place or meeting where the leaders of the company gather to reform their vision and create new ideas.

There are several facets to the CU concept that make critics uneasy. Some argue that corporate universities pose a danger both to colleges and corporate stability by blurring the line between education and training. They fear that corporation-sponsored classes in universities may compromise university integrity, and that potential employees—instead of seeking higher education or trade schools—will simply bypass these options and attend corporate universities to gain the skills they need.

Notable companies who offer CU training include Bank of America, Coca-Cola Enterprises, FedEx Ground, IBM Corporation, Harley Davidson, MasterCard, Home Depot, Gap International Inc., Proctor and Gamble, and McDonald's.

DISTANCE EDUCATION

The second form of CU involves the use of intranet-based training. This is part of distance education, or the idea that classes and skill-courses can be taught by organizations online, creating a university situation through their electronic network. This has been successful for several state universities, who have well-established "e-Learning" programs that students can participate in online. This system has great potential over a company's more secure intranet system, and is an option for organizations that do not wish to invest as much in a corporate campus but still want a system to teach their employees new skills.

Distance education began with correspondence study and has grown significantly as technology advancements create new opportunities for learning and content delivery. As computer technology became prevalent in business, the print-based correspondence courses progressed to computer-based training, which included simulations and ultimately interactive course content that provided participant feedback and enhanced learning. At the end of the twentieth century, educators and employers invested in telecommunication equipment that distributed educational or training activities from one video conferencing site to another. These interactive television programs allow companies to synchronously connect employee groups regardless of their physical distance.

The online training and education market is very competitive offering many choices for organizations and learners. Colleges and universities throughout the world are offering online courses as well as thousands of training and consulting groups. Organizations either select educational programs and courses ala carte or build a portfolio of e-Learning options. Many large organizations have integrated e-Learning into their corporate university entity. These groups generally have a planned web presence that includes a portal and learning management system (LMS) or course management system (CMS).

ON-SITE AND OTHER TYPES OF CORPORATE TRAINING

There are other types of training and education services that companies give beyond corporate university courses. Many organizations offer training programs for many things, from new technology to advancement positions. Such necessary education is on-site training, meaning that employees are trained in their own offices with the technology they will be using. On-site training can include company updates, meetings to improve marketing skills, and management concepts. The advances being made in globalization and economics require much training by organizations so that their employees are able to successfully adapt to the changing world.

Rana Sinha divides the concept of corporate training into three elements in the 2008 article "Corporate Training: A Capital Idea." These three skill sets are human capital, cultural capital, and social capital. Human capital refers to the skills that employees personally develop-talents to use technology or understand processes, the most common type of training that occurs within organizations. The second element, cultural capital, refers to the interactions, morals, and understanding of the applicable nations where the employee works. Cultural capital training would impart the moral guidelines and helpful practices of the culture to the employee. Social capital refers to the connections employees have with each other and suppliers, which with training they can use more effectively.

Organizations considering new branches of training should attempt to succeed in several areas. Training should be agreed to be the best way of communicating the necessary information. The employees and teams who will be trained should be involved in the process of creating the training system. Changes should not be expected too rapidly, but instead be segmented into a certain number of levels which employees can climb. Strategies should be in place to continue helping employees learn and change with the new software or skills after the main phase of training is completed. There are many other elements to be considered when training employees, but most are company-specific and should be decided by leaders of the organization.

CONTINUING EDUCATION AND THE GLOBAL ECONOMY

The global economy has increased the need for organizations around the world to understand the culture and business practices of their peers, competitors and partners. Both foreign and domestic organizations abroad are implementing continuing education experiences in an effort to enhance cultural understanding and address skill and knowledge gaps. U.S. universities are partnering with both U.S. and foreign companies around the world to deliver educational courses and programs that are critical to organizational competitiveness. A central ministry of education in collaboration with a ministry of commerce generally drives these programs. For instance, China has placed a high priority on the field of Human Resource Development and Entrepreneurship as well as encouraging Chinese organizations to partner with foreign organizations in an effort to implement vocational and applied skill training. India has created a new industry as an outsource venue for customer service which creates customer service training opportunities in India. Korean manufacturers have a solid history of identifying corporate and educational partners that satisfy their organizational educational needs. Continuing education helps global companies to connect the workforce with the organizational vision.

THE FUTURE OF CONTINUING EDUCATION

The abundant access of information, rapid technology changes, increased global interactions, industry shifts as well as increasing entry level credentials and skill requirements ensures that continuing education will remain a valuable resource for managers in the future.

Managers will continue to depend on continuing education as a tool for ensuring a highly skilled and knowledgeable workforce. Individuals will engage in life-long learning as a means for upward career mobility, job enhancements, and enriched quality of life.

The increased interest in lifelong learning coupled with rapid technology advancements and demands on individual personal time will guarantee that educational options will continue to be flexible and fit within the constraints of personal time and organizational priorities. The growing global economy will continue to drive the development of learning activities that span geographical regions and time zones allowing individuals around the world to collaborate and learn together.

Organizations around the world will depend on continuing education to maintain competitive positions and adopt current innovations. Managers will depend on lifelong learning to produce a workforce with the knowledge and solution-based skill-set that is required for organizational growth.

BIBLIOGRAPHY

American Society of Training and Development. "Interview: Marc Rosenberg Is Positive About the Future." Available from: http://www.learningcircuits.org/2005/mar2005/rosenberg.

Bersin and Associates. "Corporate Universities: They're Baaaaaaack!" *Bersin and Associates,* Available from: http://bersin.wordpress.com/2008/05/09/corporate-universities-theyre-baaaaaaack/.

Courtenay, S. "Defining Adult and Continuing Education." In *Handbook of Adult and Continuing Education.* San Francisco: Jossey-Bass, 1990.

"Create CPF Account for Lifelong Learning." *Business Times* (Singapore), 12 November 1998, 4.

Dooley, Kim, James Lindner, and Larry Dooley. "Advanced Methods in Distance Education: Applications and Practices for Educator, Trainers and Learners." *Information Management* 18, no. 1/2 (2005): 9.

Freifeld, Lorri. "CU There." *Manage Smarter* 1 May 2008.

Helms, Marilyn, and Judy Nixon. "Developing the Virtual Classroom: A Business School Alternative." *Education & Training* 39, no.9 (1997): 349–353.

Helms, Marilyn, Linda P. Fletcher, and Judy Nixon. "Integrating Team Teaching, Technology and Distance Learning in MBA Program: A Case Study". *Industrial and Commercial Training* 27, no. 7 (1997): 218–225.

Meister, Jeanne C. "Extending the Short Shelf-Life of Knowledge." *Training and Development,* June 1998, 52–9.

Millns, Tony, and Piatt, Wendy. *Paying for Learning.* Institute for Public Policy Research, 2004.

Paton, Rob, and Geoff Peters. *Handbook of Corporate University Development: Managing Strategic Learning.* Gower Publishing, 2005.

Sinha, Rana. "Corporate Training: A Capital Idea." *Manage Smarter,* 29 April 2008. Available from: http://www.trainingmag.com/msg/search/article_display.jsp?vnu_content_id=1003795852.

Thomas, C. William, Charles E. David, and Samuel L. Seaman. "Quality Review, Continuing Professional Education,

Experience, and Substandard Performance: An Empirical Study." *Accounting Horizons* 12, no. 40 (1998): 340–362.

Walls, Michael. "Is CE Worth Continuing?" *Broker World* 25, no. 2 (2005): 46

Wilcox, John. "A Campus Tour of Corporate Colleges." *Training and Development Journal,* May 1987.

CONTINUOUS IMPROVEMENT

Continuous improvement in a management context means a never-ending effort to expose and eliminate root causes of problems. Usually, it involves many incremental or small-step improvements rather than one overwhelming innovation. From a Japanese perspective, continuous improvement is the basis for their business culture. Continuous improvement is a philosophy permeating the Japanese culture, which seeks to improve all factors related to the transformation process (converting inputs into outputs) on an ongoing basis. It involves everyone, management and labor, in finding and eliminating waste in machinery, labor, materials and production methods.

The Japanese word for continuous improvement, *kaizen,* is often used interchangeably with the term *continuous improvement.* From the Japanese character *kai,* meaning "change," and the character *zen,* meaning "good" (taken literally), it means *improvement.*

Although kaizen is a Japanese concept, many U.S. firms have adopted it with considerable success by combining the best of traditional Japanese practices with the strengths of Western business practice: in other words, by merging the benefits of teamwork with the creativity of the individual. Some refer to its implementation in the West as lean manufacturing since, when combined with the principles of just-in-time (JIT), kaizen or continuous improvement forms the foundation for the concept of lean manufacturing.

HISTORY OF CONTINUOUS IMPROVEMENT

Following the defeat of Japan in World War II, America wanted to encourage the nation to rebuild; to accomplish this, General MacArthur asked a number of leading experts from the United States to visit Japan and advise them on how to proceed with the rebuilding process. As history would have it, one of these experts was Dr. W. Edwards Deming. Deming was a statistician with experience in census work, so he came to Japan to set up a census. While in Japan, he noticed some of the difficulties being experienced by some of the newly emerging industries. Many Japanese manufacturers were faced with huge difficulties stemming from a lack of investment funds, raw materials, and components, and from the low morale of the nation and the workforce. Based on his recent experience in reducing waste in U.S. war manufacture, he began to offer his advice.

By the mid-1950s, Deming was a regular visitor to Japan. He taught Japanese businesses to concentrate their attention on processes rather than results; concentrate the efforts of everyone in the organization on continually improving imperfection at every stage of the process. By the 1970s many Japanese organizations had embraced Deming's advice and were very quickly enjoying the benefits of their actions. Most notable is the Toyota Production System, which spawned several business improvement practices utilized heavily in Japan, including JIT and Total Quality Management (TQM).

Despite the fact that much of the foundation of continuous improvement and other Japanese concepts originated in the United States, Western firms showed little interest until the late 1970s and early 1980s. By then the success of Japanese companies caused other firms to begin to reexamine their own approaches. Hence, kaizen or continuous improvement began to emerge in the United States concurrent with the increasing popularity and use of Japanese techniques such as JIT and TQM. In fact, continuous improvement is a major principle of and a goal of JIT, while it is one of the two elements of TQM (the other is customer satisfaction). In some organizations, quality circles have evolved into continuous improvement teams with considerably more authority and empowerment than is typically given to quality circles. In fact, management consultants in the West have tended to use the term *kaizen* to embrace a wide range of management practices primarily regarded as Japanese, practices responsible for making Japanese companies strong in the areas of continual improvement rather than innovation.

KAIZEN ATTITUDES NECESSARY FOR IMPLEMENTATION

Most Japanese people are, by nature or by training, very attentive to detail and feel obligated to make sure everything runs as smoothly as possible, whether at work or at home. This attitude enhances the functionality of kaizen. However, this is not typically the case in the West. To encourage the kaizen attitude, organizations require a major change in corporate culture; one that admits problems, encourages a collaborative attitude to solving these problems, delegates responsibility, and promotes continuous training in skills and development attitudes.

The driving force behind kaizen is dissatisfaction with the *status quo,* no matter how good the firm is perceived to be. Standing still will allow the competition to overtake and pass any complacent firm. The founder of Honda has been quoted as saying, "In a race competing for a split

second, one time length on the finish line will decide whether you are a winner or a loser. If you understand that, you cannot disregard even the smallest improvement." Although continuous improvement involves making incremental changes that may not be highly visible in the short term, they can lead to significant contributions in the long term.

Organizational performance can improve from knowledge gained through experience. Lessons learned from mistakes mean those mistakes are less likely to be repeated, while successes encourage workers to try the same thing again or continue to try new things. While this learning process occurs throughout the system it is particularly important for accomplishing the long-term improvement associated with continuous improvement. In order for continuous improvement to be successful, the organization must learn from past experience and translate this learning into improved performance.

Part of the learning process is trying new approaches, exploring new methods and testing new ideas for improving the various processes. So experimentation can be an important part of this organizational learning. Naturally, many of these worker-led experiments will fail, so it is important to recognize that there is some risk associated with this experimentation. If management is uncomfortable with risk, it may be reluctant to allow any real degree of experimentation. Obviously, management cannot risk disabling the production process itself or endanger the well-being of the workforce, but the complete absence of risk can reduce the vision of those involved in the continuous improvement process. Improvements will generally come in modest increments of progress. Therefore, management must recognize that some experiments will fail as part of the learning process, and avoid the temptation to harshly judge the perpetrator as having new but unsuccessful ideas. Some even feel that it is critical to establish an environment that reinforces the notion that risk is good. Again, this involves consistency in management's attitude toward change and the empowerment of employees.

The achievement of continuous improvement requires a long-term view and the support of top management. But it is also important that all levels of management actively support and become involved in the process. Proper support structures of training, management, resource allocation, measurement, and reward and incentive systems must be in place for successful adoption. This includes a willingness to provide financial support and to recognize achievements. It is desirable to formulate goals with the workers' help, publicize the goals, and document the accomplishments. These goals give the workers something tangible to strive for, with the recognition helping to maintain worker interest and morale.

Kaizen also requires that all employees in the organization be involved in the process. Every employee must be motivated to accept kaizen as a means by which the firm can achieve a competitive advantage in the marketplace. All involved must push continuously at the margins of their expertise, trying to be better than before in every area. Japanese companies have been very successful with the use of teams composed of workers and managers. These teams routinely work together on problem solving. Moreover, the workers are encouraged to report problems and potential problems to the teams; their input is as important as that of management. In order to establish a problem-solving orientation, workers should receive extensive training in statistical process control, quality improvement, and problem solving.

Problem solving is the driving force behind continuous improvement. Workers are trained to spot problems that interrupt, or have the potential to interrupt, the smooth flow of work through the system. When such problems do occur, it is important to resolve them quickly. Also, workers are trained to seek improvements in the areas of inventory reduction, set-up time and cost reduction, increasing output rate, and generally decreasing waste and inefficiency.

There are two particular types of kaizen that occur within practicing companies on a day-to-day basis. The first is point kaizen, which occurs on the spot, immediately, usually within a factory or office setting. An employee, often a manager, will notice a problem in the business process. The problem could be anything from a cluttered workstation to an improper sales pitch, but once the issue is pointed out, immediate action is taken. A system is developed and put into place at once, solving the problem.

The second kind of kaizen involves a more orchestrated, company-wide change, or system kaizen. System kaizen focuses on transition, moving the organization from one particular state to another. One state is where the company currently stands in regard to inventory and production, and the second state is where the company plans to be, marked within a certain time frame of weeks or months. A series of steps are planned and executed to reach the second state. System kaizen is the method developed and used by many companies, whereas point kaizen is the application of the method at problem areas.

Unfortunately, workers in a continuous improvement system have more stress than their counterparts in more traditional systems. This stress comes not only from the added authority and responsibility but also from the fast pace inherent in the system. There is little slack built into the system and a continual push to improve. For this reason, firms stressing continuous improvement have suffered severe criticism from some labor unions.

SIX SIGMA

A concept often associated with continuous improvement is the Six Sigma system. Developed by Motorola in the 1980s, Six Sigma is a method focusing on what causes defect and error in companies. Whatever the errors may be for the company—from lost clients to malfunctioning products—Six Sigma strategies are designed to eliminate them, or make errors so rare they are statistically nonentities. This involves heavy analysis and carefully created steps toward achieving excellent production, and it can take different forms in different companies. Six Sigma is often connected with kaizen activity because the two both seek perfection, continuous change, adaptability, and quality improvement throughout every level of the organization. There are many Six Sigma programs and instructional aids active today.

MANAGERIAL KAIZEN

Continuous Improvement, Six Sigma, Lean Manufacturing, and JIT inventory all have ramifications for the ways managers lead, conduct accounting, and plan for success. Bookkeeping, for instance, functions differently under leaner, more flexible styles of manufacturing. Mike Rogers, in the 2008 *CIMA Managerial Studies*, refers to backflush costing as one method of dealing with continuous improvement activities.

Backflush costing accounts the costs of production when the product is completed and error free. Instead of assigning costs in a series of steps as products are assembled, backflush costing counts the costs of the finished items, assuming that all the products sold or assembled as finished goods are, collectively, an accurate picture of the costs incurred during manufacturing. This assumption is usually safe to make in lean manufacturing scenarios, where Six Sigma techniques reduce errors and continuous improvement assures production will be steady. Backflush costing, however, does not work as well in manufacturing systems that have not developed on-the-spot improvement techniques. However, in many TQM systems there is little to no supply of raw materials, works in progress, or finished good inventory to take account of, so backflush costing is able to work very well.

KAIZEN EXAMPLES

There are many case studies available for inspection on kaizen methods, showing how continuous improvement has made a marked difference in companies and the way they produce, serve their customers, and operate their organization.

DPA, or Daniel Penn Associates, a management consulting firm specializing in creating continuous improvement processes (CIPs) for organizations, gives a case study involving a mutual fund company that con-

tracted the firm to create a continuous improvement plan for their 1,500 employee business across five divisions. The plan focused on several key areas, including:

- The creation of a framework to help customer services achieve new quality and cost effectiveness.

- The streamlining of processes designed to move the company toward a paperless method of conducting business, involving the use of new technologies.

- The creation and maintenance of a number of immediate quality changes to enhance the overall profits and abilities of the company.

After thirteen months of work with more than 400 separate quality projects, the mutual fund company found they had, through the help of DPA and their new CIP system:

- Created a 30 percent to 50 percent increase in productivity

- Enhanced customer service

- Consolidated organizational units that reduced cost

- Reduced paperwork costs by moving their company to a paperless service system

Some of the greatest examples of kaizen can be found in European companies, which have begun embracing the continuous improvement concept. This can be seen in the 2008 kaizen example for the International Leading Practices Symposium, the Aberdeenshire Council of Aberdeenshire, Scotland, which won the European Improvement Award of 2006 through continuous improvement methods.

Aberdeenshire, an ocean-bordering county in Scotland, decided to increase the quality of public service to its people through two kaizen projects. These projects involved focusing on key components of the kaizen process, such as removing waste, encouraging flexibility, directing efforts at the customer, and daring to be different. Taking the customer as the people of Aberdeenshire, the Aberdeenshire Council hired outside kaizen consultants and began developing specific kaizen roles for their continuous improvement projects, including supporting managers, project leaders, and kaizen specialists. The organization of the public servants into kaizen teams produced an almost immediate difference, as once unwilling employees became eager to implement long-desired changes.

Soon, the Aberdeenshire kaizen service directors were submitting "kaizen blitz" plans, all to be executed within six months. The organizational structure between the Aberdeenshire IT department and the other services had to be reworked to create enough efficiency to meet deadlines. After massive amounts of training, instructional DVDs, and learning the kaizen process from scratch, the Aberdeenshire Council began to reap the benefits of their

efforts, winning first an award from the Scottish Local Authority and then the prestigious European Excellence Award. Their kaizen teams were renamed and made permanent.

SEE ALSO *Japanese Management; Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management; Quality Gurus; Statistical Process Control and Six Sigma*

BIBLIOGRAPHY

Aberdeenshire Council. *Kaizen a Model for Continuous Improvement.* International Leading Practices Symposium, 2008.

Cane, Sheila. *Kaizen Strategies for Winning Through People.* London: Pitman Publishing, 1996.

"A Change of Pace: Refreshing Continuous Improvement and Developing Leaders at Pace." *Training Journal* (December 2004): 50–52.

de Jager, B., et al. "Enabling Continuous Improvement: A Case Study of Implementation." *Journal of Manufacturing Technology Management,* 15, no. 4 (2004): 315–324.

Dessinger, J., and J.L. Moseley. *Confirmative Evaluation: Practical Strategies for Valuing Continuous Improvement.* San Francisco, CA: Pfeiffer, 2004.

DPA. "Financial Services Continual Improvement Success." *Daniel Penn Associates,* 2001. Available from: http://www.danielpenn.com/articles/cs.

Etienne-Hamilton, E.C. *Operations Strategies for Competitive Advantage: Text and Cases.* Fort Worth, TX: The Dryden Press, 1994.

Flint, Perry. "Rewired for Success." *Air Transport World* 41, no. 9 (2004): 38–39.

Jorgensen, F., H. Boer, and F. Gertsen. "Development of a Team-Based Framework for Conducting Self-Assessment of Continuous Improvement." *Journal of Manufacturing Technology Management.* 15, no. 4 (2004): 343–349.

Maurer, Robert. *One Small Step Can Change Your Life: The Kaizen Way.* New York: Workman, 2004.

Pereira, Ron. "Two Types of Kaizen." *LSS Academy.* 28 Oct 2007.

Rijnders, S., and H. Boer. "A Typology of Continuous Improvement Implementation Processes." *Knowledge and Process Management* 11, no. 4 (October-December 2004): 283–296.

Rogers, Mike. *CIMA Managerial Studies: Be Prepared.* Butterworth-Heinemann, 2008.

Stevenson, William J. *Production Operations Management.* 6th ed. Boston, MA: Irwin McGraw-Hill, 1999.

Stonebraker, Peter W., and G. Keong Leong. *Operations Strategy: Focusing Competitive Excellence.* Boston, MA: Allyn and Bacon, 1994.

CORPORATE GOVERNANCE

Corporate governance is the responsibility of a firm's board of directors. While management runs the company and oversees day-to-day operations, it is the board of directors that "governs" the corporations by overseeing management and representing the interests of the firm's shareholders.

By law, a corporation of any size must have a board of directors elected by its shareholders. The directors have a fiduciary duty to the shareholders (who are the corporation's owners), and directors as well as corporate officers can be held liable for failing to meet their fiduciary duties to stockholders. A passive board can get into trouble by relying on an influential CEO.

Investors and the public are particularly interested in the financial reports that publicly-traded companies release, and boards of directors of these companies have a legal obligation to ensure that these reports are fair and accurate. Recent business failures, auditor malfeasance, and material deficiencies in financial disclosures, however, have caused a serious erosion of public confidence in the financial reporting of these companies.

SARBANES-OXLEY

Several major cases of corporate fraud and accounting scandal occurred in the early 2000s, including the widely-known cases of Enron, Tyco, and WorldCom. This sudden surge in board misconduct led to investor doubt, the loss of billions in market capital, and harsh penalties for the company leaders found responsible. There was a general outcry for new standards and more specific laws.

Consequently, Congress, with nearly no dissenting votes, enacted the Sarbanes-Oxley Act of 2002, named after Democrat Senator Paul Sarbanes and Republican Representative Michael Oxley, who sponsored the legislation. Common law has traditionally held that corporate directors have a primary fiduciary duty to the corporation and a secondary duty the shareholders. Sarbanes-Oxley, referred to as SOX or Sarbox, has essentially made directors primarily responsible to the shareholders.

There are several specific requirements in SOX's eleven titles, most aimed at corporate boards and the way they authorize financial information. In addition to harsher penalties for corporate fraud and white collar crime, SOX also addresses the authorization of company financial reports. The board members reviewing the reports are now required to sign their certification that they have studied the financial reports, that the information within the reports is factual and not misleading, that the data represents the financial state of the company correctly, that analysis of the data has been conducted by the board to prove it accuracy, and that the report gives any information pertaining to fraud or the change of internal controls.

In addition to the authorization requirements, which affected most managers across the nation, SOX requires

publicly held companies to immediately notify the public concerning any drastic changes to their financial state, communicating the information so that it is easy for the investors to understand. These and other compliance laws in SOX make it much more difficult for companies to withhold incriminating data, or to hide fraud in accounting costs, as had been done in the notorious cases.

For altering or intentionally deceiving investigators through financial records, SOX imposes heavy fines and/or up to twenty years imprisonment for the company leaders involved. Accountants—usually from outside the company—who ignore attempts at fraud when auditing receive fines and up to ten years imprisonment.

KEY GOVERNANCE ISSUES

Historically, corporate boards of directors have had a myriad of duties, most of them set by common law and the corporation's own by-laws. These duties often include: hiring, supervising, and sometimes firing the chief executive officer (CEO); approving major strategic decisions; meeting with shareholders; establishing executive compensation; making decisions about mergers and acquisitions; assessing the viability of potential takeover bids; taking action if the corporation fails; overseeing financial reporting and audits; nominating board candidates; and refining board rules and policies.

One of the most difficult governance duties of the board of directors is the removal of the firm's CEO. This can occur when the board, representing the interests of the shareholders, disagrees with the strategic direction being pursued by the CEO, or if they merely want to show they are "doing their duty" as board members. For example, when Carly Fiorina was ousted as CEO of Hewlett-Packard (HP) in 2005, she was viewed by many to be hard-driving and fearless. The HP board of directors, however, had grown increasingly uncomfortable with her inability to deliver the profits that she promised she was going to deliver. Her refusal to relinquish some operating control, or to make any changes that the board requested, led to her downfall during a period of low profits and falling stock prices.

One measure of good governance is whether the company has a CEO who can maximize the company's performance. Whereas part of the governance function of the board of directors is to select the firm's CEO, another is to endorse the CEO's strategy—if it is the right one. For example, boards can support the CEO's strategic direction by endorsing proposed acquisitions. It can push the CEO to accomplish even more by encouraging him or her to think more broadly or by setting higher sales targets. The board can also support the CEO's leadership by making sure that the CEO is able to put together a strong management team to achieve those goals. In some

cases the following CEO will be recruited from the management team built by the present CEO.

Another difficult time for boards occurs when the firm is the target of a takeover attempt. It is vitally important at such a time that the board have a clear sense of the value of the firm and that it is enabled to fully evaluate takeover offers. During a takeover it is the board's responsibility to accept or reject offers, and in so doing it must represent the shareholders' interests when negotiating the sale of the firm.

GOVERNANCE COMMITTEES

Boards often administer their governance responsibilities by establishing committees to oversee different areas of concern. Typical committees include audit, nominating, and compensation committees. This is largely in line with U.S. regulatory guidance. On August 16, 2002, the Securities and Exchange Commission (SEC) updated earlier proposals related to corporate governance that would recommend, but not mandate, that boards establish three oversight committees: a nominating committee, a compensation committee, and an audit committee. The SEC recommended that these oversight committees be composed entirely of independent directors.

Each committee oversees a specific area of corporate governance and reports to the full board. The nominating committee's area of oversight consists of issues related to management succession, including the CEO, and to the composition of the board of directors. The compensation committee oversees compensation of the firm's CEO and its officers, as well as director compensation. The audit committee is concerned with the company's financial condition, internal accounting controls, and issues relating to the firm's audit by an independent auditor.

Almost all publicly held corporate entities in the United States have an audit committee. Since 1978, the New York Stock Exchange (NYSE) has required corporations to have audit committees composed entirely of independent outside directors as a condition for being listed. The audit committees of corporate boards of directors are generally expected to serve as watchdogs for the investors and the creditors. Audit committees are expected to protect the interests of both investors and creditors, as well as steward corporate accountability. Moreover, audit committees should make sure that management, the internal auditors, and the external auditors understand that the committee will hold them accountable for their actions (and in some cases, inaction).

The independent audit committee plays a key role in stewardship of the corporation it serves. The audit committee should help ensure that the financial statements are fairly stated, the internal controls are operating effectively, management risk is being reduced, and new processes are

minimizing risks. Moreover, the audit committee members should be independent of management and maintain a close working relationship with the independent auditors.

In an article in the *Pennsylvania CPA Journal,* author John M. Fleming sets forth the primary responsibilities of the corporate audit committee: (1) Evaluating the processes in place to assess company risks and the effectiveness of internal controls, and assisting management in improving these processes where necessary; (2) monitoring the financial reporting process both internally and externally; and (3) monitoring and evaluating the performance of internal and external auditors.

A board will sometimes establish a fourth committee, the governance committee. The governance committee is concerned with overseeing how the company is being run, including evaluation of both management and the board of directors. In some cases the nominating committee will evolve into, or function as, a governance committee.

ACTIVE GOVERNANCE

Historically, corporate boards have been described as either active or passive. Some corporate CEOs relished having what they thought were "rubber stamp" boards of directors who would approve virtually any actions they chose to pursue. Sarbanes-Oxley has dramatically changed that dynamic. Corporate directors must now be much more independent, and their legal liability to shareholders has increased significantly.

One example in which a traditionally "quiet" board stepped up and became more active occurred with the Walt Disney Company. For years, Michael Eisner ruled the Disney empire with an allegedly brutal iron fist. After Roy E. Disney, Walt Disney's nephew, led a shareholder revolt of sorts and complained that investor votes were being ignored or circumvented, the Walt Disney Company board of directors finally decided to step in. In early 2004, the board took the chairmanship away from Eisner after more than 45 percent of votes cast at the company's annual meeting opposed his board re-election. It was a resounding vote of no confidence. But the board then chose an Eisner ally, former U.S. Senator George Mitchell, as chairman, over the objections of several larger shareholders. Ironically, a year later, Eisner was easily re-elected to the board, with only 8.6 percent of voters withholding their support for him.

Boards can take simpler steps to ensure they are not passive without voting out the CEO. They can establish a non-executive chairman, a chairperson who is separate from the CEO. The board can also staff all board committees with independent outside directors, except the president and CEO.

ENVIRONMENTAL GOVERNANCE

Lobbyist groups and investors who are concerned with environmental responsibility are becoming increasingly involved in influencing companies whose practices are seen as environmentally unfriendly. The new, easier access to information encouraged by such legislation as Sarbanes-Oxley gives such interested groups the tools to make a difference in the business market. Companies, seeing the short- and long-term benefits to be gained by practicing environmental responsibility, are willingly changing policy in new marketing strategies and creating initiatives to become more "green" and environmentally conscious.

Some corporate boards choose to publish their new policies concerning greener ways of production and manufacturing, or like Advanced Micro Devices, Inc., to create a commitment plan for climate protection. Others, such as Disney, create a separate environmental mission statement. By investing in sustainability and environmentally friendly systems, organizations are finding ways to cut costs, create new goals for themselves, launch new marketing endeavors, and even produce revolutionary technology.

According to a 2007 article *The Encyclopedia of Earth* by Brian Roach, between the years 1995 and 2003, socially responsible investing by corporations grew approximately 40 percent faster than overall investment, and by 2003 approximately 11 percent of United States investments pertained to environmentally conscious activities.

The environmental policies boards are creating pertain to many different areas, and while many concepts are unique to the company that produces them, some are more general. For instance, *eco-labeling* is a common practice; this is the labeling of products to include pertinent environmental information. If a bottle is made of recyclable material, the company can include an eco-label noting the information, making their product more desirable in environmentally conscious markets. If food is grown naturally, or if wood is produced locally, eco-labels can indicate it for the benefit of interested customers. Eco-labels can also include information on the environmental impact the product had in being manufactured, or will have on being consumed.

Examples of corporate environmental responsibility are becoming increasingly common. In Europe, the European Automobile Industry Association agreed to try to reduce their emissions to 140 g per kilometer by 2008. Car companies developed light, small cars such as the SMART car developed by Daimler-Chrysler. In 2007, the British retailer Marks and Spencer revealed a five-year plan, estimated to cost 200 millions pounds, to make the company carbon neutral. For many companies, carbon

footprints have become an area of concern, and reducing carbon output has turned into a strong initiative for many organizations.

In America, companies such as Kimberly-Clark are working on research to develop products that have helpful social and environmental effects. Some, such as 3M, are turning their focus to products that are more environmentally disposable.

THE ROLE OF INVESTOR ACTIVISM

Finding qualified people to serve on corporate boards of directors can be a challenging task. Corporate board members are learning in the current legal environment that serving on such board can open them to a wide range of legal liability issues. The reforms of Sarbanes-Oxley and the SEC all seem well-intended, but will they make a difference for board members who get in over their heads or choose to look away?

Many critics argue that the proposed and enacted reforms do little to solve the real problems that exist with corporate boards. For example, one issue that has been repeatedly raised is the fact that corporate boards tend to meet only a couple of times a year. Yet it is further argued that more frequent meetings do little to solve the major problem, which is the fact that most corporate board members do not have enough access to information to fulfill their duties of stewardship to the shareholders.

Another issue that has been raised after continuous corporate failures revolves around the financial knowledge and competence of corporate board members. One proposed reform to remedy this problem has been to offer more generous pay for corporate board members, particularly those who serve on audit committees. The theory behind the increased pay is that it would help attract more chief financial officers and former chief executive officers from major accounting firms to serve on audit committees.

Proponents of such a move argue that former CFOs and CEOs are ideal audit committee members. But, there remains a limited pool of these professionals available to serve on audit committees. Furthermore, increased disclosure requirements are likely to raise liability for individual audit committee members, thus having a negative impact on their willingness to serve. Increased compensation may not persuade highly-qualified potential committee members to accept the burdensome legal responsibility of vouching for a multinational company's complex and intricate accounting system.

Finally, it is important to realize that having the best and most qualified corporate board of directors is no guarantee that financial reporting or other problems will not occur. Many of the corporate failures, large and small, that occur every year have arisen as a result of inattention,

reckless disregard, or malfeasance. While some of the new and proposed regulations may address specific issues that have occurred in certain situations, they will never fully compensate for flaws in human nature. Many corporate failures would still have occurred under the new rules set by Congress and the SEC if board members found ways to ignore or circumvent them. As long as human judgment and discretion is permitted to operate within the corporate board function, there is room for error and wrongdoing.

BIBLIOGRAPHY

Byron, Ellen. "Corporate Governance (A Special Report): Managers: Keep Out: Independent Directors Have a Lot More Power These Days, and a Lot More Responsibility." *Wall Street Journal,* 21 June 2004.

Fiksel, Joseph, Robert Axelrod, and Susan Russell. "Inside Out: Sustainibility Communication Begins in the Workplace." *Green@work* Summer, 2005.

Fleming, John M. "Audit Committee: Roles, Responsibilities, and Performance." *Pennsylvania CPA Journal* 73 (Summer 2002): 29–32.

Anthony, Henry. *Understanding Strategic Management* Oxford University Press, 2008.

Hymowitz, Carol. "Corporate Governance (A Special Report); Experiments in Corporate Governance: Finding the Right Way to Improve Board Oversight Isn't Easy; But Plenty of Companies Are Trying." *Wall Street Journal,* 21 June 2004.

Karmel, Roberta S. "Should a Duty to the Corporation Be Imposed on Institutional Shareholders?" *The Business Lawyer* 60 (November 2004): 1.

Levy, David, and Peter Newell. *The Business of Global Environment Governance.* MIT Press, 2004.

Pagella, Sasha. "2008 Proxy Season Foresights #9: The Environmental Agenda Heats Up." *The Corporate Library* April 14, 2008.

Raber, Roger. "What Has Really Changed in the American Boardroom." *Community Banker* 13 (October 2004): 60.

Saporito, Bill. "Why Carly's Out." *Time,* 21 February 2005, 34.

"Sarbanes-Oxley Compliance." *Soxlaw.com* 2003.

Sherman, Jay. "Eisner Still in Charge." *Television Week,* 14 February 2005, 3.

"S&P, Hawkamah Launch Environmental Corporate governance and Sustainibility Indices for Mena Markets" *AME Info.* Available from: http://www.ameinfo.com/153610.html..

U.S. Securities and Exchange Commission. "NASD and NYSE Rulemaking: Relating to Corporate Governance." Available from: http://www.sec.gov/rules/sro/34–48745.htm.

CORPORATE SOCIAL RESPONSIBILITY

In their 2003 book, *Business and Society: Ethics and Stakeholder Management,* Carrol and Bucholtz describe corporate social responsibility (CSR) as the "economic, legal, ethical, and discretionary expectations that society has of organizations at a given point in time." The concept of

corporate social responsibility means that organizations have moral, ethical, and philanthropic responsibilities in addition to their responsibilities to earn a fair return for investors and comply with the law. A traditional view of the corporation suggests that its primary, if not sole, responsibility is to its owners, or stockholders. However, CSR requires organizations to adopt a broader view of its responsibilities that includes not only stockholders, but many other constituencies as well, including employees, suppliers, customers, the local community, local, state, and federal governments, environmental groups, and other special interest groups. Collectively, the various groups affected by the actions of an organization are called "stakeholders." The stakeholder concept is discussed more fully in a later section.

Corporate social responsibility is related to, but not identical with, business ethics. While CSR encompasses the economic, legal, ethical, and discretionary responsibilities of organizations, business ethics usually focuses on the moral judgments and behavior of individuals and groups within organizations. Thus, the study of business ethics may be regarded as a component of the larger study of corporate social responsibility.

Carroll and Buchholtz's four-part definition of CSR makes explicit the multi-faceted nature of social responsibility. The economic responsibilities cited in the definition refer to society's expectation that organizations will produce goods and services that are needed and desired by customers and sell those goods and services at a reasonable price. Organizations are expected to be efficient, profitable, and to keep shareholder interests in mind. The legal responsibilities relate to the expectation that organizations will comply with the laws set down by society to govern competition in the marketplace. Organizations have thousands of legal responsibilities governing almost every aspect of their operations, including consumer and product laws, environmental laws, and employment laws. The ethical responsibilities concern societal expectations that go beyond the law, such as the expectation that organizations will conduct their affairs in a fair and just way. This means that organizations are expected to do more than just comply with the law, but also make proactive efforts to anticipate and meet the norms of society even if those norms are not formally enacted in law. Finally, the discretionary responsibilities of corporations refer to society's expectation that organizations be good citizens. This may involve such things as philanthropic support of programs benefiting a community or the nation. It may also involve donating employee expertise and time to worthy causes.

Wilhelm Autischer, the CSR project manager for an Austrian business, divides corporate social responsibility into three different dimensions. The first dimension is economic. CSR practices help not only the company, but the industry the company is in, by raising the bar of expected behavior overall. Investors, seeing one company adopt CSR policies will be naturally inclined to invest in that company, having seen it demonstrate responsibility. Other companies in the same field, seeing the benefits to CSR, will adopt similar policies as an act of competition, and the attitude of the industry will gradually change. This saves economies from suffering declines through fraudulent business practices.

The second dimension is social. By this Autischer does not necessarily mean creating a better society through specific initiatives by the business, but rather refers to a more internal change. As a company integrates CSR practices into its structure, the way it treats employees will inevitably change. Individual interests are treated with more respect in CSR-conscious companies, and concerns such as employee health and family relations are considered. Employees, benefiting from increased care from the company (in whatever form it takes), carry the positive influence home, influencing their families and society as well.

The third and last dimension is ecological. Companies take ecological responsibility primarily in two ways. First, they adopt precautionary practices, or practices that attempt to secure a healthy and productive ecological environment for future generations and the future of the company. This forward-looking action can include research into alternative technologies and waste management in production processes. The second action of the ecological dimension is eco-efficiency, or the increase in economic efficiency through better ecological practices. These sort of actions reduce unhealthy emissions, replace unsafe chemicals with harmless versions, and market more natural products. Many eco-efficent policies are also precautionary, but the main difference is that companies are looking for better profits through eco-efficiency, while precautionary actions are taken primarily on ethical grounds.

The three dimensions of CSR are practiced in a number of ways. Some of the more common policies, seen often in companies' social information sections, include:

- Reform of internal controls and accounting habits, seen especially after the series of accounting scandals that produced the Sarbanes-Oxley legislation.

- Policies encouraging diversity in the workplace and discouraging any type of discrimination.

- Reversal in corporate thinking regarding employees, a change from looking at them as costs to looking at them as assets.

- Resource productivity, or the use of more natural resources in production and manufacturing, leading

to an ecologically cleaner product and often creating recyclable products.

- Polices regarding treatment of contract employees, especially in outsourced positions located in other countries.

Companies have taken an increased interest in CSR for a combination of reasons. The role government has played in legislations requiring certain social behaviors has decreased, giving businesses more freedom to decide their social responsibilities themselves. Investors and customers alike have begun to demand stricter policies on the part of companies regarding not only their attitudes toward the environment and the people they interact with, but also how much information they reveal. Faced with more open inspection encouraged by such acts as Sarbanes-Oxley, companies are beginning to pay more attention to what their financial records prove they are doing. Many investors, realizing that ethical issues play a large part in how much they know and how successful their investments become, are forcing companies to show that ethical practices are being established.

Many companies have applied their CSR guidelines to the hiring process as well, seeking out employees who have ethical credentials or who agree with the company's moral standards. To keep such employees, businesses are paying more attention to the way they treat their work force, including the incentives they provide for performance and working conditions. Externally, many of the same policies are being applied up and down the supply chain, as companies look for suppliers and distributors who share their ethical concerns. Partnerships are formed with social responsibility as a factor in the contracts.

HISTORY

The nature and scope of corporate social responsibility has changed over time. The concept of CSR is a relatively new one—the phrase has only been in wide use since the 1960s. But, while the economic, legal, ethical, and discretionary expectations placed on organizations may differ, it is probably accurate to say that all societies at all points in time have had some degree of expectation that organizations would act responsibly, by some definition.

In the 1960s and 1970s the civil rights movement, consumerism, and environmentalism affected society's expectations of business. Based on the general idea that those with great power have great responsibility, many called for the business world to be more proactive in (1) ceasing to *cause* societal problems and (2) starting to participate in *solving* societal problems. Many legal mandates were placed on business related to equal employment opportunity, product safety, worker safety, and the environment. Furthermore, society began to expect busi-

ness to voluntarily participate in solving societal problems whether they had caused the problems or not. This was based on the view that corporations should go beyond their economic and legal responsibilities and accept responsibilities related to the betterment of society. This view of corporate social responsibility is the prevailing view in much of the world today.

The sections that follow provide additional details related to the corporate social responsibility construct. First, arguments for and against the CSR concept are reviewed. Then, the stakeholder concept, which is central to the CSR construct, is discussed. Finally, several of the major social issues with which organizations must deal are reviewed.

NEGATIVE ASPECTS OF CSR

The major arguments for and against corporate social responsibility are shown in Exhibit 1. The "economic" argument against CSR is perhaps most closely associated with the American economist Milton Friedman, who has argued that the primary responsibility of business is to make a profit for its owners, albeit while complying with the law. According to this view, the self-interested actions of millions of participants in free markets will, from a utilitarian perspective, lead to positive outcomes for society. If the operation of the free market cannot solve a social problem, it becomes the responsibility of government, not business, to address the issue.

The "competitive" argument recognizes the fact that addressing social issues comes at a cost to business. To the extent that businesses internalize the costs of socially responsible actions, they hurt their competitive position relative to other businesses. This argument is particularly

Exhibit 1

Arguments For and Against CSR

For	Against
The rise of the modern corporation created and continues to create many social problems. Therefore, the corporate world should assume responsibility for addressing these problems.	Taking on social and moral issues is not economically feasible. Corporations should focus on earning a profit for their shareholders and leave social issues to others.
In the long run, it is in corporations' best interest to assume social responsibilities. It will increase the chances that they will have a future and reduce the chances of increased governmental regulation.	Assuming social responsibilities places those corporations doing so at a competitive disadvantage relative to those who do not.
Large corporations have huge reserves of human and financial capital. They should devote at least some of their resources to addressing social issues.	Those who are most capable should address social issues. Those in the corporate world are not equipped to deal with social problems.

relevant in a globally competitive environment if businesses in one country expend assets to address social issues, but those in another country do not. According to Carroll and Buchholtz, since CSR is increasingly becoming a global concern, the differences in societal expectations around the world can be expected to lessen in the coming years.

Finally, some argue that those in business are ill-equipped to address social problems. This "capability" argument suggests that business executives and managers are typically well trained in the ways of finance, marketing, and operations management, but not well versed in dealing with complex societal problems. Thus, they do not have the knowledge or skills needed to deal with social issues. This view suggests that corporate involvement in social issues may actually make the situation worse. Part of the capability argument also suggests that corporations can best serve societal interests by sticking to what they do best, which is providing quality goods and services and selling them at an affordable price to people who desire them.

POSITIVE ASPECTS OF CSR

There are several arguments in favor of corporate social responsibility. One view, held by critics of the corporate world, is that since large corporations create many social problems, they should attempt to address and solve them. Those holding this view criticize the production, marketing, accounting, and environmental practices of corporations. They suggest that corporations can do a better job of producing quality, safe products, and in conducting their operations in an open and honest manner.

Finally, some suggest that businesses should assume social responsibilities because they are among the few private entities that have the resources to do so. The corporate world has some of the brightest minds in the world, and it possesses tremendous financial resources. (Wal-Mart, for example, has annual revenues that exceed the annual GNP of some countries.) Thus, businesses should utilize some of their human and financial capital in order to "make the world a better place."

The BSD, or Business and Sustainable Development, organization separates CSR benefits into three categories. The first category is company benefits. These positive effects are the most pertinent to the companies themselves and include lower operating costs, increased sales and customer loyalty, greater productivity, more ability to attract and keep skilled employees, access to more capital through more willing investors, decreased liability through better product safety, and reduced regulatory oversight. Many companies enhance their brand image and better their reputation through CSR actions, as previously discussed.

The second category includes all benefits to the community the business is connected to through its products and policies. Charitable contributions fall under this category, whether local or national, along with any social initiatives on the part of the company, such as education programs and homeless care activities. Employee volunteering is also included in community benefits.

The third category gathers all the environmental benefits, some of which have already been discussed. In addition to material recyclability, companies can also develop better product durability and functionality through ecologically thoughtful practices, use more renewable resources at lesser costs, and create several new analysis tools, such as life-cycle assessment and eco-efficiency.

THE STAKEHOLDER CONCEPT

According to Post, Lawrence, and Weber, stakeholders are individuals and groups that are affected by an organization's policies, procedures, and actions. A "stake" implies that one has an interest or share in the organization and its operations, per Carroll and Buchholtz. Some stakeholders, such as employees and owners, may have specific legal rights and expectations in regard to the organization's operations. Other stakeholders may not have specific rights granted by law, but may perceive that they have moral rights related to the organization's operations. For example, an environmental group may not have a legal right in regard to a company's use of natural resources, but may believe that they have a moral right to question the firm's environmental policies and to lobby the organization to develop environmentally friendly policies.

All companies, especially large corporations, have multiple stakeholders. One way of classifying stakeholder groups is to classify them as primary or secondary stakeholders. Primary stakeholders have some direct interest or stake in the organization. Secondary stakeholders, in contrast, are public or special interest groups that do not have a direct stake in the organization but are still affected by its operations. Exhibit 2 classifies some major stakeholder groups into primary and secondary categories.

The owners of a firm are among the primary stakeholders of the firm. An organization has legal and moral obligations to its owners. These obligations include, but are not limited to, attempting to ensure that owners receive an adequate return on their investment. Employees are also primary stakeholders who have both legal and moral claims on the organization. Organizations also have specific responsibilities to their customers in terms of producing and marketing goods and services that offer functionality, safety, and value; to local communities, which can be greatly affected by the actions of resident

<table>
<tr><td colspan="2" align="center">**Exhibit 2**
Categories of Stakeholder Groups</td></tr>
<tr><td>Primary Stakeholders</td><td>Shareholders (Owners)</td></tr>
<tr><td></td><td>Employees</td></tr>
<tr><td></td><td>Customers</td></tr>
<tr><td></td><td>Business Partners</td></tr>
<tr><td></td><td>Communities</td></tr>
<tr><td></td><td>Future Generations</td></tr>
<tr><td></td><td>The Natural Environment</td></tr>
<tr><td>Secondary Stakeholders</td><td>Local, State, and Federal Government</td></tr>
<tr><td></td><td>Regulatory Bodies</td></tr>
<tr><td></td><td>Civic Institutions and Groups</td></tr>
<tr><td></td><td>Special Interest Groups</td></tr>
<tr><td></td><td>Trade and Industry Groups</td></tr>
<tr><td></td><td>Media</td></tr>
<tr><td></td><td>Competitors</td></tr>
<tr><td colspan="2">Table based on Carroll and Buchholtz, 2003: p. 71</td></tr>
</table>

organizations and thus have a direct stake in their operations; and to the other companies with whom they do business. Many social commentators also suggest that companies have a direct responsibility to future generations and to the natural environment.

An organization's responsibilities are not limited to primary stakeholders. Although governmental bodies and regulatory agencies do not usually have ownership stakes in companies in free-market economies, they do play an active role in trying to ensure that organizations accept and meet their responsibilities to primary stakeholder groups. Organizations are accountable to these secondary stakeholders. Organizations must also contend with civic and special interest groups that purport to act on behalf of a wide variety of constituencies. Trade associations and industry groups are also affected by an organization's actions and its reputation. The media reports on and investigates the actions of many companies, particularly large organizations, and most companies accept that they must contend with and effectively "manage" their relationship with the media. Finally, even an organization's competitors can be considered secondary stakeholders, as they are obviously affected by organizational actions. For example, one might argue that organizations have a social responsibility to compete in the marketplace in a manner that is consistent with the law and with the best practices of their industry, so that all competitors will have a fair chance to succeed.

GLOBAL ISSUES

Corporations increasingly operate in a global environment. The globalization of business appears to be an irreversible trend, but there are many opponents to it. Critics suggest that globalization leads to the exploitation of developing nations and workers, destruction of the environment, and increased human rights abuses. They also argue that globalization primarily benefits the wealthy and widens the gap between the rich and the poor. Proponents of globalization argue that open markets lead to increased standards of living for everyone, higher wages for workers worldwide, and economic development in impoverished nations. Many large corporations are multinational in scope and will continue to face legal, social, and ethical issues brought on by the increasing globalization of business.

Whether one is an opponent or proponent of globalization, however, does not change the fact that corporations operating globally face daunting social issues. Perhaps the most pressing issue is that of labor standards in different countries around the world. Many corporations have been stung by revelations that their plants around the world were "sweatshops" and/or employed very young children. This problem is complex because societal standards and expectations regarding working conditions and the employment of children vary significantly around the world. Corporations must decide which is the responsible option: adopting the standards of the countries in which they are operating or imposing a common standard worldwide. A related issue is that of safety conditions in plants around the world.

Another issue in global business is the issue of marketing goods and services in the international marketplace. Some U.S. companies, for example, have marketed products in other countries after the products were banned in the United States.

SPECIFIC CSR PRACTICES

In their 2006 book, *Developing Corporate Social Responsibility: a European Perspective*, authors Perrini, Pogutz, and Tencati give several specific CSR practices by business that are worth a close look, as most can be applied to and adopted by any organization as an extra form of analysis or a new marketing/mission concept.

Capital valuation is the practice of defining and publishing the various types of capital a company has. This refers not only to financial assets, but social, environmental, human, moral, and intellectual capital as well. Defining the types of capital a company has not only shows investors and customers that the company is aware of the connections it has to the people and communities around it, but it also gives the company several starting places to begin CSR initiatives.

Corporate community involvement reporting is the practice of assembling periodic reports concerning community outreach and activities, such as financial aid and

employee volunteer movements. The reports usually contain the activities, descriptions of the effects produced, and future plans. Some form of measurement is often included, whether by how much time or money was spent in community involvement, or how much involvement the company has compared to competitors.

Ethical accounting statements are reports made directly to the investors concerning the ethics of the company's financial controls and practices. Since ethical activity can be debatable, EASs should be the result of a continuing dialogue between the investors and the company as to what ethical matters are important to both, and how the company can meet its ethical standards. The EAS is used primarily as a planning tool, documenting the company's intentions for future practices.

Ethical auditing is the practice of hiring an outside firm to conduct an audit of the company's policies, focused on ethical standards that the investors and the company have previously developed. The auditing process examines primarily the company's performance in social and environmental settings.

Social auditing is similar to ethical auditing but focuses only on the social performance of the company, and is more common.

Social balance is an accounting practice designed to assemble all CSR financial activity from across the company and combine it in one report. This report usually classifies the financial data in forms that are useful to CSR regulators in the company, showing where funds where allocated regarding social activities, how much separate departments have spent, and where the company stands as a whole in terms of social aid.

Value-added statements are created in order to show the investors the added benefits certain company activities have. Investors may not be aware of CSR practices by the company, and this statement allows the company to show its social activity in succinct form. Other investors may not understand how certain company policies are socially responsible or lead to added value. This report is designed to summarize and show the effects of the company's CSR activity.

Statements of principles and values are created by the company to give focus and enthusiasm to CSR policies. Akin to a mission statement, a statement of principles and values clearly states what the company's social, environmental, and financial responsibilities are, and how it intends to fulfill those responsibilities. Such responsibility statements are becoming a more common tool, and are useful for companies beginning CSR movements. Statements of principles and value should be easily accessible by customers, so that the public can see what the company's social goals are at any time.

Sustainability reporting involves a company's goals of sustainability, and the policies it has in place to meet them. Production companies often have goals of creating more recyclable products with renewable energy sources. Others may have a goal of becoming a paperless business by a certain date, or of adopting a new technology. Whatever the sustainability goal may be, sustainability reporting is a periodic assessment of the company's current endeavors to reach the goal, and its success in attaining sustainability.

ORGANIZATIONS INVOLVED IN CSR

There are many organizations that support or mandate CSR activity in businesses. An international example is the United Nations, which produced the Global Compact initiative in 1999. The Global Compact asks for signatures from major businesses across the world agreeing to nine specific principles of social and environmental activity. These nine principles include:

- To support and respect internationally proclaimed human rights

- To avoid complicity in human rights abuses

- To uphold freedom of association and the right to collective bargaining

- To eliminate all forms of forced labor

- To abolish child labor

- To eliminate discrimination in regard to business hiring and occupation

- To support a cautionary approach to environmental challenges

Another important international organization is the OECD, or the Organization for Economic Cooperation and Development. This organization puts together a set of social guidelines for international companies to follow, created with the help of over thirty different nations. It was updated in 2000 to include new CSR concerns.

In 2004, the International Standards Organization began a process to create a set of guidelines of their own, the ISO 26000. In 2005, more than 225 CSR specialists from forty-three countries and twenty-four other organizations attended the initial meeting. Their goal was to devise a practical guide to international CSR that would, as they say, "aim to encourage voluntary commitment to social responsibility and...lead to common guidance on concepts, definitions and methods of evaluation." The original date for the publication of ISO 26000 was 2008, but has since been moved to 2010.

SEE ALSO *Ethics*

BIBLIOGRAPHY

Arthaud-Day, M.L. "Transnational Corporate Social Responsibility: A Tri-Dimensional Approach to International CSR Research." *Business Ethics Quarterly* 15 (2005): 1–22.

Autischer, Wilhelm. "Corporate Social Responsibility: A Challenge for Companies." *ABCSD*. Available from:dyn.boku.ac.at/oin/_artikel/csr_in_austria.pdf.

BSD Global. "Corporate Social Responsibility." *Business and Sustainable Development*, 2007. Available from: http://www.bsdglobal.com/issues/wr.asp.

Brown, Christopher. *The Sustainable Enterprise: Profiting from the Best Practice.* Kogan Page Publishers, 2005.

Carroll, A.B., and A.K. Buchholtz. *Business and Society: Ethics and Stakeholder Management.* 5th ed. Australia: Thomson South-Western, 2003.

"Corporate Social Responsibility." *As You Sow Foundation*, 2006. Available from: http://www.asyousow.org/csr/.

Garriga, E., and D. Mele. "Corporate Social Responsibility Theories: Mapping the Territory." *Journal of Business Ethics* 53 (2004): 51–71.

Harrison, Andrew, Paul Wheeler, and Carolyn Whitehead. *The Distributed Workplace: Sustainable Work Environments.* Oxford: Taylor and Francis, 2004.

Marquez, A., and C.J. Fombrun. "Measuring Corporate Social Responsibility." *Corporate Reputation Review* 7 (2005): 304–308.

Perrini, Francesco, Stefano Pogutz, and Antonio. Tencati. *Developing Corporate Social Responsibility: A European Perspective.* Northampton, MA: Edward Elgar Publishing, 2006.

Post, J.E., A.T. Lawrence, and J. Weber. *Business and Society.* 10th ed. Boston: McGraw-Hill, 2002.

COST ACCOUNTING

Cost accounting, often referred to as managerial or management accounting, is the branch of accounting that provides economic and financial information to decision makers within a company. The idea of providing information for use within the company (to aid management to plan, direct, and control operations) differentiates cost accounting from other segments of the accountancy profession. For example, financial accounting serves the public by providing financial reporting via financial statements or financial press releases. This public information is prepared and presented based on generally accepted accounting principles (GAAP), the broad rules that assure the user of the underlying framework supporting the information.

On the other hand, cost accounting is limited predominantly to use within the company to aid management in the process of making choices that will benefit the stockholders by maximizing company profits that translate into maximizing stockholder wealth. Since the information is used internally, the information may be presented on any logical basis just so long as it will aid the manager to reach an appropriate, informed decision.

A few concepts in cost accounting, however, form the bridge between financial and managerial accounting topics. One such concept is that of product costing for a manufacturing company. Not only is this information used internally in decision making (e.g., does a company make or buy a component?), product costing is also used to determine the historical basis to account for the cost of products sold during a period and the cost of the unsold inventory that remains as an asset on the statement of financial position at the end of the period.

OVERVIEW

Numerous cost accounting concepts can benefit management in decision making, both for manufacturing and service companies. While many of the concepts discussed below are applicable to both types of companies, the basis for ease of discussion will be that of a manufacturing company. Therefore, some of the concepts to be discussed include understanding the distinction between manufacturing and non-manufacturing costs (and how these are disclosed in the financial statements), computing the cost of manufacturing a product (or providing a service), identifying cost behavior in order to utilize cost-volume-profit relationships, setting prices, budgeting and budgetary controls, and capital budgeting. These topics will be briefly discussed below.

MANUFACTURING VS. NON-MANUFACTURING COSTS

Manufacturing costs are those costs incurred by a producer of goods that are needed to transform raw materials into finished products, ready to sell. These costs consist of the cost of basic materials and components, plus the costs of labor and factory overhead needed to convert the materials into finished products.

Materials and labor can be classified as either direct or indirect in relation to the final product. Direct materials are those major components that can be easily traced to the finished good and are accounted for carefully due to their significance to the product. In the case of manufacturing a lawn mower, for example, these types of materials would include the engine, housing, wheels, and handle. Indirect materials would include those minor items that are essential but which cannot be easily traced to the finished product. Examples of these would be screws, nuts, bolts, washers, and lubricants. One might say that the cost of keeping an account of each of these indirect items exceeds the benefit derived from having the information. Consequently, the costs of these items are accumulated as part of factory overhead and prorated to products on some appropriate basis.

Direct labor refers to the efforts of factory workers that can be directly associated with transforming the materials into the finished product, such as laborers who assemble the product. Indirect laborers are those whose efforts cannot be traced directly or practically to the finished product. The indirect laborers would include maintenance personnel and supervisors.

Factory overhead includes all factory costs that can only be indirectly associated with the finished inventory, that is, all factory costs incurred in making a product other than the costs of direct materials and direct labor. In terms of cost behavior, some of these costs do not change in total even if the number of products manufactured increases or decreases from period to period; the behavior of these costs is said to be a fixed cost. For example, the amount of the monthly factory rent would not fluctuate based on the number of units produced during a particular month.

Other factory overhead costs that change in total in direct proportion to changes in the number of products manufactured are known as variable costs. For example, the number of nuts and bolts needed to assemble lawn mowers would increase and decrease exactly in proportion to the number of mowers produced and are therefore considered to be a variable cost. In summarizing this brief discussion of factory overhead costs, these costs include such things as depreciation of factory buildings and machinery, factory utilities, factory insurance, indirect materials, and indirect labor; some of these costs are variable while others are fixed in total for a specific time period.

All material, labor, and factory overhead costs are summarized into totals that represent the cost of the goods manufactured during a period of time. The cost of products that have been completed and sold during a time period are deducted from the related sales revenue total to determine the gross profit for the period. Thus it is logical that these manufacturing costs are referred to as product costs. The cost of unsold completed units at period's end is shown as finished goods on the balance sheet. Any costs of goods that are only partially completed at period's end are shown as work in process inventory, and any materials that have not yet entered into the manufacturing process are disclosed as raw materials inventory.

All the costs incurred by a manufacturing company other than the cost of factory operations are collectively known as non-manufacturing costs. These include all selling, administrative, and financing costs; all these costs are deducted as expenses from sales revenues as they are incurred each period. Costs other than manufacturing costs are called period costs for this reason. None of the period costs are deferred to a future period because none

of them represent an asset as defined by the accounting profession.

The discussion above has focused on the costs incurred by a manufacturer of goods. The discussion is also pertinent to a business that provides a service to its customers. Providers of services still incur material costs (such as cleaning supplies), labor costs, and general overhead related to providing the services. The major distinction is that, since no tangible product is created, no "product" costs can be deferred to a later period in which they will be sold.

COMPUTING THE COSTS OF PRODUCING A PRODUCT OR SERVICE

Manufacturing companies use a variety of production processes in creating goods. These processes include job shops, batch flows, machine-paced line flows, worker-paced line flow, continuous flows, and hybrids that consist of more than one of the previous separate flow process. The type of production process to a certain extent determines the type of product costing system that a company utilizes.

Job shops, such as machine shops, receive orders for products that are manufactured to the unique blueprint specifications of the requesting customer. As such, it would be rare for these products to meet the needs of any other customer. Thus each "job" must be accounted for separately as the goods are produced and no goods would be produced on a speculative basis. An appropriate method to determine the cost of each unique item produced is activity-based costing (ABC). The essence of ABC costing is that the exact costs of materials and labor, and a highly accurate estimate of factory overhead costs based on the specific activities (cost drivers) incurred to produce the goods, are determined for each unique product.

Batch flow processes (such as clothing manufacturers use) and worker-paced line flows (such as found in fast-food operations) can both use traditional product costing. This product costing system captures the exact costs of materials and labor while using some predetermined overhead rate to associate an appropriate amount of overhead with each product made. A very common basis for determining the overhead rate is the amount of labor time required to produce each unit of product. To determine the overhead rate, management must first estimate the total overhead costs for the upcoming year. Then an estimate of direct labor hours expected for the same period must be made. Finally the estimated overhead is divided by the estimated total direct labor hours and the resulting overhead rate per hour can be established. As each batch of products is completed and the total direct

labor hours used is made known from time cards, the overhead rate is multiplied by the actual hours and the overhead is said to be "applied" to the products.

The traditional product costing method was especially popular in the United States until the mid-1980s when labor costs were still a significant portion of the total cost of products. However, with technological changes (such as computer-integrated manufacturing) and more capital intensive approaches to production (such as robotics), the use of a dwindling labor component of product cost as a basis to apply overhead cost was no longer adequate. This was the impetus for the development of ABC costing mentioned above.

Machine-paced line flow processes (such as used by automobile manufacturers) lend themselves to process cost accounting. In this system of product costing, products' costs are accumulated during each of the numerous processes through which the products flow. In the case of an automobile manufacturer, some of the processes might include subassembly stations that reside offline from the main conveyor system where engine assembly, dashboard assembly and the like occur. These major components and their related material, labor, and overhead costs are then carried forward to the next process and new material, labor, and overhead costs are added in each successive process until completion. Thus the individual costs incurred in each process and the total costs incurred are available for financial statements and decision-making purposes.

Companies that use a continuous flow process of production, such as a paper manufacturing company that operates 24/7, would likely use a standard costs system. This product costing system not only accumulates the actual costs incurred in manufacturing the product, but it also determines the standard costs that should have been incurred (based on predetermined standards for material, labor, and factory overhead). By allowing comparisons between actual and standard totals, any discrepancy or variance can be noted and investigated. In particular, any unfavorable costs being incurred can be corrected in a timely manner.

COST BEHAVIOR

One of the critical steps in decision making is the estimation of costs to be incurred for the particular decision to be made. To be able to do this, management must have a good idea as to how costs "behave" at different levels of operations; i.e., will the cost increase if production increases or will the cost remain the same? A common use of cost behavior information is the attempt by management to predict the total production costs for units to be manufactured in the upcoming month. There are several methods used to estimate total product costs:

the high-low method, a scatter-graph, and least-squares regression. Each of these methods attempts to separate costs into components that remain constant (fixed) in total, regardless of the number of units produced and those that vary in total in proportion to changes in the number of units produced. Once the behavior of costs is known, predictive ability is greatly enhanced.

Use of the high-low method requires the use of only two past data observations: the highest level of activity (such as the number of units produced during a time period) and the associated total production cost incurred at that level, and the lowest level of activity and its associated cost. All other data points are ignored and even the two observations used must represent operations that have taken place under normal conditions. The loss of input from the unused data is a theoretical limitation of this method.

The scatter-graph method requires that all recent, normal data observations be plotted on a cost (Y-axis) versus activity (X-axis) graph. A line that most closely represents a straight line composed of all the data points should be drawn. By extending the line to where it intersects the cost axis, a company has a fairly accurate estimate of the fixed costs for the period. The angle (slope) of the line can be calculated to give a fairly accurate estimate of the variable cost per unit. The inclusion of the effect of all data points is a strength of this method, but the unsophisticated eyeballing of the appropriate line is a weakness.

The most robust method is the least-squares regression method. This method requires the use of thirty or more past data observations, both the activity level in units produced and the total production cost for each. This technique is known for its statistical strengths but its sophistication requiring the use of software packages can be a hindrance.

Assuming that a company has used one of the techniques above and has separated costs of manufacturing its products into fixed and variable components, it can use the following general model and substitute derived fixed and variable amounts to create a specific model:

General Model: Total cost = Fixed Costs for a Month + Variable Cost per Unit

Specific Model: Total Cost Expected = $10,000 per Month + $5.00 per Unit

Given this specific model, a prediction can easily be made of the total costs expected when any number of units are budgeted, as long as the number of units is far within the normal range of operations for the company.

For example, if 5,000 units are budgeted for the next month's production, the total expected cost would be:

$$\$10,000 + \$5.00 \ (5,000) = \text{Total Cost} = \$35,000$$

If the cost separation technique is fairly accurate, we are in a position to review whether actual costs are in line with our projected cost. Any significant variation between anticipated cost and actual costs should be investigated. The identification of any variances does not answer any questions; the variances merely note that investigation to ascertain the answers is needed.

One other idea is worth mentioning. Considering total production costs in the example above, the same techniques used to separate total costs into fixed and variable components can be utilized to separate any individual cost that isn't readily identifiable as being fixed or variable. A company could, for instance, take the past monthly factory electrical utility bills or the sales wages and use any of the three techniques to separate this individual cost into its fixed and variable components.

SETTING PRICES

Setting the price for goods and services involves an interesting interaction of several factors. The price must be sufficient to exceed the product and period costs and earn a desirable profit. For normal sales to external customers, most companies are unable to unilaterally set prices. Prices are typically set in these competitive markets by the laws of supply and demand. However, if a company manufactures a product unique to customer specifications, or if the company has a patent to its product, then the company can set its own price. One approach to accomplish this is cost-plus pricing. As discussed above, the company must have knowledge of the costs that it will incur. Then the company can apply the proper markup, given the competitive market conditions and other factors, to set its target-selling price.

Some companies add their markup to their variable costs, rather than using the full cost needed for cost-plus pricing. Variable cost pricing is especially useful in special instances such as in pricing special orders or when the company has excess capacity. In both of these cases, production and sales at normal prices to regular customers will be sufficient to cover the total fixed and variable costs for typical sales levels and the concern is only for the incremental units above normal sales levels.

Nissan Motors and other automobile manufacturers take what might be considered a "backward" approach to setting the prices of their vehicles relative to their expected costs. This approach is known as target costing. Once these companies determine what type of vehicle and market niche they wish to pursue, they test the market

to see what "target price" the market will bear for their vehicle. From this number they deduct their "desired profit" in order to determine the "target cost" for their product. Then they gather the experts needed to ascertain if they will be able to produce the vehicle for this targeted cost.

If a company has two or more divisions and the output of one division can be used as input to a subsequent division, a price can be set for "sale" from one division to the next in order to measure profitability for each division. This internal transfer price should be set so as to encourage division managers to purchase and sell internally, thus maximizing overall company profits. Transfer prices can be determined based on negotiations between the affiliated divisions, based on the existence of excess capacity by the producing division, based on marking up the variable cost of the goods sold internally, or based on market prices for similar goods, and other approaches.

BUDGETING AND BUDGETARY CONTROLS

Managers use budgets to aid in planning and controlling their companies. A budget is a formal written expression of the plans for a specific future period stated in financial terms. Jerry Weygandt, Donald Kieso, and Paul Kimmel's book, *Managerial Accounting: Tools for Business Decision Making* lists the following benefits of budgeting:

1. It requires all levels of management to plan ahead and formalize goals on a repetitive basis.

2. It provides definite objectives for evaluating performance at each level of responsibility.

3. It creates an early warning system for potential problems so that management can make changes before things get out of hand.

4. It facilitates the coordination of activities within the company by correlating segment/division goals with overall company goals.

5. It results in greater management awareness of the company's overall operations including the impact of external factors such as economic trends.

6. It motivates personnel throughout the company to meet planned objectives.

The master budget is the set of interrelated budgets for a selected time period. The specific parts to the master budget are the operating budgets and the financial budgets. The operating budgets begin with a sales budget derived from the sales forecasts provided by the marketing department, followed by the related unit production budget with detail budgets for direct materials, direct labor, and factory overhead. Finally a budget for selling

and administrative expenses provides the final information needed for a budgeted income statement. The financial budgets, based on data from the budgeted income statement, are composed of a cash budget, a budgeted balance sheet, and a budget for capital expenditures.

Budgetary control is the process of comparing actual operating results to planned operating results and thereby identifying problem areas in order to take corrective actions. A starting point in this effort is the conversion of the master budget (determined at the start of the period and based on the most probable level of operations) into a flexible budget for the actual level of operations attained. Developing a flexible budget requires identifying the variable costs and the fixed costs for the period as discussed above. Once these cost behavior determinations have been made, total variable costs for the actual level of operations and the total fixed costs for the period can be combined into a flexible budget that discloses the costs that should have been incurred for the actual level of operations achieved.

In taking corrective actions, one must be aware of whether or not a manager is responsible for a particular cost that has been incurred. While all costs are controllable at some level of responsibility within a company, only the costs that a manager incurs directly are controllable by them. Any costs that are allocated to the manager's responsibility level are not controllable at the manager's level.

The information above focused on budgetary controls for total costs, including product costs for units being produced and sold, general and administrative expenses, selling expenses, and any financial expenses incurred during the period. When comparing actual to standard costs for material, labor, and factory overhead costs, the use of a standard product costing system is needed to provide the detail to analyze each separate product cost component.

CAPITAL BUDGETING

Companies with excess funds must make decisions as to how to invest these funds to maximize their potential. The choices that involve long-term projects require the use the technique of capital budgeting, that is, choosing among many capital projects to find those that will maximize the return on the invested capital. Several methods of capital budgeting are available to management; among these are the payback period method, the net present value method, and the internal rate of return method. All of these methods require the use of estimated cash flow amounts.

The payback period method is especially simple if future inflows from the project being considered happen to be equal in amount each year. In this case, the formula for computing the payback period is:

$$\text{Cost of Capital Project} \div \text{Net Annual Cash Inflow} = \text{Payback Period}$$

If the project has uneven cash flows, creating a table with a cumulative net cash-flow column will identify the year and an estimate of the portion of a year in which the project recoups its cost. A weakness of this method is that it does not consider the time value of money over the life of the project. However, the shorter the payback period is, the sooner the project's cost is recovered and the more attractive the project is.

A strength of the net present value method is that it uses the same cash flow information as described above and it requires that each cash flow be discounted by an appropriate discount rate to allow for the time value of money. The appropriate discount rate could be the company's weighted average cost of capital or its required rate of return. After each cash inflow has been discounted to the point in time at which the investment is made, the total of the discounted cash inflows is compared to the cost of the capital project. If the present value of the net cash inflows equals the cost of the investment in the project, then the project is earning exactly the interest rate chosen for discounting. The exact discount rate at which the two values are equal is known as the internal rate of return. If the present value of the net cash inflows exceeds the cost of the capital project, the project is earning more than the discount rate. If the cost of the capital project exceeds the present value of the net cash inflows, that is, the net present value is negative; then the project is not earning at least the discount rate. While the project is profitable if the cash inflows exceed the cash outflows, it would be rejected since it is not earning the return that is needed.

Modern management theory stresses that setting and reaching goals requires that test readings and adjustments along the way are essential. The recent period of increased international competition has led to the need for cost cutting; some companies have been successful by downsizing, expanding globally, and capturing long-term contracts to minimize the increase in costs. Cost accounting can greatly benefit management by providing product or service cost information for use in planning, directing, and controlling the operations of the business.

While many firms vigorously support cost accounting, it does have its detractors as well. For instance, cost accounting has been criticized for being too focused on cutting costs rather than maximizing efficiency. In 1984 Eliyahu M. Goldratt (1948-) wrote *The Goal*, which described an alternative management-accounting theory called throughput accounting (TA) based on the

performance measures used in the theory of constraints (TOC). According to TA, the method of applying overhead rates in cost accounting distorts figures by assuming that all parts of a system are equally valuable. TA seeks to maximize profit by increasing throughput, defined as the rate at which a system generates money. The TOC contends there is a limiting factor in all production processes, which can be identified and managed to increase throughput.

SEE ALSO *Activity-Based Costing; Financial Ratios*

BIBLIOGRAPHY

Bragg, Steven M.. *Throughput Accounting: A Guide to Constraint Management.* Hoboken, NJ: John Wiley & Sons, 2007.

Eldenburg, Leslie G., and Susan K. Wolcott. *Cost Management: Measuring, Monitoring, and Motivating Performance.* Hoboken, NJ: John Wiley & Sons, 2004.

Goldratt, Eliyahu M. and Jeff Cox. *The Goal (A Process of Ongoing Improvement).* North River Press, 1984.

Hitt, Michael, Stewart Black, and Lyman Porter. *Management.* Prentice Hall, 2005.

Horngren, Charles T., Gary L. Sundem, and William O. Stratton. *Introduction to Management Accounting.* Prentice Hall, 2005.

Rasmussen, Nils H., and Christopher J. Eichom. *Budgeting: Technology, Trends, Software Selections, and Implementation.* Hoboken, NJ: John Wiley & Sons, 2004.

Robbins, Stephen P., and David A. DeCenzo. *Fundamentals of Management.* Prentice Hall, 2005.

Weygandt, Jerry J., Donald E. Kieso, and Paul D. Kimmel. *Managerial Accounting: Tools for Business Decision Making.* Hoboken, NJ: John Wiley & Sons, 2005.

Whitten, David A., and Kim Cameron. *Developing Management Skills.* Prentice Hall, 2005.

CULTURE— ORGANIZATIONAL

SEE *Organizational Culture*

CUSTOMER RELATIONSHIP MANAGEMENT

By definition, customer relationship management (CRM) uses technology that enables organizations to provide fast and effective customer service by developing a relationship with each customer through the effective use of customer database information systems. CRM objectives are to acquire new customers, retain the right current customers, and grow the relationship with an organization's existing customers. CRM is actually a combination of organizational strategy, information systems, and technology focused on providing better customer service. Businesses that successfully implement CRM systems follow an integrated business model that ties together technology, information systems, and business processes along the entire value chain of an organization.

CRM is a fundamental approach to doing business. As mentioned above, CRM implementations stretch beyond technology and must consider and include broader organizational requirements. The goal is to be customer-focused and customer-driven, running all aspects of the business to satisfy the customers by addressing their requirements for products and by providing high-quality, responsive customer service. Companies that adopt the CRM approach are customer-centric, rather than product-centric.

To be customer-centric, companies need a comprehensive customer database to collect and store meaningful information about individual customers or prospects. The database must be current, accessible, and actionable in order generate leads for new customers while supporting sales and the maintenance of current customer relationships. Smart organizations collect information every time a customer comes into contact with the organization. Based on what is known about the individual customer, organizations can customize market offerings, services, programs, messages, and choice of media. A customer database ideally contains the customer's history of past purchases, demographics, activities/interests/opinions, preferred media, and other useful information. Also, this database should be available to any organizational units that have contact with the customer.

CRM is further enhanced when various departments within a business (such as sales, technical support, and marketing) share the information they collect from customer interactions. Feedback from a tech-support center, for example, could be used to inform marketing staffers about specific services and features requested by customers. In this practice (called collaborative CRM), the ultimate goal is to use information collected from all departments to improve the quality of customer service, and, as a result, increase customer satisfaction and loyalty.

EVOLUTION OF CRM

CRM initially referred to technological initiatives to make call centers less expensive and more efficient. The concept of CRM evolved from there as organizations began looking at more macro-organizational changes. For instance, many organizations began asking how they could change their business processes to use the customer data that they have gathered. CRM strategies now cover customer interaction across the entire organization. Many commercial CRM software packages provide features that serve sales, marketing, event management, project management, and finance.

Since its mid-1990s beginnings, CRM has already gone through several overlapping stages. Originally focused on automation of existing marketing processes, CRM has made a major leap forward to a customer-driven, business process management orientation.

The first stage began when firms purchased and implemented single-function client/server systems to support a particular group of employees such as the sales force, the call center representatives, or the marketing department. CRM initially meant applying automation to existing marketing activities and processes. However, automating poorly performing activities or processes did little to improve the quality of the return on investment.

In the second stage, organizations demanded more cross-functional integration to create a holistic view of their customers' relationships. Also, the integrated system's goal was to provide a single face to the customer by enabling employees to work from a common set of customer information gathered from demographics, Web hits, product inquiries, sales calls, and so forth. Cross-functional integration allowed the whole organization to take responsibility for customer satisfaction and allowed for better predictive models to improve cross-selling and improved products and delivery options.

The Internet heavily influenced the third stage of CRM. In this stage, the big CRM vendors used new Internet-based systems to extend the reach of CRM to thousands of employees, distribution partners, and even the customers themselves. Also, most organizations at this stage tie together their CRM systems with their ERP (Enterprise Resource Planning) system and other organizational operational systems. By rethinking the quality and effectiveness of customer-related processes, many organizations began to eliminate unnecessary activities, improve outdated processes, and redesign systems that had failed to deliver the desired outcomes.

NEW USERS OF CRM

CRM systems in the twenty-first century are based on the things that matter most to the customer. Customers often have direct access to all of the information they need in order to do business with an organization. But because some customer relationships are not profitable, many CRM systems focus heavily on financial results. CRM systems help organizations to identify existing profitable customer segments and develop the business requirements to support sustained relationships with these profitable segments.

Banks, for instance, are able to deploy technology solutions that may have artificial intelligence (AI) capabilities. These AI characteristics allow the banks to set dynamic limits for certain programs (such as overdraft protection programs), and enable the bank to offer differ-

ent services to customers based on their usage and past history of repayment. At the same time, using these types of CRM solutions, financial institutions are able to provide cost effective alternatives for current non-buyers or low-margin customers.

Banking giant Chase has taken advantage of CRM by grouping and analyzing data pulled from the bank's tellers, ATM machines, Web site, and telephone service reps. Chase can pinpoint which of millions of customers in its huge network of banks have wealth potential, and subsequently provide better customer service for them. With these types of CRM programs, Chase improves its sales and services by integrating and mining customer information.

The scope of CRM technology grows in importance when companies complete mergers and acquisitions. Researchers say that merged companies need a centralized CRM system to capitalize on the strengths of the combined entity. CRM systems also enable the organization to provide consistent, high levels of client care. CRM systems in these companies will help to ensure revenue growth and consistent client service.

THE FUTURE OF CRM

In 2008, it was reported that 67 percent of CRM implementations result in a successful return on investment (ROI). The reason for this is that CRM is being treated as a formally constructive corporate initiative, rather than an ad hoc operation as it was in its earliest incarnation.

When queried in 2005, 60 percent of midsize businesses planned to adopt or expand their CRM usage in the next two years, according to the Gartner Group. That fast rate of adoption has continued. AMI-Partners Research predicted that global CRM market will increase at an average annual rate of 13 percent through 2012. AMI-Partners credited this growth to the large number of CRM vendors who are offering more targeted solutions with a wide range of prices and more accountability. DataMonitor expects the CRM market profits to nearly double from $3.6 billion to $6.6 billion during the same time period.

DataMonitor and KensingtonHouse credit the growing acceptance of the SaaS (Software as a Service) delivery model as a key driver behind CRM growth. DataMonitor also found that vertical sectors such as health care and life sciences have a growing interest in CRM, and these verticals are being targeted by niche vendors. At the same time, smaller companies are deploying more CRM technologies. Companies with fewer than one thousand employees will make up 42 percent of the market by 2012, DataMonitor predicts.

ASPECTS TO CONSIDER FOR CRM

CRM marketers focus on customer retention, loyalty, and profitability. To do this, they focus on the following initiatives: increasing attention on data analysis, enhancing the customer experience, providing more personalization and customization, and increasing mobile marketing. Many companies with a core CRM system will add more functionality before 2010 to reach these goals. The areas targeted for expansion include: sales force collaboration, lead generation management, sales analytics/forecasting, sales knowledge management, CRM/sales process integration, and incentive management.

PROBLEMS WITH CRM

In a study, Forrester Research found that companies give customers an average of 3.5 ways to reach them. But often, that information isn't linked. Data on purchases that shoppers make at a company's retail store resides in one database, information on Web site activity lives in another, and customer-service reps in a company's telephone help center might not have real-time access to either one. Also, not all customers want a relationship with the company; some may resent the organization collecting information about them and storing it in a database.

However, several hurdles of CRM deployment have been crossed. Cost has decreased with the advent of packaged applications that take a considerable amount of risk out of any CRM implementation. Development and testing time is reduced and, as a result, costs are typically lower. With standardized CRM building blocks, packaged applications enable companies to focus on the business value and making sure their CRM systems meet their business needs. These packaged applications are implemented faster and enable companies to more quickly reach their ROI.

HOW TO SUCCEED WITH CRM

CRM projects require careful planning and implementation. To be successful, CRM involves major cultural and organizational changes that often are met with much resistance. CRM should be enterprise-wide in scale and scope. However, it is usually better to take an incremental approach starting with a CRM pilot. Once the pilot succeeds, introducing one CRM application at a time is recommended. Also, it is important to be skeptical of vendor claims and to know that user expectations for CRM are often unreasonable.

SEE ALSO *Marketing Communication; Strategy Implementation*

BIBLIOGRAPHY
All, Ann. "Companies Want to Fix CRM Mistakes in 2008." *IT Business Edge* 9 Apr 2008. Available from: http://www.itbusinessedge.com/blogs/tve/?p=300.

Beasty, Colin. "Tracking the Evolution of CRM." *Customer Relationship Management* 9, no. 2 (2005): 18.

Boardman, Richard. "Get a handle on CRM." *Computer Weekly* 8 February 2005, 31.

Borck, James R. "CRM Meets Business Intelligence." *InfoWorld* 27, no. 2 (2005): 39.

Bressler, Terrel G. "How CRM Helps Merge Firms' Crucial Relationship and Intelligence Assets" *Wall Street and Technology* 19 Mar 2007. Available from: http://www.wallstreetandtech.com/features/showArticle.jhtml?articleID=198001932.

Bull, Christopher. "Strategic Issues in Customer Relationship Management (CRM) Implementation." *Business Process Management Journal* 9, no. 5 (2003): 592–602.

Buttle, Francis. *Customer Relationship Management: Concepts and Tools.* Oxford: Elsevier Butterworth-Heinemann, 2004.

Cap Gemini Ernst and Young. "CGEY and Gartner Share Secrets of ROI." (2001). Available from: http://www.crm-forum.com/library;.

Cavenagh, Andrew. "What's the Score? Is It All Hype, or Really the 'New Way' to Do Business?" *Power Economics* 2 February, 2005, 8.

Chan, Joseph O. "Toward a Unified View of Customer Relationship Management." *Journal of American Academy of Business* 1 (March 2005): 32–39.

Dyche, Jill. *The CRM Handbook.* Boston: Addison-Wesley, 2002.

Edwards, John. "Get It Together with Collaborative CRM." *insideCRM* 29 Nov 2007. Available from: http://www.insidecrm.com/features/collaborative-crm-112907/.

Freeland, John G., ed. *The Ultimate CRM Handbook.* New York: McGraw-Hill, 2003.

Gurau, Calin, Ashok Ranchhod, and Ray Hackney. "Customer-Centric Strategic Planning: Integrating CRM in Online Business Systems." *Information Technology and Management* 4, no. 2-3 (2003): 199–214.

Harris, Randy. "What Is a Customer Relationship Management (CRM) System?" *Darwin Magazine* December 2003.

Helms, C. "Promising ROI Keeps CRM Expenditures High." (2001) Available from: http://www.1to1.com/inside1to1/19763.html.

Kale, Sudhir H. "CRM Failure and the Seven Deadly Sins." *Marketing Management* 13, no. 5 (2004): 42–46.

Kotler, Philip, et al. *Marketing Management: An Asian Perspective.* Singapore: Prentice Hall, 2003.

Kotorov, Rado. "Customer Relationship Management: Strategic Lessons and Future Directions." *Business Process Management Journal* 9, no. 5 (2003): 566–571.

"Lessons from CRM Implementations" *Derby Management* Available from: http://www.derbymanagement.com/knowledge/pages/tools/implementing.html.

"Maximizer Software: CRM Set for Significant Growth Despite Economic Slow Down; Value of Global CRM Market to Reach $3.7 Billion in 2012." *Manufacturing Business Technology* 22 May 2008. Available from: http://www.mbtmag.com/articleXML/LN795544008.html?q=crm.

Neuborne, Ellen. "A Second Act for CRM." *Inc. Magazine* March 2005, 40–41.

"Spending Survey: IT Departments Slow to Invest in Systems that Create Customer Value." *Manufacturing Business Technology* 4 May 2008.

CYCLE TIME

Time has become a key success measure in business. Oftentimes, it is more important than other performance measures. In marketing, for example, a product's success or failure often depends on "time-to-market," or how quickly a new product becomes available to the customer. "Time-to-market" is one of many cycle-time measures used in management. Cycle time is the measure of a business cycle from beginning to end. Production cycle time refers to production activities, such as the total time required to produce a product. Order-processing cycle time is used in the front office to determine the total time required to process an order. From a financial perspective, cash-to-cash cycle time describes the amount of time a company takes to recover its financial investment. From a management perspective, cycle time is used to evaluate performance in all aspects of a business.

Cycle time is a key measurement tool for the performance of a number of management concepts, including supply chain management (SCM), just-in-time (JIT) management, enterprise resources planning (ERP), theory of constraints management, and lean management. Cycle-time improvements in any of these areas have been linked to reduced costs, reduced inventories, and increased capacity. The resource areas that are measured by cycle time include the measurement of financial flow, materials flow, and information flow. In each case, a delay or failure of any of these measures would indicate a failure of the entire business process.

Cycle time is best illustrated by a few examples. In marketing, time-to-market cycle time is the critical measure of success in the fashion, apparel, and technology industries. Companies that cannot get products to market quickly may get completely washed out. Time-to-market is the measure of time from idea inception through idea development, design and engineering, pilot, and finally production and customer availability. For example, the United States led the world in the idea phase of automotive airbag development. However, a slow design and engineering process enabled the Japanese to offer airbags in their vehicles several years before the United States.

Another example of cycle time is the production cycle time. This starts when an order is released on the production floor and ends when the product is available for shipment to the customer. Production cycle time became a key performance indicator in the automobile industry when, in the 1980s and 1990s, a system of manufacturing pioneered by the Japanese company Toyota was imported to the United States. Prior to the introduction of the Toyota Production System (TPS), American manufacturing operated on a volume-driven batch-and-queue system. This was characterized by long cycle times and the staging of large amounts of work-in-process inventories. Now that many American manufacturers have adopted the principles of lean manufacturing (by reducing inventories to increase efficiency and shorten production cycle times), companies seek to gain a competitive advantage by practicing lean product development in order to shorten the time-to-market cycle.

Another example of cycle time is order-processing time. Unfortunately, in far too many factories the time it takes to process an order is longer than the time it takes to manufacture the product. Order processing time starts when a phone call or fax initiates the order, and ends when the order is sent to production scheduling. This cycle time includes all paperwork-related steps, such as credit verification and order form completion.

In finance, performance measures such as cash-to-cash cycle time reflect a company's cash performance. This is the amount of time it takes from the time money is spent on a customer's product for the purchase of components until the "cash" is recovered from the customer in the form of a payment. In 2007, the median cash-to-cash cycle time in the computers and peripherals sector was thirty-six days. Apple Computers led the industry's top revenue earners with a cash cycle of negative thirty-six days, followed by Dell at negative twenty-three days. Apple and Dell have the advantage of being able to utilize its customers' cash to earn interest. Dell can then use this advantage to offer price incentives that the other computer manufacturers cannot.

A variant use of the term "cycle time" is found in industrial engineering. In this specific example, cycle time has a number of meanings, depending on the situation in which the term is used and the industry to which it is applied. Generally it is considered to be a manufacturing term applied to an environment where a series of activities or tasks (each with a predetermined completion time known as the task time) are performed in a specified sequence known as a "precedence relationship." However, the term can be used in the service sector if the rendering of the service requires a sequential series of tasks. As these tasks are completed at each operation or workstation, the product is passed on to the next workstation in the sequence until the product is complete and can be defined as a finished good.

The predetermined task times govern the range of possible cycle times. The minimum cycle time is equal to the longest task time in the series of tasks required to produce the product, while the maximum cycle time is equal to the sum of all the task times required for a finished good. For example, consider a product that requires five sequential tasks to manufacture. Task one takes 10 minutes to complete; task two, 12 minutes; task three, 20 minutes; task four, 8 minutes; and task five, 10

minutes. The minimum cycle time for this product would be 20 minutes (the longest time). Any cycle time less than 20 minutes would not allow the product to be made, because task three could not be completed. The maximum cycle time would be 60 minutes, or the sum of all task times in the sequence. This implies a range of possible cycle times of 20 to 55 minutes. However, the maximum cycle time would really only be feasible if there was no waste or non-value-added time in the process, such as delays between tasks. Some people refer to the sum of the task times as throughput time or the time required to move a product completely through the system.

However, in its more general usage, cycle time is how long it takes for material to enter and exit a production facility. Depending on the industry, this definition is appropriate with slight modifications. For example, in the automobile collision repair industry, cycle time refers to the time a car enters the facility for repair until the repair is completed.

SEE ALSO *Operations Management; Operations Scheduling*

BIBLIOGRAPHY

Blackstone, John H. *Capacity Management.* Cincinnati, OH: South-Western Publishing Co., 1989.

Cox, James F., III, and John H. Blackstone, Jr., eds. *APICS Dictionary,* 9th ed. Falls Church, VA: American Production and Inventory Control Society Inc., 1998.

Liker, Jeffrey. *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer.* New York: McGraw Hill, 2004.

Myers, Randy, "2007 Working Capital Survey" *CFO Magazine* 5 July 2007. Available from: http://www.cfo.com/media/pdf/0707WCcharts.pdf.

Plenert, Gerhard J. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

Stevenson, William J. *Production/Operations Management,* 6th ed. Boston: Irwin/McGraw-Hill, 1999.

Strategos International. "A Brief History of Lean Manufacturing, Toyota and Just in Time." Available from: http://www.strategosinc.com/just_in_time.htm.

Teresco, John, "Toyota's Real Secret: Hint, It's Not TPS." *Industry Week* 1 February 2007. Available from: http://www.industryweek.com/ReadArticle.aspx?ArticleId=13432.

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DATA PROCESSING AND DATA MANAGEMENT

Most data management methods draw distinction between data, information, and knowledge. Data is specifically a collection of mathematical truths and facts, an *is* statement of some sort, without any interpretation. Information is data that has context, showing movement and action of some specific entity. When data communicates a clear change, it has become information. Knowledge is the third form, essentially information in the hands of an experienced analyzer. Knowledge communicates what is likely to happen, how a company can use information, and what the implications of information are for the company.

In the eLearning Training company's 2007 *Making Sense of Data and Information*, several ways are given to convert data to information, and information to knowledge. Data is made of facts, often factual numbers such as sales figures, accident records, production output, costs of resources, and so on. Upon conversion to information, the data is put into a specific framework. This framework could be something like charts that identify certain trends, averages, and/or significant variables. Generally, to convert data to information, a clear set of data must be specified as affecting the business, followed by a clear and regular method of collecting the pertinent data, and joined by the ability to convert the data in some form of analysis, such as computer programs and mathematical formulas.

There are many processes used to collect, define, and organize data into information. Some of the tools analysts use include the following:

1. Data cleaning is the process of removing unnecessary or cluttering data that has no relevance to factors the analysis is focusing on.

2. Data integration is the process of combining similar sets of data to make analysis easier.

3. Data selection is the process, often automated, of retrieving pertinent sets of data from some type of data collection.

4. Data transformation involves placing the data into a form in which it can be accessed for specific types of analysis.

5. Data mining involves using carefully designed methods to access and gather data.

Changing information to knowledge is a more nebulous area, affected largely by the skills of the analysts and the needs of the company. Some business knowledge comes directly from information: production methods based on reliable manufacturing data is one type of knowledge directly branching from collected information. Reliable company policies use such knowledge as the basis of their operation. Other types of knowledge exist in companies but are more difficult to trace to information. This includes intuitive and experiential knowledge, such as the skills of an employee who is able to predict the outcome of data analysis because of previous work with sets of data.

Most of the methods discussed below pertain to changing data, the raw facts, into types of information. Data management includes the methods, concepts, and trends connected to this process.

CHARACTERISTICS OF VALUABLE INFORMATION

According to Ralph M. Stair in his 1999 book, *Principles of Information Systems,* in order for information to be valuable, it must be:

1. **Accurate.** Accurate information is free from error.

2. **Complete.** Complete information contains all of the important facts.

3. **Economical.** Information should be relatively inexpensive to produce.

4. **Flexible.** Flexible information can be used for a variety of purposes, not just one.

5. **Reliable.** Reliable information is dependable information.

6. **Relevant.** Relevant information is important to the decision-maker.

7. **Simple.** Information should be simple to find and understand.

8. **Timely.** Timely information is readily available when needed.

9. **Verifiable.** Verifiable information can be checked to make sure it is accurate.

DATA GOVERNANCE

Data governance refers to the methods, people, and policies involved in managing data. Those who work in data governance develop the strategies the company uses to sort information and change it into useful knowledge. There are a number of titles given to those involved in data governance, including data trustee, data steward, data registrar, data administrator, director of information flow, and director of application development. Although the tasks for these employees vary, database security and database development are the two primary areas of data governance. For those who wish to develop a data governance system or department for their organization, David Loshin, in his 2001 book, *Enterprise Knowledge Management,* suggests several steps for bringing together the right individuals:

1. Identify those who have a clear interest in the results of developed data. This could include specific investors, members of the corporate board who are in charge of security or information systems, and other company leaders who would be involved in data governance.

2. Create a full list of the data sets to be put under the data governance system.

3. Define who is currently in charge of the data systems, and determine whether or not those titles and employee positions should persist.

4. Create the necessary new roles in data governance, and assign those roles to interested parties.

5. Develop a registry that contains all information involved in data governance, as well as the lists and roles that have so far been created.

Once a data governance system has been established, there are many ways to begin managing the company data itself. In their 2007 book, *Master Data Management and Customer Data Integration for Global Enterprise*, Berson and Dubov give three activities often undertaken by data governance systems.

First, the process should be defined and implemented. This requires setting up the proper connections between the main storage of data and those who need to use it—the analysts and data governance leaders. How is the data going to get into the system? How many people will able to use it? To what standard is the data going to be set? How will like sets of data be linked for easy access? How will duplicate sets of data be resolved into one form? These are the sort of questions the data governance process needs to answer. This is done through a detailed integration of the system and the users, setting up steps to download the data, refine the data, and gather the data into proper families. In addition to setting up these important methods, the process should also include a manual way to investigate and delete unnecessary data (this is a correlation to automatic correction systems).

Second, some form of technology should be chosen and implemented to organize and deliver the data. There are many programs capable of doing this, and the company should choose a system tailored to meet its specific needs. Who will be using the data technology? Will it be a subset of an established intranet system? How will it label the data for those who need to access it? When considering a form of data software, there are several abilities data governance leaders should watch for, including:

- The ability to automatically monitor incoming data from all offices or data hubs

- The ability to track changes in data standards and organization over time, to better understand the accuracy and usability of the data presented

- The ability to incorporate data from other systems besides the company's, and deal with sudden changes in data or data organization

- The ability to provide a consistent and reliable platform to base data decisions on

Third, a company should make sure all their data is available for auditing and accountability purposes. Outside confirmation of the quality and purposes of a company's data is essential. Legislation such as the 2002 Sarbanes-Oxley law requires that businesses sign off on the accuracy and clarity of their information, so having checks and balances set up within a data governance system can be crucial in compliance issues. Data stewards often have the task of ensuring data accountability.

Data can be organized and connected in several ways, one of the most common electronic methods being the database approach. The database approach is such that multiple business applications access the same database. Consequently, file updates are not required of multiple files. Updates can be accomplished in the common database, thus improving data integrity and eliminating redundancy. The database approach provides the opportunity to share data, as well as information sources. Additional software is required to implement the database approach to data management. A database management system (DBMS) is needed. A DBMS consists of a group of programs that are used in an interface between a database and the user, or between the database and the application program. Advantages of the database approach are presented in Table 1. Disadvantages of the database approach are presented in Table 2.

METADATA

Metadata is defined most commonly as "data about data," and is essential in creating data management methods. At its basic form, metadata is the labels and categories placed on data to make analysis easier. For instance, the metadata for a book would contain—not the book itself—but the author, language, and ISBN of the book. Most people encounter and manipulate metadata when searching for subjects on the Internet. The bits of information pertaining to Web sites that most search engines list is all metadata, and it is sifted through by the searcher to find pertinent data.

In a company's data governance system, metadata is used to classify and control the data available. When analysts chose and manipulate large data groups, they do so through the information collected from metadata. The file type, the name, the timestamp, the physical and electronic location, the owner, and the access permissions are all common types of metadata found in company file systems.

DATABASE MODELS

The structure of the relationships in most databases follows one of three logical database models: hierarchical, network, and relational.

- A hierarchical database model is one in which the data are organized in a top-down or inverted tree-like

Table 1
Advantages of the Database Approach

Advantages	Explanation
Reduced data redundancy	The database approach can reduce or eliminate data redundancy. Data is organized by the DBMS and stored in only one location. This results in more efficient utilization of system storage space.
Improved data integrity	With the traditional approach, some changes to data were not reflected in all copies of the data kept in separate files. This is prevented with the database approach because there are not separate files that contain copies of the same piece of data.
Easier modification and updating	With the database approach, the DBMS coordinates updates and data modifications. Programmers and users do not have to know where the data is physically stored. Data is stored and modified once. Modification and updating is also easier because the data is stored at only one location.
Data and program independence	The DBMS organized the data independently of the application program. With the database approach, the application program is not affected by the location or type of data. Introduction of new data types not relevant to a particular application does not require the rewriting of that application to maintain compatibility with the data file.
Better access to data and information	Most DBMSs have software that makes it easier to access and retrieve data from a database, in most cases, simple commands can be given to get important information. Relationships between records can be more easily investigated and exploited, and applications can be more easily combined.
Standardization of data access	A primary feature of the database approach is a standardized, uniform approach to database access. This means that the same overall procedures are used by all application programs to retrieve data information.
A framework for program	Standardized database access procedures can mean more standardization of program development. Because programs go through the DBMS to gain access to data in the database, standardized database access can provide a consistent framework for program development. In addition, each application program need only address the DBMS, not the actual data files, reducing application development time.
Better overall protection of the data	The use of and access to centrally located data is easier to monitor and control. Security codes and passwords can ensure that only authorized people have access to particular data and information in the database, and ensure privacy.
Shared data and information resources development	The cost of hardware, software, and personnel can be spread over a large number of applications and users. This is a primary feature of DBMS.

structure. This type of model is best suited for situations where the logical relationships between data can be properly represented with the one-parent-many-children approach.

- A network model is an extension of the hierarchical database model. The network model has an owner-

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Table 2

Disadvantages of the Database Approach

Disadvantages	Explanation
Relative high cost of purchasing and operating a DBMS in a mainframe operating environment	Some mainframe DBMSs can cost millions of dollars.
Specialized staff	Additional specialized staff and operating personnel may be needed to implement and coordinate the use of the database. It should be noted, however, that some organizations have been able to implement the database approach with no additional personnel.
Increased vulnerability	Even though databases offer better security because security measures can be concentrated on one system, they also may make more data accessible to the trespasser if security is breached. In addition, if for some reason there is a failure in the DBMS, multiple application programs are affected.

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member relationship in which a member may have many owners, in contrast to a one-to-many relationship.

- A relational model describes data using a standard tabular format. All data elements are placed in two-dimensional tables called relations, which are the equivalent of files. Data inquiries and manipulations can be made via columns or rows given specific criteria.

Network database models tend to offer more flexibility than hierarchical models. However, they are more difficult to develop and use because of relationship complexity. The relational database model offers the most flexibility and was very popular during the early 2000s.

DATABASE MANAGEMENT SYSTEMS

As indicated previously, a database management system (DBMS) is a group of programs used as an interface between a database and an applications program. DBMSs are classified by the type of database model they support. A relational DBMS would follow the relational model, for example. The functions of a DBMS include data storage and retrieval, database modifications, data manipulation, and report generation.

A data definition language (DDL) is a collection of instructions and commands used to define and describe data and data relationships in a particular database. File descriptions, area descriptions, record descriptions, and set descriptions are terms the DDL defines and uses.

A data dictionary also is important to database management. This is a detailed description of the structure and intended content in the database. For example, a data dictionary might specify the maximum number of characters allowed in each type of field and whether the field content can include numbers, letters, or specially formatted content such as dates or currencies. Data dictionaries are used to provide a standard definition of terms and data elements, assist programmers in designing and writing programs, simplify database modifications, reduce data redundancy, increase data reliability, and decrease program development time.

The choice of a particular DBMS typically is a function of several considerations. Economic cost considerations include software acquisition costs, maintenance costs, hardware acquisition costs, database creation and conversion costs, personnel costs, training costs, and operating costs.

Most DBMS vendors are combining their products with text editors and browsers, report generators, listing utilities, communication software, data entry and display features, and graphical design tools. Consequently, those looking for a total design system have many choices.

DATA MINING

The process of collecting applicable data is referred to as data mining. Most data governance systems have automatic data-mining programs designed to fit the analysts' needs. These programs sort through and summarize data according to certain parameters. If a company wanted to cut costs in manufacturing, for instance, a data-mining activity would be done to search for figures and facts concerning manufacturing, collect that data into different categories such as supply costs and worker costs, and finally transmit the categorized data to the proper people.

To identify patterns, data mining is controlled by strict guidelines. For instance, one analysis might require a data mine of all associative information events that connected to each other through some type of relationship. Sequential patterns are another type of data mining parameter, where data is found in events that naturally lead to one another, such as the supply chain. Some data mining activities focus on classification and the search for new patterns in the available data. Still more data mining might be done to predict trends or outcomes of particular events.

Although data mining is an immensely popular tool, it does have blind spots. For the data mining to be useful, a skilled analyst must set clear parameters and interpret the data correctly. Data mining does not make value judgments or attribute importance.

DATA CLUSTERING

Data clustering is often confused with data mining, but the two are separate actions. Data clustering is a subset of data mining, and is usually performed first in a data-

mining activity. It is an automatic function, based on mathematic principles, that groups data into similar categories. When a data-mining operation is run, the data is clustered into applicable areas such as "Costs" and "Profits." The data-mining operation then goes on to apply more required parameters to the data.

DATA WAREHOUSING

Data warehousing involves taking data from a main computer for analysis without slowing down the main computer. In this manner, data are stored in another database for analyzing trends and new relationships. Consequently, the data warehouse is not the live, active system, but it is updated daily or weekly. For example, Wal-Mart uses a very large database (VLDB) that is 4 trillion bytes (terabytes) in size. Smaller parts of this database could be warehoused for further analysis to avoid slowing down the VLDB.

FUTURE TRENDS

A private database is compiled from individual consumer or business customer names and addresses maintained by a company for use in its own marketing efforts. Such a database may have originated as a public database, but typically once the company begins adding or removing information it is considered a private database. By contrast, public databases are those names, addresses, and data that are complied for resale in the list rental market. This is publicly available data (i.e., any business can purchase it on the open market) rather than lists of specific customers or targets.

However, a new trend is combining features of the two approaches. Cooperative databases are compiled by combining privately held response files of participating companies so that costs are shared. Many consider this to be a future trend, such that virtually all catalog marketers, for example, would use cooperative databases.

Geographic Information Systems (GIS) are becoming a growing area of data management. GIS involves combining demographic, environmental, or other business data with geographic data. This can involve road networks and urban mapping, as well as consumer buying habits and how they relate to the local geography. Output is often presented in a visual data map that facilitates the discovery of new patterns and knowledge.

Customer Resource Management (CRM) is another area where data process and data management is deeply involved. CRM is a set of methodologies and software applications for managing the customer relationship. CRM provides the opportunity for management, salespeople, marketers, and potentially even customers, to see sufficient detail regarding customer activities and contacts. This allows companies to provide other possible products or useful services,

as well as other business options. Security of this information is of significant concern on both sides of the equation.

SEE ALSO *Computer Networks; Computer Security*

BIBLIOGRAPHY

Berson, Alex, and Larry Dubov. *Master Data Management and Customer Data Integration for Global Enterprise.* New York: McGraw-Hill Publishing, 2007.

Chu, Margaret Y. *Blissful Data: Wisdom and Strategies for Providing Meaningful, Useful, and Accessible Data for All Employees.* New York: American Management Association, 2003.

Churchill, Gilbert A. *Marketing Research: Methodological Foundations.* 8th ed. Cincinnati, OH: South-Western College Publishing, 2001.

"Data Governance Channel." *DMReview.com*, 2008. Availabe from http://www.dmreview.com/channels/data_governance.html.

"Data Mining." *SearchSQL*, 2006. Available from: http://searchsqlserver.techtarget.com/sDefinition/0,,sid87_gci211901,00.html.

Elearn Training Company. *Making Sense of Data and Information.* Elsevier Publishing, 2007.

Han, Jiawei, and Micheline Kamber. *Data Mining: Concepts and Techniques.* San Francisco: Morgan Kaufmann Publishing, 2000.

Loshin, David. *Enterprise Knowledge Management: The Data Quality Approach.* San Francisco: Morgan-Kaufmann Publishing, 2001.

"Metadata Definition." *The Linux Information Project* Linux, 2006.

Palace, Bill. "Data Mining: What is Data Mining?"*Anderson Graduate School of Management of UCLA,* 1996. Available from: http://www.anderson.ucla.edu/faculty/jason.frand/teacher/technologies/palace/index.htm.

Seifert, Jeffrey. *Data Mining: An Overview* CRS, 2004.

Stair, Ralph M. *Principles of Information Systems: A Managerial Approach.* 4th ed. Cambridge, MA: Course Technology, 1999.

Wang, John. *Data Mining: Opportunities and Challenges.* Hershey, PA: Idea Group Publishing, 2003.

White, Ken. "DBMS Past, Present, and Future." *Dr. Dobb's Journal* 26, no. 8 (2001): 21–26.

DEBT VS. EQUITY FINANCING

Equity financing takes the form of money obtained from investors in exchange for an ownership share in the business. Such funds may come from friends and family members of the business owner, wealthy "angel" investors, or venture capital firms. The main advantage to equity financing is that the business is not obligated to repay the money. Instead, the investors hope to reclaim their investment out of future profits. The involvement of high-profile investors may also help increase the credibility of a new business. Additionally, the company's assets do not have to be used as collateral to obtain equity, and the business does not have to make debt payments. The main disadvantage to equity financing is that the investors become part-owners of the business, and thus

gain a say in business decisions. "Equity investors are looking for a partner as well as an investment, or else they would be lenders," venture capitalist Bill Richardson explained in Pacific Business News (Jefferson, 2001). As ownership interests become diluted, managers face a possible loss of autonomy or control. In addition, an excessive reliance on equity financing may indicate that a business is not using its capital in the most productive manner.

Both debt and equity financing are important ways for businesses to obtain capital to fund their operations. Deciding which to use or emphasize depends on the long-term goals of the business and the amount of control managers wish to maintain. Ideally, experts suggest that businesses use both debt and equity financing in a commercially acceptable ratio. This ratio, known as the debt-to-equity ratio, is a key factor analysts use to determine whether managers are running a business in a sensible manner. Although debt-to-equity ratios vary greatly by industry and company, a general rule of thumb holds that a reasonable ratio should fall between 1:1 and 1:2. Some experts recommend that companies rely more heavily on equity financing during the early stages of their existence, because such businesses may find it difficult to service debt until they achieve reliable cash flow. However, start-up companies may have trouble attracting venture capital until they demonstrate strong profit potential. One advantage of debt funding is that interest payments are tax deductible, whereas payments to investors in C-corporations are not.

Hybrid securities are a broad group of securities that have characteristics of both debt and equity. These securities became popular in 2005 when the rating agency Moody's established a new set of guidelines that allowed institutions to classify securities on a debt-equity continuum. The previous policy had been to treat the entire amount as debt. Companies are attracted to hybrids because they tend to include enough equity-like features not to be classified as debt on the balance sheet, and have enough debt-like features to achieve tax-deductions and inexpensive capital.

In any case, all businesses require sufficient capital in order to succeed. The most prudent course of action is to obtain capital from a variety of sources, using both debt and equity, and hire professional accountants and attorneys to assist with financial decisions.

BIBLIOGRAPHY

CCH Tax and Accounting. "Financing Basics: Debt vs. Equity." CCH Business Owner's Toolkit. Available from: http://www.toolkit.cch.com/text/P10_2000.asp/.

Cox, Helen. "Debt vs Equity Funding." *EzineArticles,* November 2007. Available from: http://ezinearticles.com/?Debt-vs-Equity-Funding&id=829120.

Jefferson, Steve. "When Raising Funds, Start-Ups Face the Debt vs. Equity Question." Pacific Business News, 3 August 2001.

Moose, John E. and Patrick M. Jones."Is It Debt, or Is It Equity?" *American Bankruptcy Institute Journal* March 2007. Available from: http://findarticles.com/p/articles/mi_qa5370/is_200703/ai_n21283870.

Tsuruoka, Doug. "When Financing a Small Business, Compare Options, Keep It Simple." Investor's Business Daily, 3 May 2004.

WomanOwned.com. "Growing Your Business: Debt Financing vs. Equity Financing." Available from: http://www.womanowned.com/Growing/Funding/Financing.aspx.

DECISION RULES AND DECISION ANALYSIS

A decision rule is a logical statement of the type "if [condition], then [decision]." The following is an example of a decision rule experts might use to determine an investment quality rating:

> If the year's margin is at least 4.27 percent and the year's ratio of shareholder funds to fixed assets is at least 35.2 percent, then the class of rating is at least lower investment grade (LIG).

The condition in this decision rule is "the year's margin is at least 4.27 percent and the year's ratio of shareholder funds to fixed assets is at least 35.2 percent," while "the class of rating is at least lower investment grade" is the decision part of the rule.

Decision rules give a synthetic, easily understandable, and generalized representation of the knowledge contained in a data set organized in an information table. The table's rows are labeled by objects, whereas columns are labeled by attributes; entries in the body of the table are thus attribute values. If the objects are exemplary decisions given by a decision maker, then the decision rules represent the preferential attitude of the decision maker and enable understanding of the reasons for his or her preference.

People make decisions by searching for rules that provide good justification of their own choices. However, a direct statement of decision rules requires a great cognitive effort from the decision maker, who typically is more confident making exemplary decisions than explaining them. For this reason, the idea of inferring preference models in terms of decision rules from exemplary decisions provided by the decision maker is very attractive. The induction of rules from examples is a typical approach of artificial intelligence. It is concordant with the principle of posterior rationality, and with aggregation-disaggregation logic. The recognition of the rules by the decision maker justifies their use as a powerful decision support tool for decision making concerning new objects.

There are many applications of decision rules in business and finance, including:

- Credit card companies use decision rules to approve credit card applications.

- Retailers use associative rules to understand customers' habits and preferences (market basket analysis) and apply the finding to launch effective promotions and advertising.

- Banks use decision rules induced from data about bankrupt and non-bankrupt firms to support credit-granting decisions.

- Telemarketing and direct marketing companies use decision rules to reduce the number of calls made and increase the ratio of successful calls.

Other applications of decision rules exist in the airline, manufacturing, telecommunications, and insurance industries. Another area where decision rules are being tested is in setting foreign policy, where small groups representing different and often conflicting perspectives must reach agreement. The way groups manage internal conflict can have a substantial affect on the agreement they reach. The group's decision will change based upon the type of decision rules followed as well as each member's primary allegiance.

DESCRIBING AND COMPARING INFORMATION ATTRIBUTES

The examples (information) from which decision rules are induced are expressed in terms of some characteristic attributes. For instance, companies could be described by the following attributes: sector of activity, localization, number of employees, total assets, profit, and risk rating. From the viewpoint of conceptual content, attributes can be one of the following types:

- Qualitative attributes (symbolic, categorical, or nominal), including sector of activity or localization

- Quantitative attributes, including number of employees or total assets

- Criteria or attributes whose domains are preferentially ordered, including profit, because a company having large profit is preferred to a company having small profit or even loss

The objects are compared differently depending on the nature of the attributes considered. More precisely, with respect to qualitative attributes, the objects are compared on the basis of an indiscernibility relation: two objects are indiscernible if they have the same evaluation with respect to the considered attributes. The indiscernibility relation is reflexive (i.e., each object is indiscernible with itself), symmetric (if object A is indiscernible with object B, then object B also is indiscernible with object A), and transitive (if object A is indiscernible with object B and object B is indiscernible with object C, then

object A also is indiscernible with object C). Therefore, the indiscernibility relation is an equivalence relation.

With respect to quantitative attributes, the objects are compared on the basis of a similarity relation. The similarity between objects can be defined in many different ways. For example, if the evaluations with respect to the considered attribute are positive, then the following statement may define similarity:

$$\frac{\text{Evaluation of A} - \text{Evaluation of B}}{\text{Evaluation of B}} \leq \text{Threshold}$$

For instance, with respect to the attribute "number of employees," fixing a threshold at 10 percent, Company A having 2,710 employees is similar to Company B having 3,000 employees. Similarity relation is reflexive, but neither symmetric nor transitive; the abandon of the transitivity requirement is easily justifiable, remembering, for example, Luce's paradox of the cups of tea (Luce, 1956). As for the symmetry, one should notice that the proposition $y\text{R}x$, which means "y is similar to x," is directional; there is a subject y and a referent x, and in general this is not equivalent to the proposition "x is similar to y."

With respect to criteria, the objects are compared on the basis of a dominance relation built using outranking relations on each considered criterion: object A outranks object B with respect to a given criterion if object A is at least as good as object B with respect to this criterion; if object A outranks object B with respect to all considered criteria then object A dominates object B. An outranking relation can be defined in many different ways. Oftentimes, it is supposed that outranking is a complete preorder (i.e., transitive and strongly complete). For each couple of objects, say object A and object B, at least one of the following two conditions is always verified: object A outranks object B and/or object B outranks object A. A dominance relation, built on the basis of the outranking relation being a complete preorder, is a partial preorder (i.e., it is reflexive and transitive, but in general not complete).

DECISION RULE SYNTAX

The syntax of decision rules is different according to the specific decision problem. The following decision problems are most frequently considered:

- Classification

- Sorting

- Choice

- Ranking

Following is a presentation of the syntax of decision rules considered within each one of the above decision problems.

Classification. Classification concerns an assignment of a set of objects to a set of predefined but non-ordered classes. A typical example of classification is the problem of market segmentation; in general there is no preference order between the different segments. The objects are described by a set of (regular) attributes that can be qualitative or quantitative. The syntax of decision rules specifies the condition part and the decision part.

With respect to the condition part, the following types of decision rules can be distinguished:

1. Decision rules based on qualitative attributes: "if the value of attribute q_1 is equal to r_{q1} and the value of attribute q_2 is equal to r_{q2} and...and the value of attribute q_p is equal to r_{qp}, then [decision]," where $r_{q1}, r_{q2},...,r_{qp}$ are possible values of considered attributes.

2. Decision rules based on quantitative attributes: "if the value of attribute q_1 is similar to r_{q1} and the value of attribute q_2 is similar to r_{q2} and...and the value of attribute q_p is similar to r_{qp}, then [decision]," where $r_{q1}, r_{q2},..., r_{qp}$ are possible values of considered attributes.

3. Decision rules based on qualitative and quantitative attributes: "if the value of attribute q_1 is equal to r_{q1} and the value of attribute q_2 is equal to r_{q2} and...and the value of attribute q_t is equal to r_{qt} and the value of attribute q_{t+1} is similar to r_{qt+1} and the value of attribute q_{t+2} is similar to r_{qt+2} and...and the value of attribute q_p is similar to r_{qp}, then [decision]," where $q_1 q_2...,q_t$ are qualitative attributes, $q_{t+1}, q_{t+2},..., q_p$ are quantitative attributes, and $r_{q1}, r_{q2},..., r_{qp}$ are possible values of considered attributes.

With respect to the decision part, the following types of decision rules can be distinguished:

1. Exact decision rule: "if [condition], then the object belongs to Y_j," where Y_j is a decision class of the considered classification.

2. Approximate decision rule: "if [condition], then the object belongs to Y_{j1} or Y_{j2} or...Y_{jk}," where $Y_{j1}, Y_{j2},..., Y_{jk}$ are some decision classes of the considered classification.

3. Possible decision rule: "if [condition], then the object could belong to Y_j," where Y_j is a decision class of the considered classification.

Sorting. Sorting concerns an assignment of a set of objects to a set of predefined and preference-ordered classes. The classes are denoted by Cl_1 Cl_2 and so on, and we suppose that they are preferentially ordered such that the higher the number, the better the class (i.e., the elements of class Cl_2 have a better comprehensive evaluation than the elements of class Cl_1 the elements of class Cl_3 have a better comprehensive evaluation than the elements of class Cl_2 and so on. For example, in a problem of bankruptcy risk evaluation, Cl_1 is the set of unacceptable-risk firms, Cl_2 is a set of high-risk firms, Cl_3 is a set of medium-risk firms, and so on. The objects are evaluated by a set of attributes that generally include criteria and qualitative and/or quantitative (regular) attributes. The syntax of the condition depends on the type of attributes used for object description. If there are criteria only, then the following types of decision rules can be distinguished:

1. Exact D≥ decision rule: "if evaluation with respect to criterion q_1 is at least as good as r_{q1} and evaluation with respect to criterion q_2 is at least as good as r_{q2} and...evaluation with respect to criterion q_p is at least as good as r_{qp}, then the object belongs to at least class t," where $r_{q1}, r_{q2},..., r_{qp}$ are possible values of considered criteria.

2. Exact D≤ decision rule: "if evaluation with respect to criterion q_1 is at most as good as r_{q1} and evaluation with respect to criterion q_2 is at most as good as r_{q2} and...evaluation with respect to criterion q_p is at most as good as r_{qp}, then the object belongs to at most class t," where $r_{q1}, r_{q2},...z, r_{qp}$ are possible values of considered criteria.

3. Approximate D≥≤ decision rule: "if evaluation with respect to criterion q_1 is at least as good as r_{q1} and evaluation with respect to criterion q_2 is at least as good as r_{q2} and...evaluation with respect to criterion q_h is at least as good as r_{qh} and evaluation with respect to criterion q_{h+1} is at most as good as r_{qh+1} and evaluation with respect to criterion q_{h+2} is at most as good as r_{qh+2} and...evaluation with respect to criterion q_p is at most as good as r_{qp}, then the object belongs to at least class t and at most to class t" where criteria $q_1 q_2...,q_k$ are not necessarily different from $q_{k+1}, q_{k+2},..., q_p$ and $r_{q1}, r_{q2},..., r_{qp}$ are possible values of considered criteria.

4. Possible D≥ decision rule: "if evaluation with respect to criterion q_1 is at least as good as r_{q1} and evaluation with respect to criterion q_2 is at least as good as r_{q2} and...evaluation with respect to criterion q_p is at least as good as r_{qp}, then the object could belong to at least class t," where $r_{q1}, r_{q2},..., r_{qp}$ are possible values of considered criteria.

5. Possible D≤ decision rule: "if evaluation with respect to criterion q_1 is at most as good as r_{q1} and evaluation with respect to criterion q_2 is at most as good as

r_{q2} and...evaluation with respect to criterion q_p is at most as good as r_{qp}, then the object could belong to at most class *t*," where r_{q1}, rq2,..., r_{qp} are possible values of considered criteria.

Choice and Ranking. Choice concerns selecting a small subset of best objects from a larger set, while ranking concerns ordering objects of a set from the best to the worst. In these two decision problems, the objects are evaluated by criteria and the decision is based on pairwise (relative) comparison of objects rather than on absolute evaluation of single objects. In other words, in these two cases the decision rules relate preferences on particular criteria with a comprehensive preference. The preferences can be expressed on cardinal scales or on ordinal scales: the former deal with strength of preferences and use relations like indifference, weak preference, preference, strong preference, absolute preference, while for the later the strength is meaningless.

Given objects *x, y, w* and *z,* and using a cardinal scale of preference, it always is possible to compare the strength of preference of *x* over *y* with the strength of preference of *w* over *z* and say whether the preference of *x* over *y* is stronger than, equal to, or weaker than the preference of *w* over *z.* Using an ordinal scale, the strengths of preference can be compared only if, with respect to the considered criterion, object *x* is at least as good as *w* and *z* is at least as good as *y.* Given an example of car selection, for any decision-maker, car *x,* with a maximum speed 200 kilometers per hour (124.28 miles per hour) is preferred to car *y,* with a maximum speed of 120 kilometers per hour (74.57 miles per hour) at least as much as car *w,* with a maximum speed 170 kilometers per hour (105.64 miles per hour) is preferred to car *z,* with a maximum speed 140 kilometers per hour (87 miles per hour). This is because it is always preferable to pass from a smaller maximum speed (car *y* versus *z*) to a larger maximum speed (car *x* versus *w*). The syntax of the decision rules in the choice and ranking problems depends on the distinction between cardinal and ordinal criteria:

1. Exact D≥ decision rule: "if with respect to cardinal criterion *q* 1, *x* is preferred to *y* with at least strength $h(q\ 1)$ and...and with respect to cardinal criterion *qe,* *x* is preferred to *y* with at least strength $h(qe)$ and with respect to ordinal criterion *qe* + 1, evaluation of *x* is at least as good as r_{qe+1} and evaluation of *y* is at most as good as s_{qe+1} and...and with respect to ordinal criterion q_{p+1}, evaluation of *x* is at least as good as r_{qp+1} and evaluation of *y* is at most as good as s_{qp+1}, then *x* is at least as good as *y,*" where $h(q\ 1),\ldots, h(qe)$ are possible strengths of preferences of considered criteria and $r_{qe+1},\ldots, r_{qp}$, and $s_{qe+1},\ldots, s_{qp}$ are possible values of considered criteria. A more concise illustration: "if

with respect to comfort (cardinal criterion) car *x* is at least strongly preferred to car *y* and car *x* has a maximum speed (ordinal criterion) of at least 200 kilometers per hour (124.28 miles per hour) and car *y* has a maximum speed of 160 kilometers per hour (99.42 miles per hour), then car *x* is at least as good as car *y.*"

2. Exact D≤ decision rule: "if with respect to cardinal criterion *q* 1, *x* is preferred to *y* with at most strength $h(q\ 1)$ and...and with respect to cardinal criterion *qe,* *x* is preferred to *y* with at most strength $h(qe)$ and with respect to ordinal criterion *qe* + 1, evaluation of *x* is at most as good as r_{qe+1} and evaluation of *y* is at least as good as s_{qe+1} and...and with respect to ordinal criterion *qp,* evaluation of *x* is at most as good as r_{qp} and evaluation of *y* is at least as good as s_{qp+1}, then *x* is not at least as good as *y,*" where $h(q\ 1),\ldots, h(qe)$ are possible strengths of preferences of considered criteria and $r_{qe+1},\ldots, r_{qp}$, and $s_{qe+1},\ldots, s_{qp}$ are possible values of considered criteria. An example of a D≤ decision rule: "if with respect to aesthetics (cardinal criterion) car *x* is at most indifferent with car *y* and car *x* consumes (ordinal criterion) at most 7.2 liters (1.90 gallons) of fuel per 100 kilometers (62.14 miles) and car *y* consumes at least at 7.5 liters (1.98 gallons) of fuel per 100 kilometers (62.14 miles), then car *x* is at most as good as car *y.*"

3. Approximate D≥≤ decision rule: the "if" condition has the syntax composed of the "if" parts of the D≥ rule and the D≤ rule. The "then" decision represents a hesitation: "*x* is at least as good as *y*" or "*x* is not at least as good as *y.*"

Using decision rules, it always is possible to represent all common decision policies. For instance, let us consider the lexicographic ordering: the criteria considered are ranked from the most important to the least important. Between two objects, the object preferred with respect to the most important criterion is preferred to the other; if there is an *ex aequo* (a tie) on the most important criterion, then the object preferred with respect to the second criterion is selected; if there is again an *ex aequo,* then the third most important criterion is considered, and so on. If there is an *ex aequo* on all the considered criteria, then the two objects are indifferent. The lexicographic ordering can be represented by means of the following D≤ decision rules:

1. If *x* is (at least) preferred to *y* with respect to criterion *q* 1, then *x* is preferred to *y.*

2. If *x* is (at least) indifferent with *y* with respect to criterion *q* 1 and *x* is (at least) preferred to *y* with respect to criterion *q* 2, then *x* is preferred to *y.*

3. If x is (at least) indifferent with y with respect to all the considered criteria except the last one and x is (at least) preferred to y with respect to criterion qn, then x is preferred to y.

4. If x is (at least) indifferent with y with respect to all the considered criteria, then x is indifferent to y.

Induction of decision rules from information tables is a complex task, and a number of procedures have been proposed in the context of such areas like machine learning, data mining, knowledge discovery, and rough sets theory. The existing induction algorithms use one of the following strategies: (a) generation of a minimal set of rules covering all objects from an information table; (b) generation of an exhaustive set of rules consisting of all possible rules for an information table; (c) generation of a set of "strong" decision rules, even partly discriminant, covering relatively many objects each but not necessarily all objects from the information table.

Artificial intelligence takes these systems a step further. Expert systems (a branch of artificial intelligence) implement human reasoning and a set of decision rules. In healthcare, for example, such a system can be used in conjunction with physical symptoms and laboratory analyses to make a suggestion for diagnosis. When the structure becomes too complex for an expert system, another branch of AI—neural networks, which are developed based on brain structure—are used to help make decisions. Like the brain, artificial neural networks can recognize patterns, manage data and learn. These programmed systems go through the options based on the decision-making rules implemented into the software.

CREDIBILITY OF DECISION RULES

Decision rules also can be considered from the viewpoint of their credibility. From this point of view, the following classes of decision rules can be distinguished:

1. Crisp, exact decision rules (i.e., the rules presented above whose "then" part is univocal).

2. Crisp, approximate decision rules, induced from an inconsistent part of a data set identified using the rough sets theory; the "then" part of approximate decision rules specifies several possible decisions that cannot be reduced to a single one due to inconsistent information.

3. Possible decision rules covering objects that may belong to the class suggested in the "then" part; the objects that may belong to a class are identified using the rough sets theory as objects belonging to so-called upper approximation of the class.

4. Fuzzy decision rules induced from a vague or imprecise data set using the fuzzy sets theory.

Informally, a fuzzy set may be regarded as a class of objects for which there is a graduality of progression from membership to nonmembership: an object may have a grade of membership intermediate between one (full membership) and zero (nonmembership).

5. Probabilistic decision rules covering objects from the class suggested in the "then" part (positive objects), but also objects from other classes (negative objects); the ratio between the positive objects and the negative objects should be at least equal to a given threshold.

APPLICATIONS

Decision rules have been used for description of many specific decision policies, in particular for description of customers' decisions. The most well known decision rules of this type are the association rules, whose syntax is the following: for p percent of times if items $x_1 x_2 \ldots, x_n$ were bought, then items $y_1 y_2 \ldots, y_m$ were bought as well, and q percent of times $x_1 x_2 \ldots, x_n, y_1 y_2 \ldots, y_m$ were bought together. For example, 50 percent of people who bought diapers also bought beer; diapers and beer were bought in 2 percent of all transactions.

The following example illustrates the most important concepts introduced above. In Table 1, six companies are described by means of four attributes:

- A_1 capacity of the management
- A_2 number of employees
- A_3 localization
- A_4 company profit or loss

The objective is to induce decision rules explaining profit or loss on the basis of attributes A_1 A_2 and A_3 Let us observe that:

- Attribute A_1 is a criterion, because the evaluation with respect to the capacity of the management is

Table 1

Sample Information Table

Warehouse	Attributes			
	A_1	A_2	A_3	A_4
C1	high	700	A	profit
C2	high	420	A	loss
C3	medium	530	B	profit
C4	medium	500	B	loss
C5	low	400	A	loss
C6	low	100	B	loss

preferentially ordered (high is better than medium and medium is better than low).

- Attribute A_2 is a quantitative attribute, because the values of the number of employees are not preferentially ordered (neither the high number of employees is generally better than the small number, nor the inverse). Similarity between companies is defined as follows: Company A is similar to Company B with respect to the attribute "number of employees" if:

$$\frac{\text{Employees of A} - \text{Employees of B}}{\text{Employees of B}} \leq 10\%$$

- Attribute A_3 is a qualitative attribute, because there is not a preferential order between types of localization: two companies are indiscernible with respect to localization if they have the same localization.

- Decision classes defined by attribute A_4 are preferentially ordered (trivially, profit is better than loss).

From Table 1, several decision rules can be induced. The following set of decision rules cover all the examples (within parentheses there are companies supporting the decision rule):

Rule 1. If the quality of the management is medium, then the company may have a profit or a loss (C3, C4).

Rule 2. If the quality of the management is (at least) high and the number of employees is similar to 700, then the company makes a profit (C1).

Rule 3. If the quality of the management is (at most) low, then the company has a loss (C5, C6).

Rule 4. If the number of employees is similar to 420 and the localization is B, then the company has a loss (C2).

Decision rules are based on elementary concepts and mathematical tools (sets and set operations, binary relations), without recourse to any algebraic or analytical structures. Principal relations involved in the construction of decision rules, like indiscernibility, similarity, and dominance, are natural and non-questioned on practical grounds. Decision rule representation of knowledge is not a "black box," or arcane methodology, because the rules represent relevant information contained in data sets in a natural and comprehensible language, and examples supporting each rule are identifiable. Because contemporary decision problems are associated with larger and larger data sets, induction of decision rules showing the most important part of the available information is increasingly in demand.

SEE ALSO *Decision Support Systems*

BIBLIOGRAPHY

Agrawal, Rakesh, Tomasz Imielinski, and Arun Swami. "Mining Association Rules Between Sets of Items in Large Databases." In *Proceedings of the 1993 ACM SIGMOD International Conference on Management of Data.* New York: ACM Press, 1993.

Albu, Adriana and Loredana Ungureanu. "Artificial Neural Network in Medicine." Available at: http://www.bmf.hu/conferences/saci2005/Albu.pdf.

Bragg, Belinda, Nehemia Geva, and Charles Hermann. "Using Decision Rules and Membership Identification to Explain Foreign Policy Decision: An Experimental Study." 22 March 2006. Available from: http://www.allacademic.com/one/prol/prol01/index.php?cmd=Download+Document&key=unpublished_manuscript&file_index=1&pop_up=true&no_click_key=true&attachment_style=attachment&PHPSESSID=c2fd506cb809dc172d61d5381aa1545c.

Greco, S., B. Matarazzo, and R. Slowinski. "The Use of Rough Sets and Fuzzy Sets in MCDM." In *Advances in Multiple Criteria Decision Making.* T. Gal, T. Hanne, and T. Stewart, ed. Dordrecht/Boston: Kluwer Academic Publishers, 1999.

Hu, Xiaohua, T.Y. Lin, and Eric Louie. "Bitmap Techniques for Optimizing Decision Support Queries and Association Rule Algorithms." *Proceedings of the 2003 International Database Engineering and Applications Symposium.* Hong Kong: SAR, July 2003.

Luce, R.D. "Semi-Orders and a Theory of Utility Discrimination." *Econometrica* 24 (1956): 178–191.

March, J.G. "Bounded Rationality, Ambiguity, and the Engineering of Choice." In *Decision Making: Descriptive, Normative, and Prescriptive Interactions.* ed. David E. Bell, Howard Raiffa, and Amos Tversky. Cambridge/New York: Cambridge University Press, 1988.

Michalski, R.S., Ivan Bratko, and Miroslav Kubat, eds. *Machine Learning and Data Mining: Methods and Applications.* Chichester: J. Wiley & Sons, 1998.

Pawlak, Zdzislaw. *Rough Sets: Theoretical Aspects of Reasoning about Data.* Dordrecht/Boston: Kluwer Academic Publishers, 1991.

Pawlak, Zdzislaw, and Roman Slowinski. "Rough Set Approach to Multi-Attribute Decision Analysis." *European Journal of Operational Research* 72 (1994): 443–459.

Peterson, Martin. "Transformative Decision Rules." *Erkenntnis* 58, no. 1 (2003): 71–85.

Slovic, P. "Choice Between Equally Valued Alternatives." *Journal of Experimental Psychology, Human Perception and Performance* 1, no. 3 (1975): 280–287.

Slowinski, Roman, ed. *Fuzzy Sets in Decision Analysis, Operations Research, and Statistics.* Dordrecht/Boston: Kluwer Academic Publishers, 1998.

Slowinski, Roman, and J. Stefanowski. "Handling Various Types of Uncertainty in the Rough Set Approach." In *Rough Sets, Fuzzy Sets and Knowledge Discovery.* ed. W.P. Ziarko. London: Springer-Verlag, 1994.

Slowinski, Roman "Rough Set Processing of Fuzzy Information." In *Soft Computing: Rough Sets, Fuzzy Logic, Neural Networks,*

Uncertainty Management, Knowledge Discovery. ed. T.Y. Lin and A. Wildberger. San Diego: Simulation Councils Inc., 1995.

Stefanowski, J. "On Rough Set Based Approaches to Induction of Decision Rules." In *Rough Sets in Data Mining and Knowledge Discovery, Vol. 1.* ed. L. Polkowski and A. Skowron. Heidelberg: Physica-Verlag, 1998.

Tversky, A. "Features of Similarity." *Psychological Review* 84, no. 4 (1977): 327–352.

Zadeh, Lofti. "Fuzzy Sets." *Journal of Information and Control* 8 (1965): 338–353.

DECISION SUPPORT SYSTEMS

Decision support systems (DSS) are computer information systems that perform complex data analysis in order to help users make informed decisions. In general, a DSS retrieves information from a large data warehouse, analyzes it in accordance with user specifications, then publishes the results in a format that users can readily understand and use. DSS applications are interactive, and they are valuable in a wide range of business settings.

According to ComputerWorld Magazine, the rise of the decision support system can be traced to the late 1960s when businesses started to use computer mainframes. These mainframe computers first enabled businesses to interactively query data so they could enhance their previously-static reports. Other experts generally agree that computerized decision support systems became practical with the development of minicomputers, time-share operating systems, and distributed computing.

In the 1970s, however, decision support systems experienced a huge boom. Query systems, what-if spreadsheets, and rules-based software were developed. The advent of packaged algorithms made it easier to get better, faster decisions. As technology evolved, new computerized decision support applications were developed and studied. Researchers used multiple frameworks to help build and understand these systems. Today, one can organize the history of DSS into the five broad DSS categories, including: communications-driven, data-driven, document driven, knowledge-driven, and model-driven decision support systems.

Trends in all these categories are emerging. Data-driven DSS continuously use faster, real-time access to larger, better integrated databases. Trends suggest that model-driven DSS will grow more complex. Systems built using simulations and accompanying visual displays are becoming increasingly realistic. Communications-driven DSS provide more real-time video communications support. Document-driven DSS access larger repositories of data; the systems present appropriate documents in more

useable formats. Finally, knowledge-driven DSS are usually more sophisticated and comprehensive. The advice from knowledge-driven DSS is often considered better, and the applications cover broader domains.

Technology advances continue to make it easier and more efficient to collect relevant data. However, collecting, analyzing, correlating, and applying these massive amounts of data pose a challenge to businesses. Even so, companies are eager to respond in real-time to customer queries. They strive to anticipate customer needs, create opportunities, and avoid potential problems, for the end goal is to establish a predictive business.

The airline industry provides a good example of using data to instantaneously respond to customer queries. In the past, most customers called the airlines to purchase their airline tickets—a process that typically took about twenty minutes. That all changed with Web transactions, which can provide more information, more quickly. Ultimately, these types of DSS enable customers to book a ticket in just a few minutes.

With decision support systems, companies correlate information about their operations and performance with information about expected behavior and business rules. Decision makers anticipate and respond to threats and capitalize on opportunities before they occur. This ability makes predictive business, which is considered the next step in the evolution of a real-time enterprise, a reality.

DECISION SUPPORT SYSTEMS FIRST TESTED IN PORTFOLIO MANAGEMENT

Decision support systems were first tested in portfolio management, which poses one of the most essential problems in modern financial theory. It involves the construction of a portfolio of securities (stocks, bonds, treasury bills, etc.) that maximizes the investor's utility. The process leading to the construction of such a portfolio consists of two major steps. In the first step, the decision-maker (investor, portfolio manager) has to evaluate the securities that are available as investment instruments. The vast number of available securities, especially in the case of stocks, makes this step necessary, in order to focus the analysis on a limited number of the best investment choices. Thus, on the basis of this evaluation stage, the decision-maker selects a small number of securities that constitute the best investment opportunities. In the second step of the process, the decision maker must decide on the amount of the available capital that should be invested in each security, thus constructing a portfolio of the selected securities. The portfolio should be constructed in accordance with the decision-maker's investment policy and risk tolerance.

The portfolio theory assumes that the decision-maker's judgment and investment policy can be represented by a utility function that is implicitly used by the decision-maker

in making his investment decisions. Thus, the maximization of this utility function will result in the construction of a portfolio that is as consistent as possible with the decision-maker's expectations and investment policy. However, it is quite difficult to determine the specific form of this utility function.

The founder of portfolio theory, Harry Markowitz (recipient of the 1990 Nobel prize in economics), developed a framework according to which the decision-maker's utility is a function of two variables: the expected return of the portfolio and its risk. Thus, he formulated the maximization of the decision-maker's utility as a two-objective problem: maximizing the expected return of the portfolio and minimizing the corresponding risk. To consider the return and the risk, Markowitz used two well-known statistical measures, the *mean* of all possible returns to estimate the return of the portfolio, and the *variance* to measure its risk. On the basis of this mean-variance framework, Markowitz developed a mathematical framework to identify the efficient set of portfolios that maximizes returns at any given level of allowable risk. Given the risk aversion policy of the investor, it is possible to select the most appropriate portfolio from the efficient set.

This pioneering work of Markowitz motivated financial researchers to develop new portfolio management techniques, and significant contributions have been made over the last decades. The most significant of the approaches that have been proposed for portfolio management include the capital asset pricing model (CAPM), the arbitrage pricing theory (APT), single- and multi-index models, as well as several optimization techniques.

DECISION SUPPORT SYSTEMS IN PORTFOLIO MANAGEMENT

The concept of decision support systems (DSS) was introduced, from a theoretical point of view, in the late 1960s. DSS can be defined as computer information systems that provide information in a specific problem domain using analytical decision models and techniques, as well as access to databases, in order to support a decision maker in making decisions effectively in complex and ill-structured problems. Thus, the basic goal of DSS is to provide the necessary information to the decision-maker in order to help him or her get a better understanding of the decision environment and the alternatives available.

A typical structure of a DSS includes three main parts: the database, the model base, and the user interface. The database includes all the information and data that are necessary to perform the analysis on the decision problem at hand. Data entry, storage, and retrieval are performed through a database management system. The model base is an arsenal of methods, techniques, and models that can be used to perform the analysis and support the decision maker. These models or techniques are applied to the raw data in order to produce analysis or more meaningful output for the decision maker. A model base management system is responsible for performing all tasks that are related to model management, such as model development, updates, storage, and retrieval. Finally, the user interface is responsible for the communication between the user and the system, while it further serves as a link between the database and the model base. The appropriate design of the user interface is a key issue towards the successful implementation of the whole system, so as to ensure that the user can take full advantage of the analytical capabilities that the system provides. Advances in computer hardware and software have enabled user-friendly graphical user interfaces (GUIs) to serve this function.
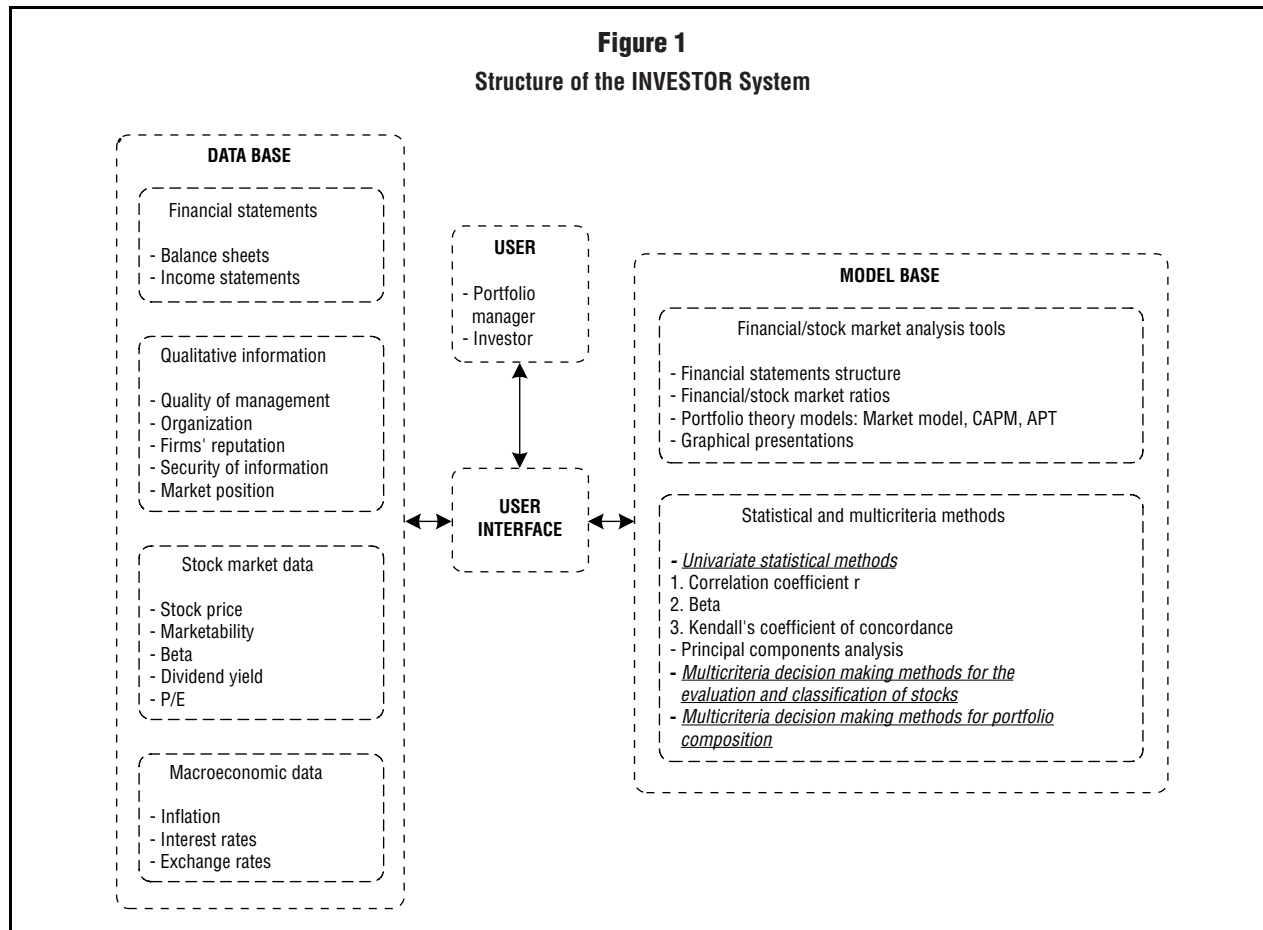
During the last four decades, DSS have been developed and implemented to tackle a variety of real world decision-making problems, in addition to financial problems and portfolio management. The portfolio management process involves the analysis of a vast volume of information and data, including financial, stock market, and macroeconomic data. Analyzing a continuous flow of such a vast amount of information for every available security in order to make real time portfolio management decisions is clearly impossible without the support of a specifically designed computer system that will facilitate not only the data management process, but also the analysis.

Thus, the contribution of DSS to portfolio management becomes apparent. They provide an integrated tool to perform real-time analyses of portfolio-management-related data, and provide information according to the decision-maker's preferences. Furthermore, they enable the decision maker to take full advantage of sophisticated analytic methods, including multivariate statistical and econometric techniques, powerful optimization methods, advanced preference modeling, and multiple-criteria decision-making techniques. DSS incorporating multiple-criteria decision-making methods in their structure are known as multicriteria DSS, and they have found several applications in the field of finance.

PORTFOLIO MANAGEMENT DSS IN PRACTICE: AN ILLUSTRATION OF THE INVESTOR SYSTEM

The Investor system is a DSS designed and developed to support the portfolio management process and to help construct portfolios of stocks. The system includes a combination of portfolio theory models, multivariate statistical methods, and multiple criteria decision-making techniques for stock evaluation and portfolio construction. The structure of the system is presented in Figure 1.

Figure 1
Structure of the INVESTOR System

```
┌─────────────────────────┐
│  DATA BASE              │
│  ┌─────────────────────┐ │
│  │ Financial statements│ │
│  │                     │ │         ┌──────────────┐
│  │ - Balance sheets    │ │         │    USER      │
│  │ - Income statements │ │         │              │        ┌────────────────────────────────────────┐
│  └─────────────────────┘ │         │ - Portfolio  │        │  MODEL BASE                            │
│                          │         │   manager    │        │  ┌──────────────────────────────────┐  │
│  ┌─────────────────────┐ │         │ - Investor   │        │  │ Financial/stock market analysis    │  │
│  │ Qualitative info    │ │         └──────────────┘        │  │  tools                             │  │
│  │                     │ │                                 │  │ - Financial statements structure   │  │
│  │ - Quality of mgmt   │ │                                 │  │ - Financial/stock market ratios    │  │
│  │ - Organization      │ │                                 │  │ - Portfolio theory models: Market  │  │
│  │ - Firms' reputation │ │                                 │  │   model, CAPM, APT                 │  │
│  │ - Security of info  │ │         ┌──────────────┐        │  │ - Graphical presentations          │  │
│  │ - Market position   │ │◄───────►│    USER      │◄──────►│  └──────────────────────────────────┘  │
│  └─────────────────────┘ │         │  INTERFACE   │        │  ┌──────────────────────────────────┐  │
│                          │         └──────────────┘        │  │ Statistical and multicriteria      │  │
│  ┌─────────────────────┐ │                                 │  │  methods                           │  │
│  │ Stock market data   │ │                                 │  │ - Univariate statistical methods   │  │
│  │                     │ │                                 │  │ 1. Correlation coefficient r       │  │
│  │ - Stock price       │ │                                 │  │ 2. Beta                            │  │
│  │ - Marketability     │ │                                 │  │ 3. Kendall's coefficient of        │  │
│  │ - Beta              │ │                                 │  │    concordance                     │  │
│  │ - Dividend yield    │ │                                 │  │ - Principal components analysis    │  │
│  │ - P/E               │ │                                 │  │ - Multicriteria decision making    │  │
│  └─────────────────────┘ │                                 │  │   methods for the evaluation and   │  │
│                          │                                 │  │   classification of stocks         │  │
│  ┌─────────────────────┐ │                                 │  │ - Multicriteria decision making    │  │
│  │ Macroeconomic data  │ │                                 │  │   methods for portfolio            │  │
│  │                     │ │                                 │  │   composition                      │  │
│  │ - Inflation         │ │                                 │  └──────────────────────────────────┘  │
│  │ - Interest rates    │ │                                 └────────────────────────────────────────┘
│  │ - Exchange rates    │ │
│  └─────────────────────┘ │
└─────────────────────────┘
```

Financial Data. The database of the system includes four types of information and data. The first involves the financial statements of the firms whose stocks are considered in the portfolio management problem. The balance sheet and the income statement provide valuable information regarding the financial soundness of the firms (e.g., sales, net profit, net worth, liabilities, assets, etc.). The system contains such financial data spanning a five-year period, so that users can reach informed conclusions about the firms' financial evolution.

Qualitative Information. In addition to these financial data, information on some qualitative factors is also inserted in the database. The management of the firms, their organization, their reputation in the market, their technical facilities, and their market position affect directly the operation and the performance of the firms; thus, they constitute fundamental factors in the analysis of the firms whose stocks are considered in the portfolio management problem.

Market Data. The third type of information included in the database involves the stocks' market histories. This information involves the stock prices, the marketability of the stocks, their beta (β) coefficient (a measure of risk representing the relationship between the changes in the price of individual stocks with the changes in the market), the dividend yield, the price/ earnings ratio, and so forth.

Macroeconomic Data. Finally, information regarding the macroeconomic environment is also included. Inflation, interest rates, exchange rates, and other macroeconomic variables have a direct impact on the performance of the stock market, thus potentially affecting any individual stock. The combination of this information with the financial and stock histories of individual firms enables portfolio managers to perform a global evaluation of the investment opportunities available, both in terms of their sensitivity and risk with respect to the economic environment, and to their individual characteristics.

Analysis Tools. The analysis of all this information is performed through the tools incorporated in the system's model base. Two major components can be distinguished

Figure 2

Results of the Portfolio Construction Process

Legend (pie)
Stock 3
Stock 1
Stock 2
Stock 7
Stock 6
Stock 5
Stock 4

Pie chart percentages: 31%, 24%, 17%, 10%, 8%, 5%, 5%

Bar chart:
- Growth of Dividends: 85%
- P/E: 69%
- Beta: 75.8%
- Marketability: 81.9%
- Return: 75%

(scale 0 to 100)

OBJECTIVES	ATTAINED VALUES
Return	1.53
Marketability	0.61
Beta	0.79
P/E	12.53
Growth of dividends per share	51.34
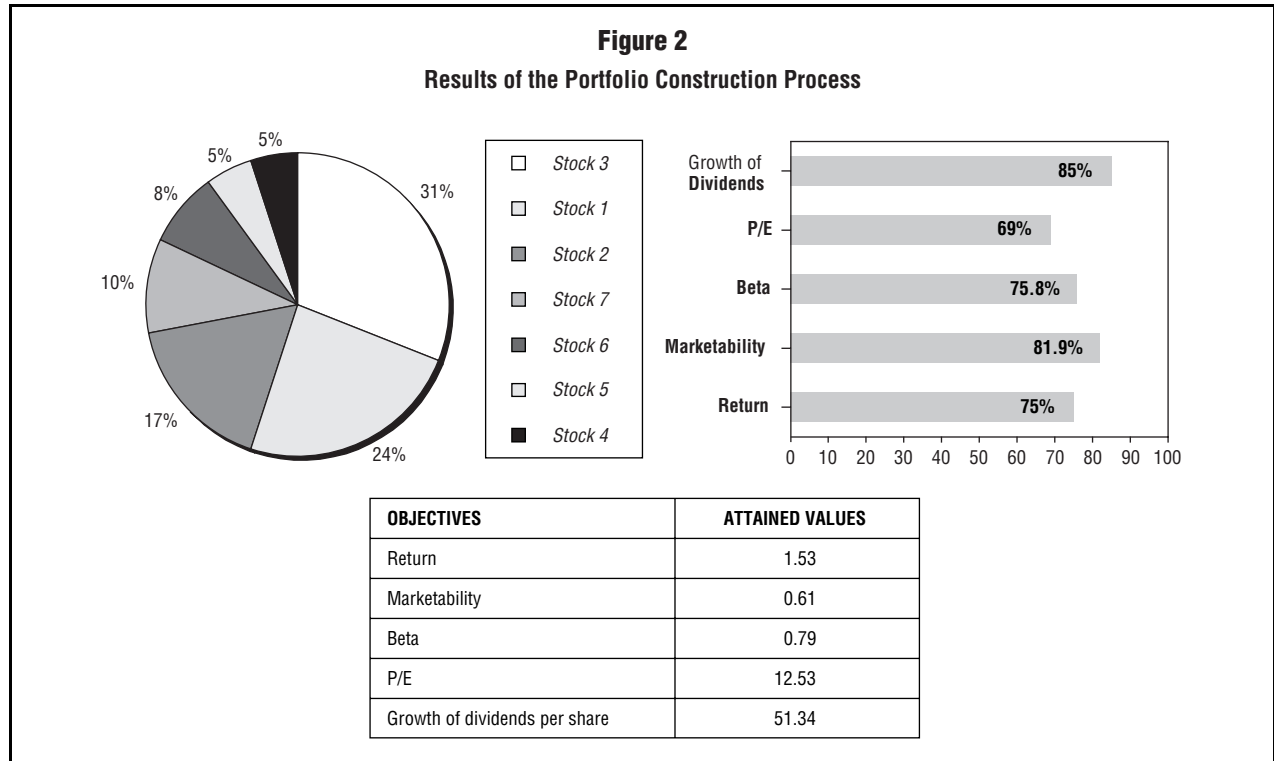
in the model base. The first one consists of financial and stock market analysis tools. These can analyze the structure of the financial statements of the firms, calculate financial and stock market ratios, apply well-known portfolio theory models (e.g., the market model, the CAPM, the APT), and present several graphical summaries of the results obtained through these tools to facilitate drawing some initial conclusions about the stocks' performance.

The second component of the model base involves more sophisticated analysis tools, including statistical and multiple-criteria decision-making techniques. More specifically, univariate statistical techniques are used to measure the stability of the beta coefficient of the stocks, while principal components analysis (a multivariate technique) is used to identify the most significant factors or criteria that describe the performance of the stocks, and to place the stocks into homogeneous groups according to their financial and stock market characteristics. The criteria identified as most crucial can be used to evaluate the stocks and thereby construct a portfolio that meets the investment policy of the investor/portfolio manager. Of course, the portfolio manager interacts with the system, and he or she can also introduce into the analysis the evaluation criteria that he or she considers important, even if these criteria are not found significant by principal components analysis.

The evaluation of the stocks' performance is completed through multiple-criteria decision-making meth-

ods. Multiple-criteria decision-making is an advanced field of operations research that provides an arsenal of methodological tools and techniques to study real-world decision problems involving multiple criteria that often lead to conflicting results. The multiple-criteria decision-making methods that are incorporated in the model base of the investor system enable the investor to develop an additive utility function that is fairly consistent with his or her investment policy, preferences, and experience. On the basis of this additive utility function a score (global utility) is estimated for each stock that represents its overall performance with respect to the selected evaluation criteria. The scores of the stocks are used as an index so they may be placed into appropriate classes specified by the user. Thus, the portfolio manager can develop an evaluation model (additive utility function) to distinguish, for instance, among the stocks that constitute the best investment opportunities, the stocks that do not have a medium-long term prospect but they can be considered only for the short run, and the stocks that are too risky and should be avoided. Of course, any other classification can be determined according to the objectives and the policy of the portfolio manager.

On the basis of this classification, the investor/portfolio manager can select a limited number of stocks to include in the actual portfolio, which represent the best investment opportunities. Constructing the portfolio is accomplished through multiple-criteria decision-making

techniques that are appropriate for optimizing a set of objective functions subject to some constraints. The objective functions represent the investor/portfolio manager's objectives on some evaluation criteria (return, beta, marketability, etc.), while constraints can be imposed to ensure that the constructed portfolio meets some basic aspects of the investment policy of the investor/portfolio manager.

For instance, the investor/portfolio manager can introduce constraints on the amount of capital invested in stocks of specific business sectors, the amount of capital invested in high-risk or low-risk stocks (high and low β coefficient, respectively), to determine a minimum level of return or a maximum level of risk, and so on. Once such details are determined, an interactive and iterative optimization procedure is performed that leads to the construction of a portfolio of stocks that meets the investor's investment policy and preferences. The results presented through the screen of Figure 2 show the proportion of each stock in the constructed portfolio, the performance of the portfolio on the specified evaluation criteria (attained values), as well as the rate of closeness (achievement rate) of the performance of the portfolio as opposed to the optimal values on each evaluation criterion (the higher this rate is, the closer the performance of the portfolio to the optimal one for each criterion).

Since the development of the portfolio theory in the 1950s, portfolio management has gained increasing interest within the financial community. Periodic turmoil in stock markets worldwide demonstrates the necessity for developing risk management tools that can be used to analyze the vast volume of information that is available. The DSS framework provides such tools that enable investors and portfolio managers to employ sophisticated techniques from the fields of statistical analysis, econometric analysis, and operations research to make and implement real-time portfolio management decisions.

DSS research in the twenty-first century has been oriented toward combining the powerful analytical tools used in the DSS framework with the new modeling techniques provided by soft computing technology (neural networks, expert systems, fuzzy sets, etc.) to address the uncertainty, vagueness, and fuzziness that is often encountered in the financial and business environment.

DSS EVOLUTION

Business intelligence (BI) practices are often cited as key to the evolution of decision support systems. BI refers to the technologies, applications, and practices used for collecting, integrating, analyzing, and presenting business information. It is the variety of software applications used to analyze an organization's raw data and extract useful insights from it. Therefore, like DSS, business intelligence systems are data-driven. They use fact-based support systems to improve business decision-making, making BI a reporting and decision support tool.

Used at the operational level, BI projects have great potential to transform business processes. For example, well-known companies use BI technologies to improve corporate sales and customer service processes. Used correctly, BI systems can transform companies from regionally-operated businesses to unified global businesses.

Like many technological advances, there are obstacles. A key impediment to BI progress is lack of corporate understanding. Often, companies don't know their own business processes well enough to determine how to improve them. Before commencing a BI project, companies must consider and understand all of the activities that make up a particular business process, how information and data flow across various processes, how data is passed between business users, and how people use it to execute their part of the process. In order to motivate upper management to standardize such processes company-wide, BI systems must have a direct impact on revenue.

Implementation of BI systems requires a change in thinking about the value of information inside organizations. Everyone involved in the BI process must have full access to information to be able to change the ways that they work. This necessitates a trusting working environment.

Well-known firm McKinsey Consulting noted that decision support systems were one of eight technology trends to watch in 2008. DSS technologies will advance as more innovative data collection and processing methods are introduced. This, according to McKinsey, will result in more granular segmentation and low-cost experimentation. The resulting information will help managers acquire more data, make smarter decisions, and develop competitive advantages and new business models.

SEE ALSO *Competitive Intelligence; Computer-Aided Design and Manufacturing; Computer Networks; Management Information Systems; Strategic Planning Tools*

BIBLIOGRAPHY

Elton, E.J., and M.J. Gruber. *Modern Portfolio Theory and Investment Analysis.* 5th ed. New York: John Wiley and Sons, 1995.

Levinson, Meridith. "Business Intelligence: Not Just for Bosses Anymore." *CIO Magazine* 15 Jan 2006. Available from: http://www.cio.com/article/16544/Business_Intelligence_Not_Just_for_Bosses_Anymore.

Lundberg, Alan. "Leverage Complex Event Processing to Improve Operational Performance." *Business Intelligence Journal* 28 Mar 2006. Available from: http://www.tdwi.org/Publications/BIJournal/display.aspx?ID=7898.

Markowitz, H. *Portfolio Selection: Efficient Diversification of Investments.* New York: John Wiley and Sons, 1959.

Phillips-Wren, Gloria E., et al., "A Multiple-Criteria Framework for Evaluation of Decision Support Systems." *Omega* August 2004.

Power, D.J. "A Brief History of Decision Support Systems." *DSSResources.com* 10 Mar 2007. Available from: http://DSSResources.com/history/dsshistory.html,.

"Supply Chain News: McKinsey's Eight Technology Trends to Watch for 2008" *Supply Chain News* 16 Jan 2008. Available from: http://www.scdigest.com/text_search.php?keyword=decision+support.

Turban, Efraim, et al. *Decision Support Systems and Intelligent Systems.* 7th ed. Englewood Cliffs, NJ: Prentice Hall, 2004.

Zopounidis, C., M. Godefroid, and C. Hurson. "Designing a Multicriteria DSS for Portfolio Selection and Management." In *Advances in Stochastic Modeling and Data Analysis.* edited by J. Janssen, C.H. Skiadas, and C. Zopounidis. Dordrecht, Netherlands: Kluwer Academic Publishers, 1995, 261–292.

DELEGATION

Delegation is the process of giving decision-making authority to lower-level employees. For the process to be successful, a worker must be able to obtain the resources and cooperation needed for successful completion of the delegated task. Empowerment of the workforce and task delegation are closely intertwined. Empowerment occurs when upper-level employees share power with lower-level employees. This involves providing the training, tools, and management support that employees need to accomplish a task. Thus, an enabled worker has both the authority and the capability to accomplish the work. Although authority can be delegated, responsibility cannot—the person who delegates a task is ultimately responsible for its success. The assigned worker is therefore accountable for meeting the goals and objectives of the task.

BENEFITS OF DELEGATION

Effective delegation can benefit the manager, the employee, and the organization. Perhaps the most important benefit for the company is a higher quality of work. Delegation can improve quality of work by allowing the employees who have direct knowledge of products and services to make decisions and complete tasks. Quality can also improve through enhanced employee motivation. Employees may do a better job because they feel a personal accountability for the outcome, even though responsibility ultimately rests with the individual who made the delegation. Motivation should also be enhanced as delegation enriches the worker's job by expanding the types of tasks that are involved in it.

Managers who delegate effectively also receive several personal benefits; most importantly, they have more time to do their own jobs when they assign tasks to others. Given the hectic nature of managerial work, time is a precious commodity. Effective delegation frees the manager to focus on managerial tasks such as planning and control. Managers also benefit from the development of subordinates' skills. With a more highly skilled workforce, they have more flexibility in making assignments and are more efficient decision makers. Managers who develop their workforce are also likely to have high personal power with their staff and to be highly valued by their organization.

DRAWBACKS OF DELEGATION

Although delegation can provide benefits to the organization, many managers lack the motivation or knowledge to delegate effectively, and thus delegation (or lack of delegation) may be detrimental to the company. Managers' lack of motivation to delegate may be associated with a number of fallacies associated with delegations. Many managers believe that "if you want it done right, you have to do it yourself." While this is at times untrue, because the ultimate responsibility for a task lies with the manager, this attitude often prevents delegation. Other reasons for a lack of motivation to delegate are lack of trust in subordinates, fear of being seen as lazy, reluctance to take risks, and fear of competition from subordinates. Some of these barriers are correctable through management training and development, but others may not be easily overcome. Managers may also lack the competencies necessary to delegate effectively. They may choose the wrong tasks to delegate, the wrong subordinate to trust, or they may provide inadequate direction to the subordinate when delegating.

Excessive sub-delegating and cross-delegating also creates a problem. This practice usually occurs when a hot issue in the company is passed around from person to person. The theory is that nobody wants to be the one working on it when senior management steps in. Managers should recognize and acknowledge when unnecessary and excessive sub-delegation is occurring. This move will lead to the long-term improvement in employee morale and contribute to achieving company goals.

Improper delegation can cause a host of problems, primary of which is an incorrectly completed task, which may hurt the overall productivity of the organization. Additionally, the careers of the manager and subordinate may suffer. The manager is likely to take the blame for delegating the wrong task, delegating to the wrong person, or not providing proper guidance. The subordinate may also take the blame for doing the task incorrectly. Thus, poor delegation may detract from the personal success of managers and employees.

PLANNING

Delegation is not difficult. Anyone can give an assignment to someone. However, effective delegation (assigning a

task to the correct person) is a highly skilled process that requires planning, thought, and managerial skill.

Defining Success. Two planning activities should be undertaken before delegating an assignment: defining success and assessing qualifications needed. Defining success requires a determination of what will constitute successful performance on the assigned task. An effective delegator assigns workers to tasks on which they have a high probability of succeeding. If a manager can't identify the successful outcome of a task, how can that manager determine if a worker is capable of performing it? The failure to define success turns delegation into a gamble, rather than a prediction. An effective delegator makes a prediction of success based on the match between job requirements and the worker's competencies. An ineffective delegator hopes that the worker will be successful but really has no basis for this hope, since success has not been defined. If success is well defined and communicated to the subordinate, the worker has a clear understanding of the task requirements and can focus his/her efforts on important activities. Similarly, clearly defining success helps the delegator coach the worker, which further enhances the probability of a positive outcome.

There are two components to defining success. The first is to define the successful outcome of the task, and the second is to determine the appropriate processes needed to complete the task. Both are needed in order to make an effective delegation. For example, a manager might be considering assigning a different salesperson to a particularly difficult client. Prior to making the delegation, the manager should reflect on the desired outcomes from this assignment (e.g., increased sales, decreased complaints) and the types of processes (e.g., better client education, greater empathy) that might be needed to produce the desired result. Only after understanding what is needed can a rational delegation be made. Thus, managers should first ask themselves: "How will I judge the success of this delegation and what do I expect someone to do to be successful?"

Assessing Qualifications Needed. The second step in planning delegation involves determining subordinate capabilities. There is always a choice in delegation, both as to which subordinates to delegate the assignment to, and whether to delegate the assignment at all. To make either decision, the manager needs to assess subordinate's capabilities. In making the assessment, a manager should ask, "What has this worker done to make me feel he or she will be effective on this assignment?" Managers should also ask themselves, "How do I think this person will perform on this assignment and why do I feel this way?" A worker could be effective in obtaining desired results, but could use an unacceptable process to obtain the results that

negates the positive outcomes. Managers are very unlikely to make an accurate prediction of success for an assignment when they have no basis for the prediction. Thus, the better a manager knows a worker's past behaviors and accomplishments, the greater the chance of an effective future delegation. Often, however, managers have to delegate assignments to people who lack the relevant training or experience. The general process still applies in this situation, although the specific questions change. Here, the manager should carefully consider, "How has this person performed on previous assignments where he or she lacked training or experience?" Again, there must be a basis for the delegation, or it becomes a wild guess.

PROCESS

The process of delegation is as critical as the planning, because a poor process can reduce the effectiveness of the delegation in several ways. First, it can lower the worker's motivation to perform the task. A qualified worker who is not motivated to complete the assignment is not likely to produce the desired results. Second, lack of proper communication of standards for the task may lead to less than desirable outcomes. Finally, the delegation process may create some artificial barriers or fail to eliminate others barriers to performance. The failure to share information and discuss real or perceived problems can reduce efficiency and may lead to failure. To avoid these obstacles, the following items should be considered when making an assignment.

Allow Employees to Participate in the Delegation Process. Employees who accept their assignments are much more likely to be committed to their success. This acceptance is enhanced when employees have some say in the process. Thus, subordinates should be allowed to participate in determining when and how the delegated task will be accomplished and, when possible, what the assignment will be. At the most basic level, a manager can ask an employee if he or she is available to do a task, rather than telling him/her to do it. Participation can also increase supervisor/subordinate communication, which may minimize problems due to misunderstandings.

Specify Standards. Many communication problems occur because of the failure to clearly consider and specify the performance standards of the assignment. Some of the things to consider include the limitations of a subordinate's tasks, (e.g., gathering information only, or making a decision), their expected level of performance, their deadlines for reporting, and the constraints under which they will be operating. Where subordinates are given a choice in accepting the assignment, these issues should be discussed and negotiated prior to the delegation. Even when subordinates do not have the option of rejecting the

assignment, these issues should be clearly described and subordinates should be asked for their input.

Balance Responsibility and Authority. A typical delegation error is to delegate work but avoid matching the responsibilities with the freedom to make decisions and the authority to implement them. This creates frustration, since the subordinate knows what needs to be done and how to do it, but is not given the opportunity to do it. Managers can avoid this problem by communicating to all individuals affected by the assignment that it has been delegated and who has the authority to complete the work. Managers can ask subordinates what resources they need for a task and then empower them to secure those resources.

In addition to providing authority, managers should also provide adequate support for the delegated task. This might involve continually providing important information and feedback that are needed to accomplish the task. Finally, managers should publicly bestow credit when the task has been accomplished. This will enhance the subordinate's motivation and authority for future assignments. It also provides an important message to others that successful completion of tasks is acknowledged and rewarded.

Delegate Consistently. Some managers delegate only when they are overworked or in a crisis. This can send a message to subordinates that they are being used since they only receive assignments when it benefits the manager. Ideally, delegation should benefit both the subordinate and the manager. Managers can send this message by delegating assignments that develop or stretch subordinates' talents and skills. Delegating to develop workers builds up a pool of talent for those inevitable crisis situations. It also enhances worker motivation and confidence since they acquire experience and benefit from the new or improved skills. Care should be taken to assure that the employee has the capability to succeed in the assignment. Employees should not be set up to fail. Certainly some failure will occur. Managers must recognize this and provide helpful, developmental feedback in those situations. Emphasis should be placed on the positive things that were done on the assignment and what actions could have been taken to overcome the problems.

Balance the Assignments. Managers need to ensure that delegation isn't viewed as getting someone else to do their dirty work. Thus, an effective manager should delegate the pleasant and the unpleasant, the challenging and the boring assignments. Similarly, assignments should be balanced across workers. For example, it is quite common for managers to delegate the most unpleasant task to the best worker since that person can be counted on to do a good job. Alternatively, a poor worker may avoid receiving an unpleasant assignment due to the poor quality of the final product. This type of situation quickly sends the message to the productive worker that the way to get out of receiving unpleasant assignments is to lower the quality of his/her work. One way to avoid this problem is to give the productive worker other rewards and/or to increase the number of unpleasant assignments to the unproductive worker until the quality of the result improves.

Focus on Results. Once the task has been delegated, managers need to allow subordinates the freedom to make the choices needed to accomplish the task. Managers should not supervise too closely for this may create frustration and make workers feel that the manager lacks confidence in their ability. Managers should review and evaluate the results of the assignment, not the means used to accomplish the task. However, managers are responsible for making sure that both the process and the outcome of the delegated task are consistent with the goals. As noted, one way to accomplish this is through the specification of clear standards prior to the delegation. The manager needs to remember these standards and intervene only when they have been violated. Managers should avoid the tendency to intervene simply due to style differences. One of the benefits of allowing subordinates to make their own choices is that this can be an important source of innovation for the organization. Sometimes employees really have a better way.

GROUP VS. INDIVIDUAL DELEGATION

A particular assignment can be delegated to an individual or a group of individuals. Additionally, a manager may not wish to delegate the whole task, but to participate as a member of the team. What are the considerations in individual versus group delegation or even participation? Perhaps the most important point is that all of the previous issues apply. Prior to making the assignment, the manager must define success and assess the capabilities of the individual or group. In making the assignment, the individual or group should be allowed to participate as much as possible, authority and responsibilities should be balanced, standards should be specified and the manager should focus on results.

One difference between individual and group delegation is that individual behavior is typically easier to control and monitor. One alternative to delegating the assignment and giving entirely to a subordinate is for a manager to participate in the process as a group member. The downside of this approach is that it may send the group an unintended message of a lack of trust. Employees may feel that the manager is not there to contribute, but to check on the quality of their work. Thus, managers should carefully review their own capabilities as a team

member and answer the question, "What do I add to this group to accomplish this task?" The answer to this question should be clearly communicated to the group so they understand why the manager has undertaken a role in the group. Finally, a manager should carefully assess the group's past behavior and have a reason for predicting that the group can accomplish the task. Again, this should be a prediction, not a gamble or wish for success.

UPWARD DELEGATION

Many employees have become skilled in delegating to their supervisors. Upward delegation occurs when an employee shifts his or her assignment to a manager at a level above. This is not always easy, but is best done when a person feels that he or she lacks the skill or direction for a particular project, but that the manager above has the capabilities to perform the task. Upward delegation may start by asking the manager questions or asking for advice to help solve a particular problem. If the manager feels that the employee has too many questions or needs too much assistance, the manager may rescind the delegation and remove the task from the employee. If employees are avoiding delegated duties by overwhelming the manager with requests for assistance, the manager can require that the employee have at least one proposed solution to every problem brought to the manager. Additionally, this situation can be improved by the manager asking questions, which lead the worker to think through and resolve a problem. Questions like, "What would you do next? What do you see as our options?" and, "What do you see as the best approach?" communicate the message that the employee is expected to take the initiative to at least attempt to solve the assignment.

A manager who uses effective delegation across time and assignments will be more efficient and have more time for true managerial work and will reap the benefits of employee empowerment at the same time. This will occur because success will be clearly defined and communicated to a worker who will be matched with jobs based on his or her capabilities. When done correctly, the process of delegation empowers workers and enhances their motivation and commitment.

SEE ALSO *Management Styles; Motivation and Motivation Theory; Time Management*

BIBLIOGRAPHY

"Delegating Work? 5 Must-Avoids You Must Know." *Rediff News,* 16 Jan 2007. Available from: http://www.rediff.com/getahead/2007/jan/16delegate.htm.

Kreitner, Robert, and Angelo Kinicki. *Organizational Behavior* 6th ed. Boston, MA: McGraw-Hill/Irwin, 2004.

Malone, Thomas W. "Is Empowerment Just a Fad? Control Decision, Decision Making and IT." *Sloan Management Review.* 38, no. 2 (1997): 23–35.

Roebuck, Chris. *Effective Delegation.* New York: American Management Association, 1998.

Straub, Joseph T. *The Agile Manager's Guide to Delegating Work.* Bristol, VT: Velocity Business Publishing, 1998.

DEREGULATION

Deregulation refers to the deletion, abandonment, or relaxation of various laws, rules, and regulations that affect business and industry. However, the topic of deregulation is best understood by first understanding the purposes and effects of regulations.

REGULATION

It is often thought that individual firms lack the perspective and/or the incentive to protect society. Consequently, the regulation of business and industry by government is for the purposes of consumer protection and or the enhancement of business competition. Regulation is generally thought to also protect minorities, employees, investors, and the environment.

The railroad industry was one of the first industries that the federal government targeted. As a result, the Interstate Commerce Act was passed in 1887. As such, the Interstate Commerce Act created the first regulatory body in the United States—the Interstate Commerce Commission, which still regulates transportation rates, as well as establishes rules and regulations for interstate commerce.

The United States government expanded its control over industry by focusing on trusts, where a company is established for the purpose of controlling multiple companies. Consequently, the Sherman Antitrust Act was enacted in 1890 to control monopolies. In 1914, the Clayton Act amended the Sherman Act by forbidding specific business actions. For example, tying contracts interlocking directorates and discriminatory pricing were made illegal, if the results of these actions lessened competition.

The Federal Trade Commission Act, also enacted in 1914, formally established the Federal Trade Commission (FTC). Among other responsibilities, the FTC remains responsible for defining, detecting, and enforcing compliance with the Clayton Act. The Wheeler-Lea Act of 1938 expanded FTC jurisdiction to include any practice or practices that harm the public in general and those practices that harm competitors. The Robinson-Patman Act was enacted in 1938 due to the growth of large retailing conglomerates. This law covered discrimination against buyers as well as sellers.

In 1958 the National Traffic and Safety Act was enacted. This legislation provided for the creation of compulsory safety standards for automobiles and tires.

In 1966 the Fair Packaging and Labeling Act was passed. This act provided for the regulation of the packaging and labeling of consumer goods. It also required manufacturers

to state package contents, the maker of the contents, and how much of individual contents are included.

The Antitrust Procedures and Penalties Act was enacted in 1974. This legislation increased fines for violation of the Sherman Act. Two years later, the Antitrust Improvement Act required firms to notify the FTC of merger plans. This act also gave state attorney generals the power to sue for the benefit of consumers.

GOVERNMENT PERMISSIVENESS

It is generally thought that the permissiveness of the federal government began during the presidency of Richard M. Nixon, which led the way for formal deregulation. During the 1980s the government turned its focus from laws, rules, and regulations to the creation of market incentives that were thought to motivate business.

Proponents of deregulation argue that government intervention impedes the natural laws of supply and demand and ultimately increases costs to consumers. In addition, the overregulation of business is thought to thwart innovation by creating delays and increased red tape. Thus in 1981 the Ronald Reagan administration created the Task Force on Regulatory Relief to review all proposed new regulations and review old regulations. The establishment of this task force also lead to the increased use of cost-benefit analysis, which compares the cost of all regulations to their benefit.

DEREGULATION AND THE AIRLINE INDUSTRY

Approximately thirty years ago, the United States government put into practice a series of deregulation legislation concerning the airline industry. The effort was intended to encourage healthy competition and lower the inflated airfare costs. To a certain extent, the deregulation worked, and the 1990s saw the continual growth of the airline industry, with a large turnover rate of airline companies.

However, airlines went through a dramatic decline in the early period of the twenty-first century. According to a 2008 article in the *New York Times*, "Did Ending Regulation Help Fliers?," the airline industry lost more than $30 billion between 2001 and 2006 due to many problems that had not been expected at the time of deregulation. The terrorist attack of 9/11 encouraged investor doubt and customer dissatisfaction with airlines, and the rising costs of air fuel again increased airfare. It has yet to be seen if deregulation had an ultimately positive effect on the airline industry or not.

DEREGULATION AND THE AMERICAN ENERGY INDUSTRY

Certain deregulation policies, such as 1992 Energy Policy Act, encouraged free action of the companies offering electricity in the United States. As a result of this deregulation, energy companies began a series of splits and mergers, an occurrence that moved state by state as the deregulation became more common. In 1998, California initiated a series of steps designed to eliminate energy monopolies and offer its public more choices in where they got their electrical power.

At first, the results of such state deregulation practices—also attempted by Texas and Illinois—were chaotic, leading to shortages and inflated energy prices. As states regulated and deregulated their electrical energy companies, the national industry saw the rise of several large conglomerations. Powering marketing, or the trading of electricity through energy companies, become common. Long-term results, however, are expected to lead to stability and healthy growth of America's energy industry.

THE TOLLBOOTH THEORY

Among the arguments for deregulation is the concept called the Tollbooth theory. This theory proposes that in economies controlled through heavy regulation, the ethical relationship between industry and government will slowly collapse and the economy will suffer. As penalties increase and regulations become too constricting to allow free movement by companies, the Tollbooth theory says the bureaucracies will begin accepting bribes and payoffs in exchange for helpful deals; they will look the other way while companies violate the regulations. A system of corruption is then established that threatens the economy and destabilizes all industries.

Supporters of deregulation and the Tollbooth theory often use Russia as an example, citing reforming legislation passed from 2001 to 2004 and its effects. These laws pertained to certification and registration by businesses; they established clear limits to the amount of regulation possible, helping to pull Russia from what was theorized as a Tollbooth economy. The amount of red-tape businesses had to surmount was drastically lessened, and much registration was localized. Freed from over-regulation, Russia's economy is expected to continue to improve, with small business employment growing and start-up companies becoming more common. (Of course, high energy prices might be a better explanation for Russia's economic resurgence).

Opponents to the Tollbooth theory use the Public Interest model instead, which theorizes that governments use regulations to control dangerous market trends, and that regulation does not usually lead to corruption or instability.

INTERNATIONAL DEREGULATION

In recent years, deregulation has become a popular international method to improve economic conditions and open nations to more global business. Many deregulation policies effect tariffs and customs fees, giving international

companies more opportunities to conduct business overseas. In Europe, for instance, the EU nations completed a marketing directive in 2007 which was intended to fully open the European Union nations to outside trade. The directive was immensely successful, with fourteen out of the fifteen original EU nations reaching fully open markets.

Deregulation is making an impact elsewhere, as well. In 2007, European businesses formally encouraged Japan to continue its deregulation policies, which were opening many Japanese markets to foreign competition. The European businesses believed that the intense deregulation Japan had spearheaded from 2001 to 2006 had led to reform-fatigue. Japan, after breaking up its post office monopoly and opening such markets as medicine and telecommunication, is now slowing deregulation efforts, afraid that they are harming internal business.

In India, deregulation has the potential to change oil prices for the growing country. In a 2008 reaction to dropping oil subsidies, the Indian government raised fuel prices, causing an even worse spike in the continuing inflation. Another possibility, encouraged by international vendors, is for India to drop tariffs on imported oil, a deregulation activity it has already refused once but is now reconsidering.

Despite rumors that in 2008 China would attempt the deregulation of fuel industries so far refused by India, the Asian nation has instead opted for a tax cut on their windfall profit tax. China has also considered raising fuel prices, but has not yet made any moves to deregulate their fuel companies, as the government is also worried about high inflation. The Chinese tax cut, however, is expected to be highly successful and serves as an example for alternatives to deregulation.

In a different type of market, the United Kingdom is now beginning to deregulate its broadband industry. Previously to 2008, broadband companies were forced to offer broadband internet services at a fixed rate determined by the government, but new analysis showed that competition between United Kingdom broadband companies was rising. Now, if four or more broadband companies are present for consumers to choose from, the price cap regulation does not apply. As the high-speed internet market continues to grow in the UK, forecasts suggest even more widespread deregulation.

SEE ALSO *Economics*

BIBLIOGRAPHY
"Deregulation." *Consumer Reports,* July 2002. Available from: http://www.consumerreports.org.
Electricity Deregulation Report Global 2008. Ed 7. ABS Energy Research, 2008.
"European business chief asks Japan to deregulate." *EU Business,* 2007. Available from: http://www.eubusiness.com/news_live/1195043521.94/.
"FCC Staff Stiffs Cable on Deregulation." *Multichannel News* 26, no. 6 (2005): 34.

Gorman, H. "Deregulation Increases Cash Flow, Profitability." *Electric Light & Power* 82, no. 5 (2004): 31–33.
Guasch, J.L., and R.W. Hahn. "The Costs and Benefits of Regulation: Implications for Developing Countries." *The World Bank Research Observer* 14, no. 1 (1999): 137–158.
Jackson, D. "A 2005 Focal Point." *Telephony* 245, no. 22 (2004): 50.
Kelly, Neon. "Deregulation Gets Green Light." *Computing,* 2008. Available from: http://www.computing.co.uk/computing/news/2210133/deregulation-gets-green-light-3836409.
Maynard, Micheline. "Did Ending Regulation Help Fliers?" *New York Times,* 2008. Available from: http://www.nytimes.com/2008/04/17/business/17air.html.
McDonald, M. "Changed Forever." *Air Transport World* 41, no. 7 (2004): 36–39.
Plunkett, Jack W. *Plunkett's Energy Industry Almanac 2008: Energy Industry Market Research.* Plunkett Research Ltd, 2007.
Shen, Samuel, and Aizhu Chen. "China won't deregulate fuel prices soon." *Business Spectator.* May, 2008.
Rachman, D.J., and M.H. Mescon. *Business Today.* New York: Random House, 1987.
Yakovlev, Evgeny, and Ekaterina Zhuravskaya. *Reforms in Business Regulation: Evidence from Russia,* 2008. Available from: http://www.hecer.fi/Seminars/Papers/zhuravskaya_paper.pdf.

DICTIONARY OF OCCUPATIONAL TITLES

SEE *Occupational Information Network*

DISASTER RECOVERY

Organizations are faced with a variety of threats and vulnerabilities, and these continue to evolve. Business disruptions can include natural disasters such as floods, fires, hurricanes, and power outages. Since 9/11, the threat of man-made disasters such as terrorist attacks has taken on a sense of urgency as well. The increase in metropolitan population density further exacerbates the threats posed by both natural and man-made disasters. Although business-continuity planning and disaster-recovery planning are now generally recognized as vital, creating and maintaining a sound plan is quite complex.

Disaster recovery planning addresses the prospect that a disaster might interrupt an organization's business operations. Whether an organization is for-profit, non-profit, or governmental, the need to mitigate disaster risks has become especially salient.

Disasters can come in many forms and sometimes last indefinitely. The 2002 Disaster Recovery guide lists many types of disasters and the categories they fall under, such as:

Environmental Disasters.

- Tornado
- Hurricane
- Snowstorm
- Flood
- Fire
- Epidemic
- Contamination

Organized/Deliberate Disruption.

- Sabotage
- Terrorism
- War
- Theft
- Arson
- Labor disputes

Equipment Failures.

- Power failure
- Air conditioning failure
- Production line failure
- Cooling plant failure

Information Security Incidents.

- Cyber crime
- Loss of records or data
- Disclosure of sensitive material
- IT system failure

Certain conditions define a disaster in relation to business interruptions. Charlotte Hiatt's *A Primer for Disaster Recovery Planning in an IT Environment* lists some of these conditions, observed in organizations going through a time of crisis. Surprise and insufficient information are, of course, natural characteristics of a disaster. There is also an uncontrollable, escalating chain of chaotic events and a loss of control in key areas of the organization. A sense of keen scrutiny from outside the organization is also common, leading to several behaviors found in disaster environments, such as siege mentality, panic, and short-term focus.

Hiatt divides disasters into three different categories for businesses. The first category is composed of low-risk incidents. These events do not seriously injure anyone and cause only minimal disruption of the organization's systems. The second category is the moderate risk incident. In these incidents there are serious injuries, many minor injuries, and damage of assets and facilities. The ability to conduct business is severely hampered for a time.

Employee distress is moderate. The last category is the high risk incident. These incidents cause widespread death, injury, and severe damage to facilities, and are the most likely to impact the media and the company's investors.

DISASTER RECOVERY AND BUSINESS

A business impact analysis helps management to understand the criticality of different business functions, recovery time required, and the need for various resources. The question of which corporate functions receive top priority should be addressed. In selecting a strategy to protect the organization, cost-benefit comparisons are made with regard to the effects of doing without various services and functions (e.g., call centers, production locations, proprietary data) at specific points in time, and developing plans for optimum recovery periods for each service and function.

A central office failure brought about by a fire or power outage can also affect trading operations. Redundancy (including back-up sites and additional staff and technologies) is recommended, albeit expensive. An additional risk is that an entire network (such as a cell-phone network) might go down. Jay Pultz, research vice-president at disaster and business continuity consultancy firm Gartner, Inc., is concerned that failures will increase because the companies that provide the networks are collapsing their infrastructure to a single backbone, as opposed to separate backbones for the Internet, phone, data, etc.

Companies should be aware that back-up systems can create expenses of their own. At times, the price for backing up necessary information can put a significant drain on the company's resources. Julie Bort, with *Network World*, reports that contracts for data storage and recovery services can easily reach more than $30,000 a month. Companies are usually willing to spend somewhere between 2 percent and 4 percent of their IT budget on disaster recovery, and this is not always enough to ensure full coverage. Some companies make disaster recovery a much larger priority and budget accordingly.

Organizations that depend on electronic-based information suffer greater losses at the time of disasters, and usually make use of more security options. According to the Joint Commission Resource's *2008 Standards for Long Term Care*, a disaster recovery plan for electronic information can include several components. A plan can be based around some or all of the following:

- Procedures for scheduled and unscheduled downtime
- Contingency plans for operation interruptions
- An emergency service plan
- A back-up system (electronic or manual)
- Data retrieval procedures

SMALL BUSINESSES

Oddly enough, smaller businesses have been found to lead many midsize businesses in implementing true disaster-recovery solutions. Small businesses often rely on value added resellers (VARs) for their solutions, and larger firms use internal IT departments. Midsize firms, however, are too complex to be relocated quickly, yet lack the internal staff to restore business processes rapidly, increasing opportunities for VARs to offer business continuity services to this market.

Small businesses have yet another ally in the SBA, or Small Business Administration. The SBA, created in 1953, focuses on aiding small business through such trials as system-crashing disasters. In their 2007 Recovery Plan, the SBA focuses on its intent to help small businesses recover from natural disasters, especially those with widespread effects (such as hurricane Katrina in 2005). With the aid from the SBA, small businesses are often able to recoup their losses from disasters.

APPLICATIONS TO SUPPLY CHAIN MANAGEMENT

Companies involved in extensive outsourcing or exclusive partnerships with suppliers may have more to lose than others. A disaster affecting their supply chain would leave such companies without immediate recourse to resume production.

This "dark side" of supply chain management is discussed in a white paper appearing in a March 2005 issue of *Supply Chain Management Review.* The authors explore the notion of supply continuity planning, which is a comprehensive approach to managing supply risk. They state that by employing their supply continuity planning model, organizations can guard against a major supply disruption that could potentially delay orders and result in loss of customers.

Whereas companies previously relied on inventory buffers (safety stock, lead times, excess capacity) to protect them, today's competitive environment makes these buffers less attractive. A consequence is that today's lean supply chains are increasingly fragile, or more sensitive to shocks and disruptions.

The authors make a strong case for how devastating disruptions can be by citing several events, including a fire at a factory supplying valves to Toyota, resulting in estimated costs of $195 million; an earthquake in Taiwan, hampering the supply of computer chips and computer demand during the holiday season; a lightning strike at a radio-frequency chip plant in Albuquerque, NM, resulting in a fire, production delays, and the eventual withdrawal of Ericsson from mobile phone manufacturing (because the plant was its sole supplier); and the 9/11 terrorist attacks, resulting in loss of life and loss of information databases.

Based on case studies of four organizations that proactively manage inbound supply risk, the authors present a framework describing detailed efforts focused on four major activities: creating system awareness of supply risk, preventing the occurrence of supply disruptions, remediating supply interruptions, and managing knowledge.

BEING PREPARED

In a 2005 *Canadian Business* article titled "Always Be Prepared," an expert in enterprise risk presents a series of questions that managers should ask about the firm's state of readiness to continue business after a disruption. For example, does the business even have a plan? Is the plan tailor-made or "off the rack"? Are critical functions the basis of the plan? The maintenance of knowledge management, regular testing of the plan, and supplier preparedness are other important issues.

What should businesses look for when considering a disaster recovery plan? Clearly, a carefully defined procedure should be created, to be followed exactly during a crisis. Employee training and periodic reviews go hand in hand with this preparation. But there are also a number of outside companies and devices that specialize in information storage and recovery. Which sort of protection should a company consider? Laura Buckley, in her article "2008 Trends: Data Protection, Archiving, and Disaster Recovery Challenges," gives a short, helpful list to consider when looking at data protection. According to her, the appliance should:

- Be easy to purchase, install, manage, and support
- Optimize all back-up systems to meet corporate RTO and RPO requirements
- Comply with regulated retention policies
- Efficiently use media
- Automate daily functions to reduce administrative hours needed
- Provide an adaptable foundation so that newer data protection systems can be built on top of existing appliances

When a protection and recovery system is in place, there are several routines organizations can follow which ensure high quality results. *Disaster Recovery Information* (DRI) gives three practices that every organization can apply to their disaster recovery program.

First, DRI advises that organizations search carefully for flaws in their contingency plans. Weaknesses and faults should be carefully noted and dealt with. Brainstorming sessions and planned tests are both excellent ways to expose flaws.

Second, organizations should establish a cycle of scheduled tests for the contingency plan. Not only will this make step one easier, but it will provide the company with an opportunity to see itself under pressure. These planned tests should strive to be difficult, so that serious weaknesses can be exposed.

Last, organizations should never expect real disasters to act like their simulated tests. They should prepare for the unexpected, and always act as if the real disaster includes all the possibilities they did not test.

Being prepared for disaster is increasingly essential. The good news for those new to business continuity planning and disaster recovery planning is that information on how to prepare is proliferating. Business continuity and disaster recovery planning software explore the potential impacts of disaster, and underlying risks; constructing a plan; maintenance, testing, and auditing to ensure that the plan remains appropriate to the needs of the organization; and support infrastructure and services.

SEE ALSO *Contingency Approach to Management; Lean Manufacturing and Just-in-Time Production; Strategic Planning Tools; Strategy Formulation; Supply Chain Management*

BIBLIOGRAPHY
Barnes, James C. *A Guide to Business Continuity Planning.* New York: Wiley, 2001.

Bort, Julie. "Do-It-Yourself Disaster Recovery." *Network World,* 2004. Available from: http://www.networkworld.com/supp/2004/ndc5/082304disaster.html.

Buckley, Laura. "2008 Trends: Data Protection, Archiving, and Disaster Recovery Challenges for SMB." *Computer Technology Review,* 2008. Available from: http://www.wwpi.com.

"The Business Continuity Planning & Disaster Recovery Planning Directory." *Disaster Recovery World.* Available from: http://www.disasterrecoveryworld.com.

Garvey, Martin J. "From Good to Great (Maybe)." *InformationWeek,* 3 January 2005, 45.

Gerson, Vicki. "Better Safe Than Sorry." *Bank Systems & Technology* 42, no. 1 (2005): 41.

Hanna, Greg. "How to Take a Computer Disaster in Stride." *Strategic Finance* 86, no. 7 (2005): 48–52.

Hiatt, Charlotte J. *A Primer for Disaster Recovery Planning in an IT Environment.* Idea Group, Inc, 2000.

Hofmann, Mark A. "Y2K Spurred Continuity Plan That Was Put to Test by 9/11." *Business Insurance* 39, no. 16 (2005): 71.

Hoge, John. "Business Continuity Planning Must Extend to Vendors." *Bank Technology News* 18, no. 2 (2005): 47.

Hood, Sarah B. "Always Be Prepared." *Canadian Business* 78, no. 6 (2005): 61–63.

Huber, Nick. "Business Continuity Plans Eat 35% of Clearing House's Core IT Spend." *ComputerWeekly,* 8 February 2005, 5.

"Impact and Risk Assessment." *The Disaster Recovery Guide,* 2002. Available from: http://www.disaster-recovery-guide.com/risk.htm.

Joint Commission Resources. *2008 Standards for Long Term Care* Joint Commission Resources, 2007.

"The Possibility for Disaster." *Disaster Recovery Information,* 2007. Available from: http://recovery-disaster.net/it-disaster-recovery/disaster-recovery-threat.htm.

Roberts, John, and Frank J. Ohlhorst. "Disaster Planning Promises Big Channel Profits." *CRN* 1130 (2005): 22.

SBA. *Disaster Recovery Plan* United States Small Business Administration, 2007

Sisk, Michael. "Business Continuity: Still Not Entirely Ready For Disaster." *Bank Technology News* 17, no. 12 (2004): 41.

Zsidisin, George, A., Gary L. Ragatz, and Steven A. Melnyk. "The Dark Side of Supply Chain Management." *Supply Chain Management Review* 9, no. 2 (2005): 46–52.

DISCRIMINATION

Discrimination, in an employment context, can be generally defined as treating an individual or group less well in recruiting, hiring, or any other terms and conditions of employment due to the person's or group's race, color, sex, religion, national origin, age, disability, or veteran's status. These categories are referred to as protected classifications because they are singled out for protection by equal employment opportunity (EEO) laws. Subcategories of people within each protected classification are referred to as protected groups. For example, male and female are the protected groups within the protected classification of sex. EEO legislation affords protection from illegal discrimination to all protected groups within a protected classification, not just the minority group. Thus, employment discrimination against a man is just as unlawful as that aimed at a woman. The lone exception to this rule concerns the use of affirmative action programs (discussed later), which, under certain circumstances, allow employers to treat members of certain protected groups preferentially.

In the United States, effective federal legislation banning employment-related discrimination did not exist until the 1960s, when Congress passed Title VII of the Civil Rights Act (1964). In the years since, several other important federal laws have been passed. In addition to the myriad federal laws banning discrimination on the basis of race, color, sex, religion, national origin, age, disability, and veteran's status, almost all states have anti-discrimination laws affecting the workplace. Most of these laws extend the protections in federal law to employers that are not covered by the federal statutes because of their size (Title VII for example, applies only to employers with 15 or more employees). Some state laws also attempt to prevent discrimination against individuals and groups that are not included in federal law. For example, approximately fourteen states have passed statutes protecting all workers in the states from employment discrimination based on sexual orientation, and

several other states prohibit public sector employers from discriminating on the basis of sexual orientation.

SPECIFIC ANTI-DISCRIMINATION LEGISLATION AFFECTING THE WORKPLACE

Title VII of the Civil Rights Act (CRA), passed in 1964, covers organizations that employ fifteen or more workers for at least twenty weeks during the year. Specifically, the law states: "It shall be an unlawful employment practice for an employer to fail or refuse to hire or discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, sex, or national origin." Interpretations of Title VII by courts have clarified the specific meaning of the prohibitions against discrimination. In general, it is safe to say that virtually any workplace decision involving personnel is subject to legal challenge on the basis of Title VII, including not only decisions made relative to recruiting and hiring, but also in relation to promotion, discipline, admission to training programs, layoffs, and performance appraisal. Harassment of applicants or employees because of their membership in a protected classification is also considered a violation of Title VII.

Title VII is probably the most valuable tool that employees have for remedying workplace discrimination because it covers the greatest number of protected classifications. If a court determines that discrimination has occurred, this law entitles the victim to relief in the form of legal costs and back pay (i.e., the salary the person would have been receiving had no discrimination occurred). For instance, suppose a woman sues a company for rejecting her application for a $35,000 per year construction job because the company unlawfully excludes women from this job. The litigation process takes two years and, ultimately, the court rules in the applicant's favor. To remedy this discrimination, the court could require the company to pay her legal fees and grant her $70,000 in back pay (two years' salary).

Title VII of the Civil Rights Act of 1964 has had an enormous impact on the human resource management (HRM) practices of many companies, as it forced them to take a close look at the way they recruit, hire, promote, award pay raises, and discipline their employees. As a result of this self-scrutiny, many firms have changed their practices, making them more systematic and objective. For instance, most firms now require their supervisors to provide detailed documentation to justify the fairness of their disciplinary actions, and many firms are now more cautious with regard to their use of employment tests that restrict the employment opportunities for certain protected groups.

A number of Supreme Court decisions in the mid to late 1980s made discrimination claims under Title VII more difficult for employees to substantiate. To put more teeth into the law, Congress amended it by enacting the Civil Rights Act of 1991. This 1991 amendment expanded the list of remedies that may be awarded in a discrimination case—the employer now has more to lose if found guilty of discrimination. In addition to legal fees and back pay, an employer may now be charged with punitive and compensatory damages (for future financial losses, emotional pain, suffering, inconvenience, mental anguish, and loss of enjoyment of life). The cap for these damages ranges from $50,000 to $300,000 depending on the size of the company. Employees are entitled to such damages in cases where discrimination practices are "engaged in with malice or reckless indifference to the legal rights of the aggrieved individual" (e.g., the employer is aware that serious violations are occurring, but does nothing to rectify them).

Moreover, the CRA of 1991 adds additional bite to the 1964 law by providing a more detailed description of the evidence needed to prove a discrimination claim, making such claims easier to prove. The CRA of 1991 also differs from the 1964 law by addressing the issue of mixed-motives cases. The CRA of 1991 states that mixed-motive decisions are unlawful. That is, a hiring practice is illegal when a candidate's protected group membership is a factor affecting an employment decision, even if other, more legitimate factors are also considered. For instance, a company rejects the application of a woman because she behaves in an "unladylike" manner—she is "too aggressive for a woman, wears no makeup, and swears like a man." The company is concerned that she would offend its customers. The employer's motives are thus mixed: its concern about offending customers is a legitimate motive; its stereotyped view of how a "lady" should behave is a discriminatory one.

Congress introduced another bill, the Civil Rights Act of 2008, intended to "restore the right of individuals and to challenge practices that have an unjustified discriminatory effect based on race, color, national origin, disability, age, or gender." The bill, ultimately defeated, was questioned by some, as it stated that allowing employers to hire illegal aliens "undermine[s] the living standards and working conditions of all Americans."

OTHER MAJOR EEO LAWS

The Equal Pay Act of 1963 prohibits discrimination in pay on the basis of sex when jobs within the same company are substantially the same. The company is allowed to pay workers doing the same job differently if the differences are based on merit, seniority, or any other reasonable basis other than the workers' gender. In 2008, the Lilly Ledbetter Fair Pay Act (the Fair Pay Restoration Act) would have reversed the Supreme Court decision

that takes away the ability of women workers to sue for wage discrimination. However, it failed to get the 60-vote majority that it needed for Senate passage.

The Age Discrimination in Employment Act (ADEA) of 1967 bans employment discrimination on the basis of age by protecting applicants and employees who are forty or older. The ADEA applies to nearly all employers of twenty or more employees. The ADEA protects only older individuals from discrimination; people under forty are not protected. The act also prohibits employers from giving preference to individuals within the forty or older group. For instance, an employer may not discriminate against a fifty-year-old by giving preference to a forty-year-old. Except in limited circumstances, companies cannot require individuals to retire because of their age.

The Vocational Rehabilitation Act of 1973, a precursor to the 1990 passage of the Americans with Disabilities Act, requires employers who are federal contractors ($2,500 or more) to take proactive measures to employ individuals with disabilities. This law is limited in application since it only applies to federal agencies and businesses doing contract work with the government.

The Vietnam Veterans' Readjustment Assistance Act, passed in 1974, requires employers who are government contractors ($10,000 or more) to take proactive steps to hire veterans of the Vietnam era. The scope of this law is also limited by the fact that only government contractors must comply.

The Pregnancy Discrimination Act of 1978 amended the CRA of 1964 by broadening the interpretation of sex discrimination to include pregnancy, childbirth, or related medical conditions. It prohibits discrimination against pregnant job applicants or against women who are of child-bearing age. It states that employees who are unable to perform their jobs because of a pregnancy-related condition must be treated in the same manner as employees who are temporarily disabled for other reasons. It has also been interpreted to mean that women cannot be prevented from competing for certain jobs within a company just because the jobs may involve exposure to substances thought harmful to the reproductive systems of women.

The Immigration Reform and Control Act (IRCA) of 1986 prohibited discrimination based on national origin and citizenship. Specifically, the law states that employers of four or more employees cannot discriminate against any individual (other than an illegal alien) because of that person's national origin or citizenship status. In addition to being an anti-discrimination law, this act makes it unlawful to knowingly hire an unauthorized alien. At the time of hiring, an employer must require proof that the person offered the job is not an illegal alien.

The Americans with Disabilities Act (ADA) of 1990 was designed to eliminate discrimination against individuals with disabilities. The employment implications of the act, which are delineated in Titles I (private sector) and II (public sector) of the ADA, affect nearly all organizations employing fifteen or more workers. According to the act, an individual is considered disabled if he or she has a physical or mental impairment that substantially limits one or more of the individual's major life activities, such as walking, seeing, hearing, breathing, and learning, as well as the ability to secure or retain employment. In the years since passage of the legislation, the courts have applied a fairly broad definition of disability. The ADA only protects qualified individuals with a disability. To win a complaint, an individual who has been denied employment because of a disability must establish that, with accommodation (if necessary), he or she is qualified to perform the essential functions of the job in question. To defend successfully against such a suit, the employer must demonstrate that, even with reasonable accommodation, the candidate could not perform the job satisfactorily, or it must demonstrate that the accommodation would impose an undue hardship. The ADA defines "undue hardship" as those accommodations that require significant difficulty to effect or significant expense on the part of the employer.

An example of an ADA case would be one in which an employee is fired because of frequent absences caused by a particular disability. The employee may argue that the employer failed to offer a reasonable accommodation, such as a transfer to a part-time position. The employer, on the other hand, may argue that such an action would pose an undue hardship in that the creation of such a position would be too costly.

INTERPRETING EEO LAW

It is clear from the preceding discussion that an employer may not discriminate on the basis of an individual's protected group membership. But exactly how does one determine whether a particular act is discriminatory? Consider the following examples:

Case 1: A woman was denied employment as a police officer because she failed a strength test. During the past year that test screened out 90 percent of all female applicants and 30 percent of all male applicants.

Case 2: A woman was denied employment as a construction worker because she failed to meet the company's requirement that all workers be at least 5 feet 8 inches tall and weigh at least 160 pounds. During the past year, 20 percent of the male applicants and 70 percent of the female applicants have been rejected because of this requirement.

Case 3: A female accountant was fired despite satisfactory performance ratings. The boss claims she has violated company policy by moonlighting for

another firm. The boss was heard making the comment, "Women don't belong in accounting, anyway."

Case 4: A male boss fired his female secretary because he thought she was too ugly, and replaced her with a woman who, in his opinion, was much prettier.

The Civil Rights Acts of 1964 and 1991 prohibit sex discrimination. Yet, knowing that sex discrimination is unlawful provides very little guidance in these cases. For instance, how important are the intentions of the employer? And how important are the outcomes of the employment decisions? In the first two cases, the employer's intentions seem to be noble, but the outcomes of the employment decisions were clearly disadvantageous to women. In the third case, the employer's intentions appear questionable, but the outcome may be fair. After all, the employee did violate the company policy. In the fourth case, the employer's intentions are despicable, yet the outcome did not adversely affect women in the sense that another member of her sex replaced the discharged employee.

To determine whether an EEO law has been violated, one must know how the courts define the term *discrimination*. In actuality, there are two definitions: disparate treatment and disparate impact. Disparate treatment is intentional discrimination. It is defined as treating people unfairly based on their membership in a protected group. For example, the firing of the female accountant in Case 3 would be an example of disparate treatment if the discharge were triggered by the supervisor's bias against female accountants (i.e., if men were not discharged for moonlighting). However, the employer's actions in Cases 1 and 2 would not be classified as disparate treatment because there was no apparent intent to discriminate.

While disparate treatment is often the result of an employer's bias or prejudice toward a particular group, it may also occur as the result of trying to protect the group members' interests. For instance, consider the employer who refuses to hire women for dangerous jobs in order to protect their safety. While its intentions might be noble, this employer would be just as guilty of discrimination as one with less noble intentions.

What about Case 4, where a secretary was fired for being too ugly? Is the employer guilty of sex discrimination? The answer is no if the bias displayed by the boss was directed at appearance, not sex. Appearance is not a protected classification. The answer is yes if the appearance standard were being applied only to women; that is, the company fired women but not men on the basis of their looks.

Disparate impact is unintentional discrimination, defined as any practice without business justification that has unequal consequences for people of different protected groups. This concept of illegal discrimination was first established by the Griggs v. Duke Supreme Court decision, handed down in 1971. Disparate impact discrimination occurs, for instance, if an arbitrary selection practice (e.g., an irrelevant employment test) resulted in the selection of a disproportionately low number of females or African Americans. The key notion here is "arbitrary selection practice." If the selection practice were relevant or job-related, rather than arbitrary, the employer's practice would be legal, regardless of its disproportionate outcome. For example, despite the fact the women received the short end of the stick in Cases 1 and 2, the employer's actions would be lawful if the selection criteria (e.g., the strength test and height and weight requirements) were deemed job related. As it turns out, strength tests are much more likely to be considered job related than height and weight requirements. Thus, the employer would probably win Case 1 and lose Case 2.

WORKPLACE DISCRIMINATION IN THE TWENTY-FIRST CENTURY

The EEOC reported that nearly 7,000 racial harassment claims were filed in 2007, making it a record year for such cases. In one such case, Conectiv Energy and three subcontractors reached a $1.65 million discrimination settlement with four African American employees who, while on the job, were subjected to racial slurs, KKK graffiti, and hanging nooses. However, defense contractor Lockheed Martin holds the record for the biggest individual racial discrimination settlement in U.S. history. In 2008, the company paid $2.5 million to an African American employee who was the recipient of death threats and racial slurs.

Sex-based discrimination complaints were also high in 2007. That year, the EEOC received 24,826 charges of sex-based discrimination. The Commission resolved 21,982 sex discrimination charges and recovered $135.4 million in monetary benefits for charging parties and other aggrieved individuals. This figure did not include monetary benefits obtained through litigation.

As of 2008, most states still did not have laws that protect homosexual people from discrimination in employment, housing, and health care. However, the spring of 2008 ushered in activity surrounding employment discrimination based on sexual orientation. A bill introduced in Congress would have prohibited employment discrimination based on sexual orientation. In May 2008, the California Supreme Court ruled that same sex couples have a constitutional right to marry, making California and Massachusetts the first two states to recognize such marriages. Homosexual employees argue that they are being undercompensated by not being able to provide benefits for their

domestic partners. This is a benefit usually granted to spouses and family members. California, since 2005, has had a law that requires employers to grant the same benefits to registered domestic partners as married spouses.

Finally, a study conducted about age discrimination revealed that even the use of ageist language has negative effects for companies and employees. Such phrases used in the workplace, like "old goat" or "let's bring in the young guns," are linked to poor health and lower productivity of older workers. These comments can be costly for companies. In its 2006 fiscal year, the EEOC received nearly 17,000 workplace age discrimination charges and recovered nearly $52 million in monetary benefits.

AFFIRMATIVE ACTION

The aim of affirmative action is to remedy past and current discrimination. Although the overall aim of affirmative action is thus identical to that of EEO (i.e., to advance the cause of protected groups by eliminating employment discrimination), the two approaches differ in the way they attempt to accomplish this aim. EEO initiatives are color-blind, while affirmative action initiatives are color-conscious. That is, affirmative action makes special provisions to recruit, train, retain, promote, or grant some other benefit to members of protected groups (e.g., women, blacks).

In some cases, employers are legally required to institute affirmative action programs. For instance, Executive Order 11246, issued by President Lyndon Johnson, makes such programs mandatory for all federal government contractors. Affirmative action can also be court ordered as part of a settlement in a discrimination case. For example, in the 1970s, the state of Alabama was ordered by the Supreme Court to select one black applicant for each white hired as a state trooper. The purpose of this decree was to rectify the effects of past discrimination that had been blatantly occurring for several years.

Most firms, however, are under no legal obligation to implement affirmative action programs. Those choosing to implement such programs do so voluntarily, believing it makes good business sense. These firms believe that by implementing affirmative action they can (1) attract and retain a larger and better pool of applicants, (2) avoid discrimination lawsuits, and (3) improve the firm's reputation within the community and its consumer base.

Affirmative action implementation consists of two steps. First, the organization conducts an analysis to identify the underutilized protected groups within its various job categories (e.g., officials and managers, professionals, service workers, sales workers). It then develops a remedial plan that targets these underutilized groups. A utilization analysis is a statistical procedure that compares the percentage of each protected group for each job category within the organization to that in the available labor market. If the organiza-

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Exhibit 1
Affirmative Action Options

Always Legal
1. Do nothing special, but make sure you always hire and promote people based solely on qualifications.
2. Analyze workforce for underutilization.
3. Set goals for increasing the percentage of minorities employed in jobs for which they are underutilized.
4. Remove artificial barriers blocking the advancement of minorities.
5. Create upward mobility training programs for minorities.
6. Advertise job openings in a way that ensures minority awareness (e.g., contact the local chapter of NOW or the NAACP).
7. Impose a rule that states that a manager cannot hire someone until there is a qualified minority in the applicant pool.

Sometimes Legal
(depends on the severity of the under-utilization problem)
8. Impose a rule that when faced with two equally qualified applicants (a minority and non-minority), the manager must hire the minority candidate.
9. Impose a rule that when faced with two qualified applicants (a minority and non-minority), hire the minority even if the other candidate has better qualifications.
10. Set a hiring quota that specifies one minority hiring for every non-minority hiring.

Never Legal
11. Do not consider any non-minorities for the position. Hire the most qualified minority applicant.
12. Fire non-minority employee and replace him or her with a minority applicant.

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tional percentage is less than the labor-market percentage, the group is classified as being underutilized.

For example, the percentage of professionals within the organization who are women would be compared to the percentage of professionals in the available labor market who are women. The organization would classify women as being underutilized if it discovered, for instance, that women constitute 5 percent of the firm's professionals, and yet constitute 20 percent of the professionals in the available labor market.

The second step is to develop an affirmative action plan (AAP) that targets the underutilized protected groups. An AAP is a written statement that specifies how the organization plans to increase the utilization of targeted groups. The AAP consists of three elements: goals, timetables, and action steps.

The action steps specify how the organization plans to reach its goals and timetables. Action steps typically include such things as intensifying recruitment efforts, removing arbitrary selection standards, eliminating workplace prejudices, and offering employees better promotional and training opportunities.

When a company initiates an AAP as a remedy for under-utilization, it attempts to bring qualified women or minorities into the workplace to make it more reflective of the population from which the employees are drawn. This

practice sometimes involves the use of preferential treatment or giving members of underutilized groups some advantage over others in the employment process. The use of preferential treatment has triggered a storm of controversy, as detractors point to the seemingly inherent lack of fairness in giving preference to one individual over another based solely on that person's race or gender. Supporters, however, believe that preferential treatment is sometimes needed to level the playing field. The U.S. Supreme Court has ruled that preferential treatment is legal if engaged in as part of a bona fide affirmative action program that is designed to remedy underutilization. The AAP, however, must be temporary, flexible, and reasonable.

Opponents of affirmative action programs argue that reverse discrimination has resulted from some AAPs. For example, programs designed to ensure that women receive a higher education have been very effective; they now outnumber white males in college classrooms and white males are having a much harder time getting accepted. This could have future implications for the workplace.

Some states are considering doing away with affirmative action in government funded projects and public schools. In the 2008 election, voters in Arizona, Colorado, Missouri, Nebraska, and Oklahoma may get the chance to vote on the initiative: "The state shall not discriminate against or grant preferential treatment to any individual or group on the basis of race, sex, color, ethnicity or national origin in the operation of public employment, public education or public contracting."

Some AAP and diversity programs are considered counterproductive. In a Harvard review of diversity programs data filed by companies to the EEOC in 2006, it was discovered that initiatives aimed at reducing bias at the top levels of a company resulted in a 6 percent decline in the proportion of black women in management.

SEE ALSO *Affirmative Action; Employee Recruitment Planning; Employee Screening and Selection; Employment Law and Compliance*

BIBLIOGRAPHY

Barnett, T., A. McMillan, and W. McVea. "Employer Liability for Harassment by Supervisors: An Overview of the 1999 EEOC Guidelines." *Journal of Employment Discrimination Law* 2, no. 4 (2000): 311–315.

Barnett, T. and W. McVea. "Preemployment Questions Under the Americans with Disabilities Act." *SAM Advanced Management Journal* 62 (1997): 23–27.

Clark, M. M. "Religion vs. Sexual Orientation." *HR Magazine* 49, no. 8 (2004): 54–59.

Dessler, G. *Human Resource Management.* 10th ed. Upper Saddle River, NJ: Prentice-Hall, 2005.

Giddens, Brent. "Same Sex Marriage–What does it Mean for California Employers." 19 June 2008. Available from: http://www.callaborlaw.com/archives/court-decisions-same-sex-marriage-what-does-it-mean-for-california-employers.html.

"Key Workplace Trends & Impact to Human Resources." 18 Mar. 2008. Available from: http://www.belmont.edu/hr/pdf/Revised%20Workplace%20Trends%20March%202008.ppt.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* Cincinnati: South-Western College Publishing, 2000.

Kleiman, L.S., and R.H. Faley. "Voluntary Affirmative Action and Preferential Treatment: Legal and Research Implications." *Personnel Psychology* 77, no. 1 (1988): 481–496.

Montgomery, Lori. "Senate Republicans Block Pay Disparity Measure." *Washington Post* 24 Apr 2008. Available from: http://www.washingtonpost.com/wp-dyn/content/article/2008/04/23/AR2008042301553.html.

Okamura, Angela and Katie McCown. "Congress Introduces Civil Rights Act of 2008." *civilrights.org* 24 Jan 2008. Available from: civilrights.org.

"Racial Harassment Cases Continue to Rise After Record Year. " 8 May 2008. Available from: http://blog.diversityjobs.com/racial-harassment-cases-continue-to-rise.

Rodriguez, Juan. "Ageist Language in the Workplace Impacts Productivity, Employee Health, and the Bottom Line." *Diversityjobs.com* 24 Apr 2008. Available from: http://www.diversityjobs.com/ageist-language-in-the-workplace-impacts-productivity-employee-health-and-bottom-line.

Royce, Cindy. "Affirmative Action Ban Heads for Ballot in 5 States." *CNNPolitics.com* 7 Mar 2008. Available from: http://www.cnn.com/2008/POLITICS/03/07/affirmative.action/.

"Sexuality and Public Policy." *News Batch* June 2008. Available from: http://www.newsbatch.com/sex.htm.

Smith, M.A., and C. Charles. "Title VII of the Civil Rights Act of 1964." *Georgetown Journal of Gender and the Law* 5, no. 1 (2004): 421–476.

Stodghil, Ron. "Is There Room at the Top for Black Executives?" *New York Times* 1 Nov 2007. Available from: http://www.nytimes.com/2007/11/01/business/01generation.html?pagewanted=print.

Wolkinson, B.W., and R.N. Block. *Employment Law.* Cambridge, MA: Blackwell, 1996.

DISTRIBUTION AND DISTRIBUTION REQUIREMENTS PLANNING

A supply channel is composed of three structures. At one end of the channel is the manufacturer. The manufacturer focuses on the development and production of products and originates the distribution process. The terminal point in the channel is the retailer who sells goods and services directly to customers for their personal, non-business use. In between the two lies a process called distribution, which is more difficult to define. One involved in the distribution process is labeled a "distributor." The *APICS Dictionary* describes a distributor as "a business that does not manufacture its own products but purchases and resells these products. Such a business usually maintains a finished goods

inventory." The proliferation of alternative distribution forms, such as warehouse clubs, catalog sales, marketing channel specialists, and mail order, have blurred functional distinctions and increased the difficulty of defining both the distribution process and the term "distributor."

One ultimately could maintain that distributors include all enterprises that sell products to retailers and other merchants—and/or to industrial, institutional, and commercial users—but do not sell in significant amounts to the ultimate customer. According to this definition, most companies that are involved with the disbursement of raw materials and finished products belong, in one sense or another, to the distribution industry. By adopting this definition, distribution is expanded to cover nearly every form of materials management and physical distribution activity performed by channel constituents, except for the processes of manufacturing and retailing.

Distribution involves a number of activities centered around a physical flow of goods and information. At one time the term "distribution" applied only to the outbound side of supply chain management, but it now includes both inbound and outbound. Management of the inbound flow involves these elements:

- Material planning and control
- Purchasing
- Receiving
- Physical management of materials via warehousing and storage
- Materials handling

Management of the outbound flow involves these elements:

- Order processing
- Warehousing and storage
- Finished goods management
- Material handling and packaging
- Shipping
- Transportation

Distribution channels are formed to solve three critical distribution problems: functional performance, reduced complexity, and specialization.

The central focus of distribution is to increase the efficiency of time, place, and delivery utility. When demand and product availability are immediate, the producer can perform the exchange and delivery functions itself. However, as the number of producers grows and the geographical dispersion of the customer base expands, the need for both internal and external intermediaries

who can facilitate the flow of products, services, and information via a distribution process increases.

Distribution management also can decrease overall channel complexity through sorting and assistance in routinization. Sorting is the group of activities associated with transforming products acquired from manufacturers into the assortments and quantities demanded in the marketplace. Routinization refers to the policies and procedures providing common goals, channel arrangements, expectations, and mechanisms to facilitate efficient transactions. David F. Ross describes sorting as including four primary functions:

1. Sorting is the function of physically separating a heterogeneous group of items into homogeneous subgroups. This includes grading and grouping individual items into an inventory lot by quality or eliminating defects from the lot.

2. Accumulating is the function of combining homogeneous stocks of products into larger groups of supply.

3. Allocation is the function of breaking down large lots of products into smaller salable units.

4. Assorting is the function of mixing similar or functionally related items into assortments to meet customer demand. For example, putting items into kit form.

As the supply chain grows more complex, costs and inefficiencies multiply in the channel. In response, some channels add or contain partners that specialize in one or more of the elements of distribution, such as exchange or warehousing. Specialization then improves the channel by increasing the velocity of goods and value-added services and reducing costs associated with selling, transportation, carrying inventory, warehousing, order processing, and credit.

ROLE OF THE DISTRIBUTION FUNCTION

There are a number of critical functions performed by the channel distributor. Ross describes these functions as:

1. **Product acquisition.** This means acquiring products in a finished or semi-finished state from either a manufacturer or through another distributor that is higher up in the supply channel. These functions can be performed by independent channel intermediaries or by the distribution facilities of manufacturing companies.

2. **Product movement.** This implies significant effort spent on product movement up or down the supply channel.

3. **Product transaction.** Distributors can be characterized as selling products in bulk quantities solely for

the purpose of resale or business use. Downstream businesses will then sell these products to other distributors or retailers who will sell them directly to the end customer or to manufacturers who will consume the material/components in their own production processes.

Following are the separate elements contained within the three critical functions of distribution:

- **Selling and promoting.** This function is very important to manufacturers. One strategy involves the use of distribution channels to carry out the responsibilities of product deployment. In addition to being marketing experts in their industry, distribution firms usually have direct-selling organizations and a detailed knowledge of their customers and their expectations. The manufacturer utilizing this distributor can then tap into these resources. Also, because of the scale of the distributing firm's operations and its specialized skill in channel management, it can significantly improve the time, place, and possession utilities by housing inventory closer to the market. These advantages mean that the manufacturer can reach many small, distant customers at a relatively low cost, thus allowing the manufacturer to focus its expenditures on product development and its core production processes.

- **Buying and building product assortments.** This is an extremely important function for retailers. Most retailers prefer to deal with few suppliers providing a wide assortment of products that fit their merchandizing strategy rather than many with limited product lines. This, of course, saves on purchasing, transportation, and merchandizing costs. Distribution firms have the ability to bring together related products from multiple manufacturers and assemble the right combination of these products in quantities that meet the retailer's requirements in a cost-efficient manner.

- **Bulk breaking.** This is one of the fundamental functions of distribution. Manufacturers normally produce large quantities of a limited number of products. However, retailers normally require smaller quantities of multiple products. When the distribution function handles this requirement it keeps the manufacturer from having to break bulk and repackage its product to fit individual requirements. Lean manufacturing and JIT techniques are continuously seeking ways to reduce lot sizes, so this function enhances that goal.

- **Value-added processing.** Postponement specifies that products should be kept at the highest possible level in the pipeline in large, generic quantities that can be customized into their final form as close as possible to the actual final sale. The distributor can facilitate this process by performing sorting, labeling, blending, kitting, packaging, and light final assembly at one or more points within the supply channel. This significantly reduces end-product obsolescence and minimizes the risk inherent with carrying finished goods inventory.

- **Transportation.** The movement of goods from the manufacturer to the retailer is a critical function of distribution. Delivery encompasses those activities that are necessary to ensure that the right product is available to the customer at the right time and right place. This frequently means that a structure of central, branch, and field warehouses, geographically situated in the appropriate locations, are needed to achieve optimum customer service. Transportation's goal is to ensure that goods are positioned properly in the channel in a quick, cost-effective, and consistent manner.

- **Warehousing.** Warehousing exists to provide access to sufficient stock in order to satisfy anticipated customer requirements, and to act as a buffer against supply and demand uncertainties. Since demand is often located far from the source (manufacturer), warehousing can provide a wide range of marketplaces that manufacturers, functioning independently, could not penetrate.

- **Marketing information.** The distribution channel also can provide information regarding product, marketplace issues, and competitors' activities in a relatively short time.

DRP

The need for more detailed distribution planning led to the emergence of distribution requirements planning (DRP) during the 1970s. DRP is a widely used and potentially powerful technique for helping outbound logistics systems manage and minimize inbound inventories. This concept extended the time-phase order point found in material requirements planning (MRP) logic to the management of channel inventory. By the 1980s DRP had become a standard approach for planning and controlling distribution logistics activities and had evolved into distribution resource planning. The concept now embraces all business functions in the supply channel, not just inventory and logistics, and is termed DRP II.

DRP is usually used with an MRP system, although most DRP models are more comprehensive than stand-alone MRP models and can schedule transportation. The underlying rationale for DRP is to more accurately forecast demand and then use that information to develop delivery schedules. This way, distribution firms can

Figure 1

A DRP Calculation

Scheduled receipts:	1200, period 3
On-hand inventory balance:	1000
Lead time:	3 periods
Order receipt:	period due
Lot size:	600 units per pallet

Periods	1	2	3	4	5	6	7	8
Gross Requirements	500	500	500	500	500	500	500	500
Scheduled Receipts			1200					
On Hand	500			200				
Net Requirements					300	200	100	
Planned Order Receipt					600	600	600	
Planned Order Release		600	600	600				

minimize inbound inventory by using MRP in conjunction with other schedules.

One of the key elements of DRP is the DRP table, which includes the following elements:

- Forecast demand for each stock-keeping unit (SKU)
- Current inventory level of the SKU
- Target safety stock
- Recommended replenishment quantity
- Replenishment lead time

The concept of DRP very closely mimics the logic of MRP. As with MRP, gross requirements consist of actual customer orders, forecasted demand, or some combination of both; scheduled receipts are the goods the distributor expects to receive from orders that already have been released, while goods that already are received and entered into inventory constitute the on-hand inventory balance. Subtracting scheduled receipts and on-hand inventory from gross requirements yields net requirements. Based upon the distributor's lot-sizing policy and receiving behavior, planned order receipts are generated. Firms may order only what they need for the next planning period or for a designated time period. Known as economic order quantity (EOQ), this involves a lot size based on a costing model. Alternatively, firms may be limited to multiples of a lot size simply because the supplying firm packages or palletizes their goods in standard quantities. Also, some distributors may require some time interval between the arrival of goods on their docks and the entry of the goods into the inventory system. For example, a firm may have a staging area where goods remain for an average time period while awaiting quality or quantity verification. Hence, planned order receipt may be during the planning period when the goods are needed, or they may need to be received earlier depending on time requirements. Order release is then determined by offsetting the planned order receipt by the supplier's lead time. Figure 1 is a representation of a DRP calculation (ignoring possible safety stock requirements).

Today's competitive business landscape demands that companies proactively address quality issues of suppliers along the distribution chain to prevent incidents that cause significant damage to the business and/or consumers. This concept of regulatory oversight and customer demand for quality products is a strategic requirement. It is quality management's role to create a predictable product supply; this enables companies to stay competitive and mitigate risk. Organizations who fail to implement quality management into their manufacturing and value chain operations ultimately weaken their competitive standings in the market and may expose their brands to great risks.

SEE ALSO *Forecasting; Logistics and Transportation; Reverse Supply Chain Logistics; Supply Chain Management; Warehousing and Warehouse Management*

BIBLIOGRAPHY

Coyle, John J., Edward J. Bardi, and C. John Langley, Jr. *The Management of Business Logistics: A Supply Chain Perspective.* 7th ed. Mason, OH: South-Western/Thomson Learning, 2003.

McGowan, James E. "Quality Management Specialist Ranks Top Supplier Challenges for 2008." *Manufacturing Business*

Technology, 8 May 2008. Available from: http://www.mbt
mag.com/article/CA6558421.html.

Ross, David Frederick. *Distribution Planning and Control:
Managing in the Era of Supply Chain Management.* 2nd ed.
Boston: Kluwer Academic Publishers, 2004.

DIVERSIFICATION STRATEGY

Diversification strategies are used to expand firms' operations by adding markets, products, services, or stages of production to the existing business. The purpose of diversification is to allow the company to enter lines of business that are different from current operations. When the new venture is strategically related to the existing lines of business, it is called concentric diversification. Conglomerate diversification occurs when there is no common thread of strategic fit or relationship between the new and old lines of business; the new and old businesses are unrelated.

DIVERSIFICATION IN THE CONTEXT OF GROWTH STRATEGIES

Diversification is a form of growth strategy. Growth strategies involve a significant increase in performance objectives (usually sales or market share) beyond past levels of performance. Many organizations pursue one or more types of growth strategies. One of the primary reasons is the view held by many investors and executives that "bigger is better." Growth in sales is often used as a measure of performance. Even if profits remain stable or decline, an increase in sales satisfies many people. The assumption is often made that if sales increase, profits will eventually follow.

Rewards for managers are usually greater when a firm is pursuing a growth strategy. Managers are often paid a commission based on sales. The higher the sales level, the larger the compensation received. Recognition and power also accrue to managers of growing companies. They are more frequently invited to speak to professional groups and are more often interviewed and written about by the press than are managers of companies with greater rates of return but slower rates of growth. Thus, growth companies also become better known and may be better able to attract quality managers.

Growth may also improve the effectiveness of the organization. Larger companies have a number of advantages over smaller firms operating in more limited markets.

1. Large size or large market share can lead to economies of scale. Marketing or production synergies may result from more efficient use of sales calls, reduced travel time, reduced changeover time, and longer production runs.

2. Learning- and experience-curve effects may produce lower costs as the firm gains experience in producing and distributing its product or service. Experience and large size may also lead to improved layout, gains in labor efficiency, redesign of products or production processes, or larger and more qualified staff departments (e.g., marketing research or research and development).

3. Lower average unit costs may result from a firm's ability to spread administrative expenses and other overhead costs over a larger unit volume. The more capital intensive a business is, the more important its ability to spread costs across a large volume becomes.

4. Improved linkages with other stages of production can also result from large size. Better links with suppliers may be attained through large orders, which may produce lower costs (quantity discounts), improved delivery, or custom-made products that would be unaffordable for smaller operations. Links with distribution channels may lower costs by better location of warehouses, more efficient advertising, and shipping efficiencies. The size of the organization relative to its customers or suppliers influences its bargaining power and its ability to influence price and services provided.

5. Sharing of information between units of a large firm allows knowledge gained in one business unit to be applied to problems being experienced in another unit. Especially for companies relying heavily on technology, the reduction of R&D costs and the time needed to develop new technology may give larger firms an advantage over smaller, more specialized firms. The more similar the activities are among units, the easier the transfer of information becomes.

6. Taking advantage of geographic differences is possible for large firms. Especially for multinational firms, differences in wage rates, taxes, energy costs, shipping and freight charges, and trade restrictions influence the costs of business. A large firm can sometimes lower its cost of business by placing multiple plants in locations providing the lowest cost. Smaller firms with only one location must operate within the strengths and weaknesses of its single location.

CONCENTRIC DIVERSIFICATION

Concentric diversification occurs when a firm adds related products or markets. For example, Microsoft's 2008 bid for Yahoo! can be seen as an attempt at concentric diversification. The goal of such diversification is to achieve strategic fit, which allows an organization to achieve

synergy. In essence, synergy is the ability of two or more parts of an organization to achieve greater total effectiveness together than would be experienced if the efforts of the independent parts were summed. Synergy may be achieved by combining firms with complementary marketing, financial, operating, or management efforts. Breweries have been able to achieve marketing synergy through national advertising and distribution. By combining a number of regional breweries into a national network, beer producers have been able to produce and sell more beer than had independent regional breweries.

Financial synergy may be obtained by combining a firm with strong financial resources but limited growth opportunities with a company having great market potential but weak financial resources. For example, debt-ridden companies may seek to acquire firms that are relatively debt-free to increase the leveraged firm's borrowing capacity. Similarly, firms sometimes attempt to stabilize earnings by diversifying into businesses with different seasonal or cyclical sales patterns.

Strategic fit in operations could result in synergy by the combination of operating units to improve overall efficiency. Combining two units so that duplicate equipment or research and development are eliminated would improve overall efficiency. Quantity discounts through combined ordering would be another possible way to achieve operating synergy. Yet another way to improve efficiency is to diversify into an area that can use by-products from existing operations. For example, breweries have been able to convert grain, a by-product of the fermentation process, into feed for livestock.

Management synergy can be achieved when management experience and expertise is applied to different situations. Perhaps a manager's experience in working with unions in one company could be applied to labor management problems in another company. Caution must be exercised, however, in assuming that management experience is universally transferable. Situations that appear similar may require significantly different management strategies. Personality clashes and other situational differences may make management synergy difficult to achieve. Although managerial skills and experience can be transferred, individual managers may not be able to make the transfer effectively.

CONGLOMERATE DIVERSIFICATION

Conglomerate diversification occurs when a firm diversifies into areas that are unrelated to its current line of business. Synergy may result through the application of management expertise or financial resources, but the primary purpose of conglomerate diversification is improved profitability of the acquiring firm. Little, if any, concern is given to achieving marketing or production synergy with conglomerate diversification.

One of the most common reasons for pursuing a conglomerate growth strategy is that opportunities in a firm's current line of business are limited. Finding an attractive investment opportunity requires the firm to consider alternatives in other types of business. Products, markets, and production technologies of the brewery were quite different from those required to produce cigarettes.

Firms may also pursue a conglomerate diversification strategy as a means of increasing the firm's growth rate. As discussed earlier, growth in sales may make the company more attractive to investors. Growth may also increase the power and prestige of the firm's executives. Conglomerate growth may be effective if the new area has growth opportunities greater than those available in the existing line of business.

Probably the biggest disadvantage of a conglomerate diversification strategy is the increase in administrative problems associated with operating unrelated businesses. Managers from different divisions may have different backgrounds and may be unable to work together effectively. Competition between strategic business units for resources may entail shifting resources away from one division to another. Such a move may create rivalry and administrative problems between the units.

Caution must also be exercised in entering businesses with seemingly promising opportunities, especially if the management team lacks experience or skill in the new line of business. Without some knowledge of the new industry, a firm may be unable to accurately evaluate the industry's potential. Even if the new business is initially successful, problems will eventually occur. Executives from the conglomerate will have to become involved in the operations of the new enterprise at some point. Without adequate experience or skills (management synergy) the new business may become a poor performer.

Without some form of strategic fit, the combined performance of the individual units will probably not exceed the performance of the units operating independently. In fact, combined performance may deteriorate because of controls placed on the individual units by the parent conglomerate. Decision-making may become slower due to longer review periods and complicated reporting systems.

DIVERSIFICATION: GROW OR BUY?

Diversification efforts may be either internal or external. Internal diversification occurs when a firm enters a different, but usually related, line of business by developing the new line of business itself. Internal diversification frequently involves expanding a firm's product or market base. External diversification may achieve the same result; however, the company enters a new area of business by

purchasing another company or business unit. Mergers and acquisitions are common forms of external diversification.

Internal Diversification. One form of internal diversification is to market existing products in new markets. A firm may elect to broaden its geographic base to include new customers, either within its home country or in international markets. A business could also pursue an internal diversification strategy by finding new users for its current product. For example, Arm & Hammer marketed its baking soda as a refrigerator deodorizer. Finally, firms may attempt to change markets by increasing or decreasing the price of products to make them appeal to consumers of different income levels.

Another form of internal diversification is to market new products in existing markets. Generally this strategy involves using existing channels of distribution to market new products. Retailers often change product lines to include new items that appear to have good market potential. Johnson & Johnson added a line of baby toys to its existing line of items for infants. Packaged-food firms have added salt-free or low-calorie options to existing product lines.

An effective way to extend a company's product line is to partner with another company. Companies can take advantage of both of the aforementioned strategies–market existing products in new markets and market new products in existing markets–by working with a complementary company. Existing customers of both partnering companies are much more likely to buy something from a business they already trust than a stranger who has no experience with their products. Good partners will have revenue streams that are different, but complementary to each other.

It is also possible to have conglomerate growth through internal diversification. This strategy would entail marketing new and unrelated products to new markets. This strategy is the least used among the internal diversification strategies, as it is the most risky. It requires the company to enter a new market where it is not established. The firm is also developing and introducing a new product. Research and development costs, as well as advertising costs, will likely be higher than if existing products were marketed. In effect, the investment and the probability of failure are much greater when both the product and market are new.

External Diversification. External diversification occurs when a firm looks outside of its current operations and buys access to new products or markets. Mergers are one common form of external diversification. Mergers occur when two or more firms combine operations to form one corporation, perhaps with a new name. These firms are usually of similar size. One goal of a merger is to achieve management synergy by creating a stronger management team. This can be achieved in a merger by combining the management teams from the merged firms.

Acquisition, a second form of external growth, occurs when the purchased corporation loses its identity. The acquiring company absorbs it. The acquired company and its assets may be absorbed into an existing business unit or remain intact as an independent subsidiary within the parent company. Acquisitions usually occur when a larger firm purchases a smaller company. Acquisitions are called "friendly" if the firm being purchased is receptive to the acquisition. (Mergers are usually friendly.) Unfriendly mergers or hostile takeovers occur when the management of the firm targeted for acquisition resists being purchased.

DIVERSIFICATION: VERTICAL OR HORIZONTAL?

Diversification strategies can also be classified by the direction of the diversification. Vertical integration occurs when firms undertake operations at different stages of production. Involvement in the different stages of production can be developed inside the company (internal diversification) or by acquiring another firm (external diversification). Horizontal integration or diversification involves the firm moving into operations at the same stage of production. Vertical integration is usually related to existing operations and would be considered concentric diversification. Horizontal integration can be either a concentric or a conglomerate form of diversification.

Vertical Integration. The steps that a product goes through in being transformed from raw materials to a finished product in the possession of the customer constitute the various stages of production. When a firm diversifies closer to the sources of raw materials in the stages of production, it is following a backward vertical integration strategy. Avon's primary line of business has been the selling of cosmetics door-to-door. Avon pursued a backward form of vertical integration by entering into the production of some of its cosmetics. Forward diversification occurs when firms move closer to the consumer in terms of the production stages. Levi Strauss & Co., traditionally a manufacturer of clothing, has diversified forward by opening retail stores to market its textile products rather than producing them and selling them to another firm to retail.

Backward integration allows the diversifying firm to exercise more control over the quality of the supplies being purchased. Backward integration also may be undertaken to provide a more dependable source of needed raw materials. Forward integration allows a manufacturing company to assure itself of an outlet for its products. Forward integration also allows a firm more control over how its

products are sold and serviced. Furthermore, a company may be better able to differentiate its products from those of its competitors by forward integration. By opening its own retail outlets, a firm is often better able to control and train the personnel selling and servicing its equipment. Since servicing is an important part of many products, having an excellent service department may provide an integrated firm a competitive advantage over firms that are strictly manufacturers.

Some firms employ vertical integration strategies to eliminate the "profits of the middleman." Firms are sometimes able to efficiently execute the tasks being performed by the middleman (wholesalers, retailers) and receive additional profits. However, middlemen receive their income by being competent at providing a service. Unless a firm is equally efficient in providing that service, the firm will have a smaller profit margin than the middleman. If a firm is too inefficient, customers may refuse to work with the firm, resulting in lost sales.

Vertical integration strategies have one major disadvantage. A vertically integrated firm places "all of its eggs in one basket." If demand for the product falls, essential supplies are not available, or a substitute product displaces the product in the marketplace, the earnings of the entire organization may suffer.

Horizontal Diversification. Horizontal integration occurs when a firm enters a new business (either related or unrelated) at the same stage of production as its current operations. For example, Avon's move to market jewelry through its door-to-door sales force involved marketing new products through existing channels of distribution. An alternative form of horizontal integration that Avon has also undertaken is selling its products by mail order (e.g., clothing, plastic products) and through retail stores (e.g., Tiffany's). In both cases, Avon is still at the retail stage of the production process.

DIVERSIFICATION STRATEGY AND MANAGEMENT TEAMS

As documented in a 2004 study by Marlin, Lamont, and Geiger, ensuring a firm's diversification strategy is well matched to the strengths of its top management team members factored into the success of that strategy. For example, the success of a merger may depend not only on how integrated the joining firms become, but also on how well suited top executives are to manage that effort. The study also suggests that different diversification strategies (concentric vs. conglomerate) require different skills on the part of a company's top managers, and that the factors should be taken into consideration before firms are joined.

There are many reasons for pursuing a diversification strategy, but most pertain to management's desire for the organization to grow. Companies must decide whether they want to diversify by going into related or unrelated businesses. They must then decide whether they want to expand by developing the new business or by buying an ongoing business. Finally, management must decide at what stage in the production process they wish to diversify.

SEE ALSO *Strategic Planning Failure; Strategy Formulation; Strategy Implementation; Strategy in the Global Environment*

BIBLIOGRAPHY
Amit, Raphael, and Joshua Livnat. "A Concept of Conglomerate Diversification." *Academy of Management Journal* 28 (1988): 593–604.

Block, Joel. "Diversify Your Revenue Streams." *News Blaze,* 7 May 2007. Available from: http://newsblaze.com/story/20070507053524joel.nb/newsblaze/GROWTHMN/Joel-Block:-Growth-Minute.html.

Gehl, Derek. "Five Strategies for Growing Your Business." *PCWorld,* 30 April 2008. Available from: http://downloads.pcworld.about.com/businesscenter/article/145294/five_strategies_for_growing_your_business.html.

Homburg, C., H. Krohmer, and J. Workman. "Strategic Consensus and Performance: The Role of Strategy Type and Market-Related Dynamism." *Strategic Management Journal* 20 (1999): 339–358.

Luxenber, Stan. "Diversification Strategy Raises Doubts." *National Real Estate Investor,* February 2004.

Lyon, D.W., and W.J. Ferrier. "Enhancing Performance with Product-Market Innovation: The Influence of the Top Management Team." *Journal of Managerial Issues* 14 (2002): 452–469.

Marlin, Dan, Bruce T. Lamont, and Scott W. Geiger. "Diversification Strategy and Top Management Team Fit." *Journal of Managerial Issues* 16 (2004): 361.

Munk, Nina "How Levi's Trashed a Great American Brand." *Fortune* 12 April 1999, 83–90.

St. John, Carson, and Jeffrey Harrison, "Manufacturing-Based Relatedness, Synergy, and Coordination." *Strategic Management Journal* 20 (1999): 129–145.

DIVERSITY

The advent of equal employment opportunity (EEO) laws and affirmative action programs created new employment opportunities for members of protected groups that had previously been victimized by employment discrimination. The demographic mix within the twenty-first century workplace has consequently become much more diverse, a result not only of these laws but also due to the globalization of business. Furthermore, the changing demographics of the United States have affected worker diversity. The aging population has created what some refer to as the "sandwich generation": the group of the population who are charged with caring for both their parents and their children.

In today's world, fewer workers support Medicare and Social Security. To provide opportunities for the new population of workers, businesses are allowing more flextime, telecommuting, and sabbaticals. They are also training line managers to respond to the cultural, lingual, generational, and technological differences that the new workforce introduces. Finally, more retirees are returning to the workforce.

All these new realities add up to a different-looking workplace. No longer are the majority of workers white, male, and English-speaking. People of color continue to increase their shares of the labor force as these groups grow more rapidly than whites. In fact, white non-Hispanics are projected to continue to decline as a percentage of the labor force.

The Hispanic population growth will be a key and growing portion of a more diverse workforce, according to the Bureau of Labor Statistics. The Hispanic labor force will grow by 30 percent by 2015, reaching nearly 27 million. By 2025, Hispanics are predicted to make up 17 percent of the total labor force. This group gained a greater share of the market than African Americans in 2000. At that time, Hispanics made up 13 percent, and African Americans, 12.7 percent. Finally, it is estimated that Asians and other people of color will make up about 8 percent of the labor force in 2025.

In the United States, the average age of the workforce is getting older, mirroring the age demographics of the population. The number of workers 55 and older is expected to reach about 23 million by 2016. This represents a growth rate of 46.7 percent, which is almost 5.5 times the projection for the overall labor force.

The workforce is also experiencing a dramatic increase in the number of dual-income families (many of whom have young children); in 2005, women made up 46 percent of the workforce, but in 1975, they made up less than 40 percent of the total. The workforce is also reacting to an increase in single-parent families and families facing the demands of elder care. The labor market will continue to be significantly impacted by the aging of the baby-boom generation.

In the past, organizations ignored the impact that diversity had on the attitudes and behavior of employees. However, years of political, social, and legal change brought new groups of employees into the workplace. At first, organizations attempted to handle these new groups through assimilation; simply put, people were expected to fit in. Equal treatment at the workplace meant the same treatment for each employee; individual differences were ignored. Consequently, assimilation often resulted in pressure to conform, exclusion and isolation, and reinforcement of the dominant group values. The problem became compounded as the number of

diverse groups within the organization increased and the number of white males declined.

The failure to deal effectively with the diversity issue can hinder competitive advantages. For instance, firms choosing to do business as usual have been plagued with a high turnover among nontraditional employees, low morale within the organization, under-utilization of employee skills, numerous intergroup conflicts, low productivity, and an inability to attract new workers. On the other hand, if diversity is dealt with effectively, competitive advantage can be enhanced. For instance, companies that value diversity can attract a larger and better pool of applicants than companies that limit themselves to a traditional workforce.

Accommodating the needs of the diverse workforce is more important to organizations now than ever before. When properly managed, such cultural diversity can represent a key strategic advantage. Diversity in age, gender, race, and viewpoint can offer organizations a number of benefits including additional knowledge, creative ideas and insights to aid in problem solving, enhanced product positioning, better development of strategic plans and objectives, and fresh opinions. These diverse workers can bring original ideas and approaches to the workplace that can help a firm target its products and services to a marketplace that is becoming more and more diverse. This adds economic importance to the issue of diversity since, in 2007, the combined African-American, Hispanic-American, and Asian-American buying power was more than $750 billion.

MINORITIES IN THE WORKPLACE

Although minorities have been entering the workforce in record numbers, their quests to reach the top of the corporate ladder have been thwarted. Many have topped out at entry- or mid-level management positions. Minorities have failed to reach the highest levels of management partly because many have only recently entered the managerial ranks; it takes time to climb the corporate ladder. However, this explanation does not account for the magnitude of the problem. For years minorities have faced invisible, subtle, yet very real institutional barriers to promotions into higher level executive positions. The belief that minority groups reach organizational plateaus consisting of artificial barriers that derail them from senior management opportunities has been alternately termed "the glass ceiling" or "the brick wall." These barriers found in the structure of many organizations have often stymied the advancement of these select employee groups.

How can the glass ceilings be cracked or the brick walls broken down? Effective diversity training that helps decision makers overcome their biases would certainly help. But diversity training, by itself, is not enough, and

diversity management must not be confused with affirmative action. The Society for Human Resource Management recommends the following components for a successful diversity initiative:

1. **Get executive commitment.** Enlisting the visible support and commitment of your organization's CEO is fundamental to a successful diversity initiative.

2. **Articulate the desired outcomes.** Be explicit about how support and commitment are to be shown and from whom it is expected.

3. **Assess the climate, needs, and issues at your organization.** The use of focus groups can help clarify the obstacles. It will prove helpful to determine where your organization currently is on the diversity continuum before determining what interventions need to be taken.

4. **Create and maintain open channels of communication with employees at the launch of your diversity initiative and throughout the process.** Communication is crucial to the success of your diversity plan and should occur not only at the beginning of a diversity initiative, but also throughout the process.

5. **Consider forming a diversity taskforce to widen your support base.** This group can help analyze assessment data and make recommendations to top management.

6. **Develop a mechanism for dealing with systemic changes and procedural problems.** Once identified, obstacles and problems must be addressed. For example, your company may be committed to hiring persons outside of the dominant culture, but has difficulty promoting those same persons once they are with the organization.

7. **Design relevant, interactive, applicable training.** The purpose of good training is to not just increase awareness and understanding about diversity, but to also develop concrete skills that employees can use to deal with workplace diversity, its implications, and its effects.

8. **Evaluate and measure each component of your diversity initiative (training, taskforce, mentoring initiative, employee networks, etc.).** Set measurable criteria and determine what you would like to accomplish and how you will gather data.

9. **Ensure integration and accountability.** Integrate the concepts, skills and results of your diversity efforts into the fabric of the organization and hold management accountable for encouraging diversity throughout the organization.

Inclusive companies have similar characteristics. They usually support local diversity groups, have clear, written anti-discrimination policies, and allow and support diversity-employee-affinity groups to support the networking and mentoring needs of their employees. They also incorporate companywide diversity training as a standard part of their business.

Dealing with diversity is a continuing process that enhances an organization's ability to adapt and capitalize on today's increasingly complex world and global marketplace. In an online survey of more than 2,500 senior human resources executives in the United States and Canada, employers say that globalization has prompted them to enhance their diversity efforts or their inclusion programs.

Changes in American society have brought unprecedented social diversity into the workforce. Immigrants from all over the world and societal segments that have been excluded or poorly represented in the past are entering new professions and attaining management and leadership roles. Corporate cultures, employment policies, and networks of influence have been forced to change. The principal challenge for American employers today lies less in finding diverse talent but in developing it and creating an environment that supports social cohesion amid the diversity. A well-managed diverse workforce can give companies the competitive advantage necessary to compete in a global economy.

SEE ALSO *Employment Law and Compliance; Mentoring; Organizational Culture*

BIBLIOGRAPHY

Bell, E.E., and S.M. Nkomo. *Our Separate Ways.* Boston, MA: Harvard Business School Press, 2001.

Counting Minorities. Available from: http://www.bls.gov/opub/rtaw/chapter1.htm.

"Four Characteristics that Demonstrate that a Company is Diversity Friendly." *Diversityjobs.com* 14 June 2008. Available from: http://blog.diversityjobs.com/four-characteristics-that-demostrate-a-company-is-diversity-friendly.

Fullerton, H.N., Jr. "Labor Force Participation: 75 Years of Change, 1950–98 and 1998–2025." *Monthly Labor Review* 122, no. 12 (1999): 3–12.

Fullerton, H.N., Jr., and M. Toossi. "Labor Force Projections to 2010: Steady Growth and Changing Composition." *Monthly Labor Review* 124, no. 11 (2001): 21–38.

Mitra, A. "Breaking the Glass Ceiling: African American Women in Management Positions." *Equal Opportunities International* 22, no. 2 (2003): 67–80.

"More Companies Expand Their Diversity and Inclusion Efforts in Response to Globalization." *Diversityjobs.com* 15 Apr 2008. Available from: http://blog.diversityjobs.com/four-characteristics-that-demonstrate-a-company-is-diversity-friendly.

Ruiz, Gina. "BLS Report: Get Ready for a Smaller, More Diverse Workforce." 13 Dec 2007. Available from: http://www.workforce.com/section/00/article/25/26/71.html.

Schomer, Karine. "Culture Matters: Workforce Diversity in India and the US." Available from: http://www.sourcingmag.com/content/c070212a.asp.

Stodghil, Ron. "Is There Room at the Top for Black Executives?" *New York Times* 1 Nov 2007. Available from: http://www.nytimes.com/2007/11/01/business/01generation.html?pagewanted=print.

Tatum, B.D. *Why Are All the Black Kids Sitting Together in the Cafeteria?* New York, NY: Basic Books, 2003.

Toossi, M. "Labor Force Projections to 2012: The Graying of the U.S. Workforce." *Monthly Labor Review* 127, no. 2 (2004): 37–57.

U.S. Department of Labor, Women's Bureau. Available from: http://www.dol.gov/wb/factsheets/Qf-ESWM05.htm.

"What Are the Components of a Successful Diversity Initiative?" Available from: http://www.shrm.org/diversity/components.asp.

DIVESTMENT

Divestment is a form of retrenchment strategy used by businesses when they downsize the scope of their business activities. Divestment usually involves eliminating a portion of a business. Firms may elect to sell, close, or spin-off a strategic business unit, major operating division, or product line. This move often is the final decision to eliminate unrelated, unprofitable, or unmanageable operations.

While the number of divestments increases when the economy suffers, divestment is commonly the consequence of a growth strategy. Much of the corporate downsizing of the 1990s has been the result of acquisitions and takeovers that were the rage in the 1970s and early 80s. Firms often acquired other businesses with operations in areas with which the acquiring firm had little experience. After trying for a number of years to integrate the new activities into the existing organization, many firms have elected to divest themselves of portions of the business in order to concentrate on those activities in which they had a competitive advantage.

REASONS TO DIVEST

In most cases it is not immediately obvious that a unit should be divested. Many times management will attempt to increase investment as a means of giving the unit an opportunity to turn its performance around. Portfolio models such as the Boston Consulting Group (BCG) Model or General Electric's Business Screen can be used to identify operations in need of divestment. For example, products or business operations identified as "dogs" in the BCG Model are prime candidates for divestment.

Decisions to divest may be made for a number of reasons:

Market Share Too Small. Firms may divest when their market share is too small for them to be competitive or when the market is too small to provide the expected rates of return.

Availability of Better Alternatives. Firms may also decide to divest because they see better investment opportunities. Organizations have limited resources. They are often able to divert resources from a marginally profitable line of business to one where the same resources can be used to achieve a greater rate of return.

Need for Increased Investment. Firms sometimes reach a point where continuing to maintain an operation is going to require large investments in equipment, advertising, research and development, and so forth to remain viable. Rather than invest the monetary and management resources, firms may elect to divest that portion of the business.

Lack of Strategic Fit. A common reason for divesting is that the acquired business is not consistent with the image and strategies of the firm. This can be the result of acquiring a diversified business. It may also result from decisions to restructure and refocus the existing business.

Legal Pressures to Divest. Firms may be forced to divest operations to avoid penalties for restraint of trade. Service Corporation Inc., a large funeral home chain acquired so many of its competitors in some areas that it created a regional monopoly. The Federal Trade Commission required the firm to divest some of its operations to avoid charges of restraint of trade.

IMPLEMENTATION OF DIVESTMENT STRATEGIES

Firms may pursue a divestment strategy by spinning off a portion of the business and allowing it to operate as an independent business entity. Firms may also divest by selling a portion of the business to another organization. RJR Nabisco used both of these forms of divestment. In 1985 Nabisco Brands was bought by R.J. Reynolds, the manufacturer of Winston, Camel, and many other cigarette brands. Fueled in part by fears of legal liability resulting from tobacco lawsuits and by complaints from investors that the tobacco side of RJR Nabisco was dragging the food business down, in early 1999 the decision was made to spin-off the domestic tobacco operations into a separate company. Later in 1999 the decision was made to sell the overseas tobacco business to Japan Tobacco.

Another way to implement a divestment decision is to simply close a portion of the firm's operations. Faced with a decline in its market share of almost half in the 14 to 19 male age group and no introduction of a successful new product in years, and rising manufacturing costs, Levi Strauss has found it necessary to divest some of its operations. For nearly a decade, the company slashed costs by shutting dozens of factories in North America and Europe and eliminating thousands of jobs. Selling many of the plants probably was not feasible as many other clothing manufacturers are also closing plants and moving operations overseas, depressing the price for clothing manufacturing facilities. Besides, the most likely buyers for the Levi's plants would be competitors and Levi Strauss probably would not want them to have the added capacity.

In 2004 Teleflex, a U.S. 2 billion dollar industrial product manufacturer, implemented a divestment and acquisition strategy to remove underperforming units while acquiring companies in markets where it intended to expand its business.

Although a business may be identified as a target for divestment, the implementation of divestment is not always easy. First a buyer must be found. This may be difficult for a failing business unit. Once a buyer is found, then price must be negotiated. Many divestments are blocked by management's expectations for the operation. Firms may expect demand for the product to pick up. Management may also see the poor performance as a temporary setback that can be overcome with time and patience. Decisions to divest a business may be seen as an admission of failure on the part of management and may lead to escalating commitment to the struggling business as a way of protecting management's ego and public image.

Robert Haas, who was president and CEO at Levi Strauss & Co. until 2005, certainly received bad publicity and had his leadership abilities and judgment questioned as a result of his decision to close company plants and eliminate jobs. With profits already falling around the beginning of the twenty-first century, Haas and Levi Strauss & Co., missed on the timing of its divestiture. The divestiture process, which typically takes eight months or more, is easier and more profitable when companies divest at the right time. While it is difficult for companies to divest their business when it's healthy, strategists should look at its long-term potential. If none exists, the company should research divesting as an option, rather than waiting until the business has peaked and become a declining or even failing business. (Incidentally, Levi Strauss & Co., added 870 employees in 2007, a turn-around after years of lay-offs.)

Divestment is not usually the first choice of strategy for a business. However, as product demand changes and firms alter their strategies, there will almost always be some portion of the business that is not performing to management's expectations. Such an operation is a prime target for divestment and may well leave the company in a stronger competitive position if it is divested.

SEE ALSO *Downsizing and Rightsizing; Strategic Planning Failure; Strategy Implementation*

BIBLIOGRAPHY
Badenhausen, Kurt. "Breaking Up Is Good to Do." *Forbes* 1 January 2005, 56–57.

Dranikoff, Lee, Tim Koller, and Antoon Schneider. "Divestiture: Strategy's Missing Link." *Harvard Business Review* 80, no. 5 (May 2002): 75–83.

Grocer, Stephen. "Teleflex Plans to Flex Its Divestiture Muscle." *Mergers & Acquisitions Report* 17, no. 45 (November 2004): 4–5.

Harding, David, and Charles Tillen. "Getting Small to Grow Big." *Brandweek* 24 January 2005, 20.

Leidtke, Michael. "Levi's 4Q profit more than doubles to cap best year since 1996." *San Francisco Chronicle* 12 Feb 2008. Available from: http://www.sfgate.com/cgi-bin/article.cgi?f=/n/a/2008/02/12/financial/f122323S65.DTL&type=business.

Monderer, David, "Preparing for a Divestiture." *The Deal.com* 12 March 2008. Available from: http://www.thedeal.com/corporatedealmaker/2008/03/preparing_for_a_divestiture.php.

Munk, Nina. "How Levi's Trashed a Great American Brand." *Fortune* 12 April 1999, 82–90.

Shimizu, K., and M.A. Hitt. "What Constrains or Facilitates Divestitures of Formerly Acquired Firms?" *Journal of Management* 31, no. 1 (February 2005): 50–73.

DOMESTIC MANAGEMENT SOCIETIES AND ASSOCIATIONS

Management societies and associations exist to promote greater professionalism within the field and provide educational opportunities for their members. Many societies and associations exist within the field of management. Some have members primarily from academia; others have members who are primarily practitioners; while still others have both. Although almost all associations within the field of management have some international members, the focus of the following paragraphs is on those societies and associations whose membership is predominantly in the United States.

The management associations discussed in this article all have similar organization structures and activities:

- All sponsor a variety of useful professional services available to their members.

- Most have local chapters that are affiliated with the national organization.

- Most have at least one and sometimes several conferences each year and sponsor publications

designed to disseminate management research findings or to communicate helpful information to management practitioners.

- Some offer professional certification programs to allow members to demonstrate their competence within their area of specialty.

ACADEMY OF MANAGEMENT

The Academy of Management (AOM) is the preeminent professional organization for those involved or interested in management research and education in the United States. It was founded in 1936, and its membership consisted of more than 18,000 individuals from 102 nations as of 2008. Most of its members are college professors teaching within the field of management or related disciplines. Most academy members have doctoral degrees in management or related disciplines. The academy also has some practitioner members. Although the academy has members from around the world, the overwhelming majority of its membership is in the United States.

AOM sponsors an annual conference each August. At this meeting, educational and professional development programs are held and scholarly research papers are presented and discussed. Other activities at the annual meeting include meetings of various divisions and interest groups and a job placement service that allows universities to recruit for qualified applicants to fill open faculty positions in management and related fields.

AOM publishes scholarly journals and a newsletter. The *Academy of Management Journal (AMJ)* features empirical papers, and the *Academy of Management Review (AMR)* features theoretical papers. The *Academy of Management Executive (AME)* publishes applied articles related to management practice and has a substantial readership among practitioners. There is also the *Academy of Management Learning and Education (AMLE)*. Additionally, the association publishes an annual meeting Best Papers Proceedings CD. The AOM started publishing the Academy of Management Annals in 2007. This new book series will be published annually.

AOM has a variety of divisions and interest groups that allow members with common interests to interact more closely. Some of these divisions include Business Policy & Strategy, Human Resource Management, Organizational Behavior, Operations Management, Social Issues in Management, Entrepreneurship, and Management History.

Within AOM, there are several associated organizations, including the Southern Management Association, the Eastern Academy of Management, the Southwest Academy of Management, the Midwest Academy of Management, and the Western Academy of Management. Each of these regional associations holds annual meetings

of its own, with activities that are similar to those that take place at the national meeting of the academy. Many management scholars also hold memberships in one or more of these regional associations.

AOM has a significant presence online (http://www.aomonline.org). The site has information of interest to management scholars and researchers, news about upcoming conferences, and links to related divisions and groups.

AMERICAN MANAGEMENT ASSOCIATION

The American Management Association (AMA) is a large, nonprofit educational association that seeks to develop organizational effectiveness. AMA has programs related to many areas of management practice, including general and administrative services, strategic management, human resources, information systems, manufacturing, purchasing, research and development, and sales and marketing. Founded in 1923, AMA has about 25,000 members, and its newsletters are delivered to 80,000 members and customers. Membership consists mainly of management practitioners based in the United States, although it attracts members from 89 countries around the world.

AMA publishes about 80 business-related books each year. It also publishes several periodicals related to management, including *Management Review, The Take-Charge Assistant, Organizational Dynamics,* and *HR Focus.* It also offers members and customers six different e-newsletters and launched *The Thinker Series* to provide inspiration to drive organizational growth.

The association holds an annual conference and sponsors numerous seminars, workshops, and forums on various management-related topics. It also offers podcasts and on-demand webcasts on the AMA Web site (http://www.amanet.org), which provides details about its programs, conferences, and seminars, as well as other useful information relevant to the practicing manager.

SOCIETY FOR HUMAN RESOURCE MANAGEMENT

The Society for Human Resource Management (SHRM), founded in 1948, is the largest professional association in its field. SHRM has 225,000 individual members in more than 125 countries. The association has a network of more than 575 affiliated chapters in the United States, and offices in China and India. Its members belong to local professional chapters or college and university student chapters.

SHRM has several professional publications, most of which are free with membership in the organization. Its premiere publication is the monthly *HR Magazine. HR News, Workplace Visions,* and *Mosaics* are primarily of interest to practitioners. *HRM Journal* features academic

research of interest to scholars in the field. Additionally, SHRM offers members several newsletters more targeted to specific audiences that are delivered via email.

SHRM sponsors professional development and certification programs. Professional development activities include seminars and certificate programs, portfolio subscriptions, and certification preparation learning modules. A certification program is administered through the Human Resource Certification Institute (HRCI). Certification is available at three levels: Professional in Human Resources (PHR), Senior Professional in Human Resources (SPHR), and Global Professional in Human Resources (GPHR). Certification requires several years of experience in an exempt HR position and the successful completion of a certification examination, which is offered to those wishing to take the test during two two-month periods during the year.

SHRM funds human resources management academic research through its Foundation. It also conducts an annual HR salary survey.

The society holds an annual conference and exposition, an employment law and legislative conference, a leadership conference, a strategy conference, and a diversity conference.

SHRM's Web site (http://www.shrm.org) contains a wide variety of resources for the HR professional, including an information center, online publications, and a placement area. Although some of the internet services are available to the public, most are restricted to SHRM members.

APICS: THE ASSOCIATION FOR OPERATIONS MANAGEMENT

APICS: The Association for Operations Management (formerly Association for Production and Inventory Control) is a professional organization for those involved or interested in operations management, and production and inventory management. It provides professional certifications, educational programs, and publications. Founded in 1957, APICS has practitioner, academic, and student members. There are more than 43,000 individuals from 15,000 companies worldwide from nearly all industries. APICS membership is concentrated in the United States.

APICS offers member discounts on educational materials, programs, and certification exam and review material. The organization also offers numerous national workshops and in-house training programs, as well as opportunities for online resources, local training, and networking. APICS offers members its award-winning publication, *APICS Magazine*.

APICS has three certification programs for professionals in the field: Certified in Production and Inventory Management (CPIM), Certified in Integrated Resource Management (CIRM), and Certified Supply Chain Pro-

fessional (CSCP). CPIM certification was developed in 1973 to provide a means for individuals to assess their knowledge of production and inventory management relative to a common core of knowledge. CIRM certification was developed in 1991 and is designed to assess cross-functional knowledge of interrelated functions within an organization. First offered in 2008, the CSCP was developed for individuals seeking in-depth knowledge and understanding of their entire supply chain. APICS created it to educate supply chain managers with changing requirements of educational needs in the field of supply chain management.

APICS holds an annual conference that allows members to learn about the latest management and manufacturing techniques. It also sponsors various research activities, including an undergraduate and graduate paper competition through its Educational and Research Foundation.

The APICS Web site (http://www.apics.org) contains information about its services and the field.

WORLD AT WORK

Founded in 1955, WorldatWork (formerly the American Compensation Association) is a professional organization for those involved or interested in the management of employee compensation and benefits policies and procedures. WorldatWork provides information, training, research support, and networking opportunities to its 30,000 members and customers in 75 countries. Specific benefits of membership include discounts on WorldatWork educational and training programs, career placement and networking opportunities, and updates in the field through various publications.

WorldatWork offers various educational and professional training programs. Seminars provide training in all areas of compensation and benefits management. In-house training programs allow organizations to sponsor training for their employees on-site.

WorldatWork sponsors a certification program that enables members to increase their credibility as compensation and benefits management professionals. Certification is available along three tracks: Certified Compensation Professional (CCP), Certified Benefits Professional (CBP), and the Work-Life Certified Professional (WLCP).

WorldatWork holds an annual conference and sponsors various research activities at leading U.S. universities. It publishes several journals and newsletters, including *Workspan* and *WorldatWork Journal*. Its highest visibility online newsletter is called *Workspan Weekly*.

WorldatWork also attempts to increase linkages between practitioners and academia through its Academic Partnership Network. This concept is designed to foster increased communication between practitioners and academics.

WorldatWork's Web site (http://www.worldatwork. org) includes information resources for the compensation and benefits professional.

INSTITUTE FOR SUPPLY MANAGEMENT

The Institute for Supply Management (ISM) is a professional association designed to advance the purchasing and supply management profession. Founded in 1915, its membership consists of more than 40,000 supply management professionals, mostly in the United States. To be eligible for membership, a person must be involved in the purchasing or materials process, be employed by an affiliated association, or be a full-time professor or administrator at a college or university whose academic responsibility includes purchasing or material management courses.

ISM offers a variety of educational and development programs and products. Conferences, seminars, and other educational activities allow purchasing and material managers to expand their professional skills.

The ISM flagship publication is *Inside Supply Management.* Blackwell Publishing puts out *The Journal of Supply Chain Management* on behalf of the ISM. The association also develops a number of online newsletters including *Supply Line 2055: Certification Update, Just in ETime,* and*ISM eDigest: Chemicals Electronic Newsletter,* which ISM creates with its ISM Chemical Group.

ISM sponsors three certification programs: the Certified Purchasing Manager, which allows purchasing or materials management professionals to demonstrate their mastery of the requirements of the field; and the Accredited Purchasing Practitioner, designed primarily for entry-level buyers engaged in the operational side of purchasing and materials management. The Certified Professional in Supply Management (CPSM) program was first offered in 2008. It addresses the additional education, skills, and experiences that supply managers need as the professional continues to evolve in the twenty-first century.

ISM provides information about its conferences, seminars, professional forums, products, and other information of interest to the purchasing and materials management professional on its Web site at (http://www.ism.ws).

SEE ALSO *International Management Societies and Associations; Management and Executive Development*

DOWNSIZING AND RIGHTSIZING

Downsizing refers to the permanent reduction of a company's workforce and is generally associated with corporate reorganization, or creating a "leaner, meaner" company.

For example, a sluggish U.S. economy forced several American companies to downsize in 2008. General Motors was forced to lay off about 3,500 workers at its pickup truck and large sport utility vehicle plants in several locations throughout the United States. High gasoline prices decreased consumer demand for trucks, shifting their preference to cars. Simultaneously, a housing slowdown and tight credit market forced Citigroup, a company with more than 300,000 worldwide employees, to plan layoffs of more than 13,000 jobs throughout 2008.

Downsizings such as these are also commonly called reorganizing, reengineering, restructuring, or rightsizing. Regardless of the label applied, however, downsizing essentially refers to layoffs that may or may not be accompanied by systematic restructuring programs, such as staff reductions, departmental consolidations, plant or office closings, or other forms of reducing payroll expenses. Corporate downsizing results from both poor economic conditions and company decisions to eliminate jobs in order to cut costs and maintain or achieve specific levels of profitability. Companies may lay off a percentage of their employees in response to these changes: a slowed economy, merging with or acquiring other companies, the cutting of product or service lines, competitors grabbing a higher proportion of market share, distributors forcing price concessions from suppliers, or a multitude of other events that have a negative impact on specific organizations or entire industries. In addition, downsizing may stem from restructuring efforts to maximize efficiency, to cut corporate bureaucracy and hierarchy and thereby reduce costs, to focus on core business functions and outsource non-core functions, and to use part-time and temporary workers to complete tasks previously performed by full-time workers in order to trim payroll costs.

The following sections discuss trends in downsizing, the growth of downsizing, downsizing and restructuring, criticisms of downsizing, support for downsizing, and downsizing and management.

TRENDS IN DOWNSIZING

As a major trend among U.S. businesses, downsizing began in the 1980s and continued through the 1990s largely unabated and even growing. During this time, many of the country's largest corporations participated in the trend, including General Motors, AT&T, Delta Airlines, Eastman Kodak, IBM, and Sears, Roebuck and Company. In the twenty-first century, downsizing continued after a sharp decline in the stock market early in the century and followed by continued pressure on corporate earnings in the aftermath of the September 11, 2001, terrorist attacks. Skyrocketing gas prices, a housing slowdown, and a market credit crunch were factors in 2008 layoffs. Downsizing affects most sectors of the labor

Table 1

Number of U.S. Unemployed Workers by Month

Type of Downsizing	December 2007	January 2008	February 2008	March 2008	April 2008	May 2008	June 2008	July 2008	August 2008
Temporary downsizing	1,061,000	1,614,000	1,351,000	1,341,000	1,053,000	856,000	949,000	1,134,000	1,126,000
Permanent downsizing	2,066,000	2,110,000	2,204,000	2,276,000	2,114,000	2,220,000	2,341,000	2,512,000	2,656,000

Adapted from: U.S. Department of Labor, Bureau of Labor Statistics. 2008. Unemployed Persons by Reason of Unemployment. Employment Situation Summary.

market, including retail, industrial, managerial, and office jobs, impacting workers in a wide range of income levels. Table 1 compares the number of temporarily downsized workers with the number of permanently downsized workers.

While layoffs are a customary measure for companies to help compensate for the effects of recessions, downsizing also occurs during periods of economic prosperity, even when companies themselves are doing well. Consequently, downsizing is a controversial corporate practice that receives support and even praise from executives, shareholders, and some economists, and criticism from employees, unions, and community activists. Reports of executive salaries growing in the face of downsizing and stagnant wages for retained employees only fan the flames of this criticism. In contrast, announcements of downsizing are well received in the stock markets. It is not uncommon for a company's stock value to rise following a downsizing announcement.

However, economists remain optimistic about downsizing and the effects of downsizing on the economy when the rate of overall job growth outpaces the rate of job elimination. A trend toward outsourcing jobs overseas to countries with lower labor costs is a form of downsizing that affects some U.S. employees. These jobs are not actually eliminated, but instead moved out of reach of the employees who lose their jobs to outsourcing. Some economists, however, suggest that the overall net effect of such outsourced jobs will actually be an increase in U.S. jobs as resulting corporate operating efficiencies allow for more employment of higher-tier (and thus higher-wage) positions. Regardless of whether downsizing is good or bad for the national economy, companies continue to downsize and the trend shows few signs of slowing down. For some sectors, this trend is projected to be particularly prevalent through 2012, as shown in Table 2.

THE GROWTH OF DOWNSIZING

The corporate downsizing trend grew out of the economic conditions of the late 1970s, when direct international competition began to increase. The major industries affected by this stiffer competition included the automotive, electronics, machine tool, and steel industries. In contrast to their major competitors—Japanese manufacturers—U.S. companies had significantly higher costs. For example, U.S. automobile manufacturers had approximately a $1,000 cost disadvantage for their cars compared to similar classes of Japanese cars. Only a small percentage of this cost difference could be attributed to labor costs, however, but labor costs were among the first to be cut despite other costs associated with the general structure of the auto companies and their oversupply of middle managers and engineers. Auto workers were among the first to be laid off during the initial wave of downsizing. Other U.S. manufacturing industries faced similar competitive problems during this period, as did some U.S. technology industries. Companies in these industries, like those in the auto industry, suffered from higher per-unit costs and greater overhead than their Japanese counterparts due to lower labor productivity and a glut of white-collar workers in many U.S. companies.

To remedy these problems, U.S. companies implemented a couple of key changes: They formed partnerships with Japanese companies to learn the methods behind their cost efficiencies and they strove to reduce

Table 2

Projected Job Decline in Selected Occupations, 2006-2016

Occupation	Projected Decline
Photographic processing machine operators	-50%
File clerks	-41%
Electrical and electronic equipment assemblers	-27%
Sewing machine operators	-27%
Computer operators	-25%
Bindery workers	-22%
Prepress technicians and workers	-21%

Adapted from: U.S. Department of Labor, Bureau of Labor Statistics. 2007. Occupations With the Largest Job Decline, 2006-2016.

costs, and expedite decision-making by getting rid of unnecessary layers of bureaucracy and management. Nevertheless, some companies began simply to cut their workforce without determining whether or not it was necessary and without any kind of accompanying strategy. In essence, they downsized because they lacked new products that would have stimulated growth and because their existing product markets were decreasing.

DOWNSIZING AND RESTRUCTURING

Downsizing generally accompanies some kind of restructuring and reorganizing, either as part of the downsizing plan or as a consequence of downsizing. Since companies frequently lose a significant number of employees when downsizing, they usually must reallocate tasks and responsibilities. In essence, restructuring efforts attempt to increase the amount of work output relative to the amount of work input. Consequently, downsizing often accompanies corporate calls for concentration on "core capabilities" or "core businesses," which refers to the interest in focusing on the primary revenue-generating aspects of a business. The jobs and responsibilities that are not considered part of the primary revenue-generating functions are the ones that are frequently downsized. These jobs might then be outsourced or handled by outside consultants and workers on a contract basis.

Eliminating non-core aspects of a business may also include the reduction of bureaucracy and the number of corporate layers. Since dense bureaucracy frequently causes delays in communication and decision making, the reduction of bureaucracy may help bring about a more efficient and responsive corporate structure that can implement new ideas more quickly.

Besides laying off workers, restructuring efforts may involve closing plants, selling non-core operations, acquiring or merging with related companies, and overhauling the internal structure of a company. The seminal work on restructuring or reengineering, *Reinventing the Corporation*, by Michael Hammer and James Champy, characterizes the process as the "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service, and speed."

Reengineering was envisioned as a mechanism for transforming bureaucracy-laden organizations into productive market leaders. The goal of the movement is to create lean, streamlined organizations. Reengineering has introduced many process management principles into the workplace: Workflows are more efficient, cross-functional operations are better coordinated, and overhead costs have been reduced. For example, the introduction of the personal computer into the office has facilitated instantane-ous communication and has reduced the need for office support positions, such as secretaries.

Reengineering has had a significant effect on the airline industry. Midwest Airlines, a midsized provider, has followed the lead of several large airlines, reengineering its company with the goal to make it easy for the customer to do business. With information technology, the airline has provided the ability to redeem frequent flyer miles and find the best deals on fares. Midwest also offers services like web check-in and loading flight schedules on PDAs. The airline takes advantage of technology to optimize several business processes, including revenue management, pricing, and crew scheduling. With wireless communications, dispatchers quickly send critical information to pilots, and mechanics obtain engine performance data and access systems right from the aircraft. These IT enhancements have changed the way Midwest does business and how people there do their jobs. Unlike many other airlines, Midwest has been successful in the early 2000s with a major acquisition closing in 2008.

Done right, business reengineering positively transforms the workings of an office. Often, the reengineered office does require fewer, but more highly skilled people with more complex jobs.

CRITICISM OF DOWNSIZING

While companies frequently implement downsizing plans to increase profitability and productivity, downsizing does not always yield these results. Although critics of downsizing do not rule out the benefits in all cases, they contend that downsizing is over-applied and often used as a quick fix without sufficient planning to bring about long-term benefits. Moreover, downsizing can lead to additional problems, such as poor customer service, low employee morale, and bad employee attitudes. Laying workers off to improve competitiveness often fails to produce the intended results because downsizing can lead to the following unforeseen problems and difficulties:

- The loss of highly-skilled and reliable workers and the added expense of finding new workers.

- An increase in overtime wages.

- A decline in customer service because workers feel they lack job security after layoffs.

- Employee attitudes that may change for the worse, possibly leading to tardiness, absenteeism, and reduced productivity.

- An increase in the number of lawsuits and disability claims, which tends to occur after downsizing episodes.

- Restructuring programs sometimes take years to bear fruit because of ensuing employee confusion and the

amount of time it takes for employees to adjust to their new roles and responsibilities.

Some studies have indicated that the economic advantages of downsizing have failed to come about in many cases, and that downsizing may have had a negative impact on company competitiveness and profitability in some cases.

Downsizing has repercussions that extend beyond the companies and their employees. For example, governments must sometimes enact programs to help displaced workers obtain training and receive job placement assistance. Labor groups have reacted to the frequency and magnitude of downsizing, and unions have taken tougher stances in negotiations because of it.

Through downsizing and reengineering, it can be argued that many companies have lost some of their critical, long-term capabilities that did not seem essential to short-term survival. Intangible assets such as employee commitment, productivity, innovation, and risk-taking have been weakened. Too often, reengineering becomes a catch-all term used to describe any and all corporate change programs—including downsizing. The result, then, of reengineering for some companies has been overworked and demoralized employees, bad customer service, and poor quality products.

Instead of laying employees off, critics recommend that companies eliminate jobs only as a last resort; not as a quick fix when profits fail to meet quarterly projections. Suggested alternatives to downsizing include early retirement packages and voluntary severance programs. Furthermore, some analysts suggest that companies can improve their efficiency, productivity, and competitiveness through quality initiatives such as Six Sigma, empowering employees through progressive human resource strategies that encourage employee loyalty and stability, and other such techniques.

SUPPORT FOR DOWNSIZING

Advocates of downsizing counter critics' claims by arguing that, through downsizing, the United States has maintained its position as one of the world's leading economies. Economists point out that despite the downsizing that has become commonplace since the 1970s, overall U.S. standards of living, productivity, and corporate investment have grown at a healthy pace. They reason that without downsizing, companies would not remain profitable and hence would go bankrupt when there is fierce competition and slow growth. Therefore, some executives and economists see downsizing as a necessary albeit painful task, and one that ultimately saves the larger number of jobs that would be lost if a company went out business.

Advocates of downsizing also argue that job creation from technological advances offsets job declines from downsizing. Hence, displaced workers are able find new jobs relatively easily, especially if those workers have skills that enhance the technological competence of prospective employers. In other words, despite the admitted discomfort and difficulties that downsizing has on displaced workers, some workers are able to locate new jobs, and companies are able to achieve greater efficiency, competitiveness, and profitability. Moreover, even though downsizing may not solve all of a company's competitive problems or bolster a company's profits indefinitely, downsizing can help reduce costs, which can lead to greater short-term profitability. In addition, advocates of downsizing contend that staff-reduction efforts help move workers from mature, moribund, and obsolete industries to emerging and growing industries, where they are needed. Economists argue that this process strengthens the economy and helps it grow. This process also enables companies with growing competitive advantages to maintain their positions in the market in the face of greater domestic and global competition, and it is the difficult but necessary result of the transition toward a global economy.

DOWNSIZING AND MANAGEMENT

Downsizing poses the immediate managerial problem of dismissing a large number of employees in a dignified manner in order to help minimize the trauma associated with downsizing. Employees who are laid off tend to suffer from depression, anxiety, insomnia, high blood pressure, marital discord, and a host of other problems. A 2007 Finnish study showed that those most at risk of mental health problems were men who had left their jobs. This group was 64 percent more likely than the average person to be given a drug prescription for anxiety problems.

Thus, when companies decide that downsizing is the best course of action, managers should do so in a way that does the least harm to employees and their families. This includes taking the time to allow dismissed employees to air their thoughts, instead of laying them off quickly and impersonally, and providing assistance in finding new jobs.

Because of the possible negative effects that occur after downsizing, managers may have to implement measures to counteract employee apathy, improve customer service, and restore employee trust. Analysts of downsized companies argue that managers should take steps immediately after workforce reductions to provide the remaining workers with the support and guidance they need. Staffs who survive a round of corporate downsizing run a significantly increased risk of suffering mental health problems because of the increased workload they face once colleagues have left. The Finnish study mentioned

above also found that men who continue to work for a downsized company are 50 percent more likely than those whose had not been through downsizing efforts to be given a prescription for drugs such as antidepressants or sleeping pills.

Managers, aware of the possible outcomes, should provide employees with clear indications of what is expected of them and how they can meet increased productivity goals. Managers should confer with employees regularly to discuss performance and strategies for meeting the goals. In addition, managers should encourage employee initiative and communication and provide employees with rewards for excellent work. By promoting employee initiative and even employee involvement in decision-making, managers can help restore employee trust and commitment and help increase employee motivation.

The aftermath of downsizing also places greater demands on managers to make do with less. In other words, managers must strive to maintain or increase productivity and quality levels despite having a smaller workforce. Since downsizing often brings about a flatter corporate structure, the flow of information and communication no longer requires the effort needed prior to restructuring. Therefore, reports used for communication between layers of the old corporate hierarchy, for example, can be eliminated. If redundant but nonessential work cannot be completely eliminated, it perhaps can be reduced. By studying particular tasks and determining their essential components, managers can get rid of unnecessary tasks and eliminate unnecessary jobs altogether.

Southwest Airlines, which historically has had a culture of trust between management and employees, provides a good example of effective organizational downsizing. Growth in online bookings—a technological event outside of management control—necessitated the need for layoffs. In its reduction, Southwest focused on both the employees who were being let go and employees who were keeping their jobs, hoping to keep the latter group motivated and committed to the company. Management did not make the cuts until all employees could see that the move was necessary, and then offered employees the choice of moving to a different call center, or taking a severance package and leaving the company.

Downsizing appears to be an ongoing practice for the foreseeable future. Top managers with responsibility for making downsizing decisions are in a difficult predicament. Failure to downsize may result in inefficiencies, while downsizing clearly has a number of potentially negative effects on individuals and communities. Finding the balance between these outcomes is the primary challenge facing these managers.

SEE ALSO *Divestment; Quality and Total Quality Management; Strategic Planning Failure*

BIBLIOGRAPHY
Battles, Matthew. "How Business Can Save the World." *Boston Globe* 28 Feb 2008. Available from: http://www.boston.com/bostonglobe/ideas/articles/2008/02/17/how_business_can_save_the_world/.
Champy, James. "People and Process." *Workflow Systems* 4, No. 2. (March 2006). Available from: http://www.acmqueue.org/modules.php?name=Content&pa=printer_friendly&pid=372&page=1.
"Continental Airlines Cuts Jobs, Capacity." *Denver Business Journal* 5 June 2008. Available from: http://www.bizjournals.com/denver/stories/2008/06/02/daily46.html.
Dash, Eric. "Citigroup Records a Loss and Plans 9,000 Layoffs." *International Herald* 18 Apr 2008. Available from: http://www.iht.com/articles/2008/04/18/business/18cndciti.php.
"Downsizing a Threat to Mental Health," *Management Issues* 18 Jan 2007. Available from: http://www.management-issues.com/2007/1/18/research/downsizing-a-threat-to-mental-health.asp.
Hammer, Michael, and James Champy. *Reengineering the Corporation: A Manifesto for Business Revolution.* Harper Business Publications, 2004.
Karoub, Jeff. "GM to Lay Off 3,550 at SUV and Pick-Up Factories." *The Auto Channel* 29 April 2008. Available from: http://www.theautochannel.com/news/2008/04/29/085469.html.
Mandel, Michael J. "Jobs: The Lull Will Linger." *Business Week* 25 Oct 2004, 38–42.
Marks, M.L., and K.P. DeMeuse. "Resizing the Organization: Maximizing the Gain While Minimizing the Pain of Layoffs, Divestitures, and Closings." *Organizational Dynamics* 34, no. 1 (2004): 19–35.
Menn, Joseph. "Series of Layoffs Begins at PeopleSoft." *Los Angeles Times* 15 Jan 2005, D1.
Vanden Plas, Joe. "CIO Leadership Series: Alex Yarmulnik and IT Lift Midwest Airlines." 5 Dec 2007. Available from: http://wistechnology.com/fusioncio/article/4364/.
Weber, Joseph. "More Jobs—and More Layoffs." *Business Week Online* 16 June 2004. Available from: http://www.businessweek.com.
Wiesenfeld, Batia. "The Analysis: The Upside of Downsizing." *Business Week* 8 Apr 2008. Available from: http://www.businessweek.com/managing/content/apr2008/ca2008041_972224_page_2.htm.

DUE DILIGENCE

Due diligence is a legal term that describes the level of care or judgment that a reasonable person would be expected to exercise in a given situation. The term, synonymous with "background check," finds application in a wide range of business settings, including mergers and acquisitions, occupational health and safety, environmental impact assessments, supplier and vendor relationships, asset purchase decisions, and employee hiring or promotion practices. Performing a due diligence analysis in such situations helps managers make informed decisions and reduce the risks incurred by the business. "Real due

diligence analyzes and validates all the financial, commercial, operational, and strategic assumptions underpinning the decision," an analyst for Price Waterhouse Coopers told *Mondaq Business Briefing.* "Due diligence is a strategy to reduce the risk of failure, as well as the embarrassment of discovering what underlies spectacular success," Herrington J. Bryce added in *Nonprofit Times.*

In the area of workplace safety, employers have a responsibility to exercise due diligence in eliminating hazards and creating a work environment that minimizes the risk of accidents or injuries. In fact, due diligence is the legal standard used to determine whether employers can be held liable under occupational health and safety laws. Employers are generally not held liable for accidents if they can prove that they took reasonable precautions to protect workers from injury. Companies can establish due diligence by putting workplace safety policies and procedures in writing, providing appropriate training to employees, and holding managers accountable for following safety guidelines.

Due diligence also applies to the process of making investments, whether personal investments in shares of stock, corporate investments in technology, or the purchase of one company by another. In the area of mergers and acquisitions, a due diligence analysis is an important part of the process of evaluating potential investments and confirming basic information before entering into a transaction. "Quite often, a proposed merger or acquisition gets canned or valued down following conflicts over intellectual property rights, personnel, accounting discrepancies, or incompatibilities in integrating operating systems," wrote Lee Copeland in *Computer World.* "The process of researching, understanding and, in some cases, avoiding these risks is known as due diligence."

When a business makes a purchase offer of any kind, it is often a matter of policy to make the offer contingent on the results of a due diligence analysis. This analysis might include reviewing financial records, hiring experts to examine the assets in question, and taking other reasonable steps to make sure that all questions are answered and expectations met. Experts suggest that sellers also perform due diligence analysis prior to entering into a transaction. Going through this process helps sellers be prepared for any questions that might arise out of the buyer's due diligence analysis, and also gives sellers a basis on which to evaluate the merits of potential purchase offers.

Changing accounting rules are prompting companies to consider tweaking the structure and timing of due diligence when entering into a corporate merger. The rules, two released by the Financial Accounting Standards Board and two companion mandates issued by the International Accounting Standards Board, affect companies both in the United States and abroad. The most sweeping

changes happen in America; for example, buyers must value the amount paid for a target company on the day the transaction closes, rather than the day of the deal announcement, as the earlier rules stipulated. The rule is effective for all acquisitions that close in fiscal years that start after December 15, 2008, and includes recording the value of stock the buyer may use to pay for all or part of an acquisition.

Although the legal concept of due diligence endured for half a century, it came under siege in the early 2000s following a spate of accounting scandals and revelations of deceit and ethical lapses by senior executives at major corporations. "The issue of due diligence arises whenever a financial transaction generates questions, such as: How could this have happened? How could this have gone undetected for so long?" Bryce noted in *Nonprofit Times.* Rather than dismissing due diligence as an outdated concept, however, some analysts argued that such incidents underlined the importance of due diligence as a way for managers to be informed about and exercise judgment over all transactions that affect the welfare of the business.

In a critique of traditional due diligence practices for *Mondaq Business Briefing,* Charles F. Bacon warned that traditional due diligence tends to be reactive. For example, senior management might order a due diligence analysis after making the decision to purchase a competitor. "In effect, they bought the car and now that the tires are getting kicked, they don't want to hear about the bad transmission or leaky gaskets because that would tarnish the fun of deal-making," Bacon explained. Instead, he recommended that businesses take a systemic approach to due diligence starting at the top and incorporating due diligence into all organizational decision-making. The ultimate goal is to create a culture of due diligence in which all employees are encouraged to question and explore the implications of financial and strategic decisions.

SEE ALSO *Entrepreneurship; Licensing and Licensing Agreements*

BIBLIOGRAPHY
Bacon, Charles F. "Next Generation Due Diligence." *Mondaq Business Briefing* 1 October 2004.
Bryce, Herrington J. "Due Diligence: Evaluation of Financial Matters." *Nonprofit Times* 15 October 2002.
Cecil, Mark. "Financial Services Players Rework Due Diligence." *Mergers and Acquisitions Report* 4 February 2002.
Cipra, Richard R. "There Is No Substitute for Due Diligence." *Los Angeles Business Journal* 8 November 2004.
Copeland, Lee. "Due Diligence." *Computer World* 6 March 2000. Available from: http://www.computerworld.com/news/2000/story/0,11280,42836,00.html.
Hallinan, Eric. "Due Diligence." *Reeves Journal* 3 June 2004.
Leone, Marie. "New Merger Rules May Spark Cash Deals." *CFO.com* 4 January 2008. Available from: http://www.cfo.com/article.cfm/10522704?f=search.

Kroll, Luisa. "Gotcha: Pushing the Limits of Due Diligence." *Forbes* 30 October 2000.

Nadler, Paul. "In Due Diligence, Numbers Are Just the Beginning." *American Banker* 23 June 2004.

"What Does 'Due Diligence' Mean When Buying a Business?" 20 October 2004. Available from: http://www.allbusiness. com/buying-exiting-businesses/purchasing-a-business/ 360-1.html.

E

EAP

SEE *Employee Assistance Programs*

E-COMMERCE

SEE *Electronic Commerce*

ECONOMICS

The study of economics leads to the formulation of the principles upon which the economy is based. History, politics, and the social sciences cannot be understood without the basic understanding of economic principles. The science of economics is concerned with the scientific laws that relate to business administration, and attempts to formulate the principles that relate to the satisfaction of wants.

The term "economics" covers such a broad range of meaning that any brief definition is likely to leave out some important aspect of the subject. It is a social science concerned with the study of economies and the relationships between them. Economics is the study of how people and society choose to employ scarce productive resources, which could have alternative uses, to produce various commodities and distribute them for consumption. Economics generally studies problems from society's point of view rather than from the individual's. Finally, economics studies the allocation of scarce resources among competing ends.

OBJECTIVES

As a science, economics must first develop an understanding of the processes by which human desires are fulfilled. Second, economics must show how causes that affect production and consumption lead to various results. Furthermore, it must draw conclusions that will serve to guide those who conduct and, in part, control economic activity.

MICRO AND MACRO VIEWS OF THE ECONOMY

While there are numerous specialties within the academic field, at its most basic level economics is commonly divided into two broad areas of focus: microeconomics and macroeconomics. Microeconomics is the study of smaller levels of the economy, such as how an individual firm or a small group of firms operate. Macroeconomics is the study of whole economies or large sectors of economies.

Microeconomics. Microeconomics is the social science dealing in the satisfaction of human wants using limited resources. It focuses on individual units that make up the whole of the economy. It examines how households and businesses behave as individual units, not as parts of a larger whole. For instance, microeconomics studies how a household spends its money. It also studies the way in which a business determines how much of a product to produce, how to make the best use of production factors, and what pricing strategy to use. Microeconomics also studies how individual markets and industries are organized, what patterns of competition they follow, and how these patterns affect economic efficiency and welfare.

Macroeconomics. Macroeconomics studies an economy at the aggregate level. It is concerned with the workings of the whole economy or large sectors of it. These sectors include government, business, and households. Macroeconomics deals with such issues as national economic output and growth, unemployment, recession, inflation, foreign trade, and monetary and fiscal policy.

For example, many political leaders in the United States believed that economic stimulus packages (sending Americans tax rebates) from the U.S. government in 2001 and again in 2008 would spur on the national economy when the Americans spent their rebates. Economists generally agree that the economy gets a boost; however, they argue that the full impact is less than the total value of the stimulus package because people may opt to save their checks or invest in imported goods. These rebates, economists say, create temporary changes to the economy. Instead, politicians should focus on developing policies that promote healthy, long-term growth.

BASIC ECONOMIC PRINCIPLES

Basic economic principles include the law of demand, demand determinants, the law of supply, supply determinants, market equilibrium, factors of production, the firm, gross product, as well as inflation and unemployment.

The Law of Demand. When an individual want is expressed as an intention to buy, it becomes a demand. The law of demand is a theory about the relationship between the amount of a good that a buyer both desires and is able to purchase per unit of time, and the price charged for it. The ability to pay is as important as the desire for the good, because economics is interested in explaining and predicting actual behavior in the marketplace, not just intentions. At a given price for a good, economics is interested in the buyer's demand that can effectively be backed by a purchase. Thus, it is implied with demand that a consumer not only has the desire and need for a product, but also has the money to purchase it. The law of demand states that the lower the price charged for a product, resource, or service, the larger will be the quantity demanded per unit of time. Conversely, the higher the price charged, the smaller will be the quantity demanded per unit of time—all other things being constant. For example, the lower the purchase price for a six-pack of Coca-Cola, the more a consumer will demand (up to some saturation point, of course).

Demand Determinants. Movement along the demand curve—referred to as a change in quantity demanded—means that only the price of the good and the quantity demanded change. All other things are assumed to be constant or unchanged. These things include the prices of all other goods, the individual's income, the individual's expectations about the future, and the individual's tastes. A change in one or more of these things is called a change in demand. The entire demand curve will move as a result of a change in demand.

Law of Supply. The law of supply is a statement about the relationship between the amount of a good that a supplier is willing and able to supply and offer for sale, per unit of time, and each of the different possible prices at which that good might be sold. This law also states that suppliers will supply larger quantities of a good at higher prices rather than lower prices. In other words, supply generally is governed by profit-maximizing behaviors. The supply curve indicates what prices are necessary in order to give a supplier the incentive to provide various quantities of a good per unit of time. Just as with the demand curve, movement along the supply curve always assumes that all other things are constant.

Supply Determinants. At the opportunity for sale at a certain price, a part of total supply becomes realized market supply. Economics emphasizes movement along the supply curve in which the price of the good determines the quantity supplied. As with the demand curve, the price of the good is singled out as the determining factor with all other things being constant. On the supply side, these things are the prices of resources and other production factors, technology, the prices of other goods, the number of suppliers, and the suppliers' expectations.

Market Equilibrium. Supply and demand interact to determine the terms of trade between buyers and sellers. In theory, supply and demand mutually determine the price at which sellers are willing to supply just the amount of a good that buyers want to buy. The market for every good has a demand curve and a supply curve that determine this price and quantity. When this price and quantity are established, the market is said to be in equilibrium. The price and quantity at which this occurs are called the equilibrium price and equilibrium quantity. In equilibrium, price and quantity have the tendency to remain unchanged.

FACTORS OF PRODUCTION.

Factors of production are economic resources used in the production of goods, including natural, man-made, and human resources. They may be broken down into two broad categories: (1) property resources, specifically capital and land; and (2) human resources, specifically labor and entrepreneurial ability.

Managers often speak of capital when referring to money, especially when they are talking about the purchase of equipment, machinery, and other productive facilities.

Financial capital is the more accurate term for the money used to make such purchases. An economist would refer to these purchases as investments. The economist uses the term *capital* to mean all the man-made aids used in production. It is sometimes referred to as investment goods. Capital consists of machinery, tools, buildings, transportation and distribution facilities, and inventories of unfinished goods. A basic characteristic of capital goods is that they are used to produce other goods. Capital goods satisfy wants indirectly by facilitating the production of consumable goods, while consumer goods satisfy wants directly.

To an economist, land is the fundamental natural resource that is used in production. This resource includes water, forests, oil, gas, and mineral deposits. These resources are rapidly becoming scarce. Land resources, which include natural resources above, on, and below the soil, are distinguished by the fact that man cannot make them.

Labor is a broad term that covers all the different capabilities and skills possessed by human beings. While this often means direct production labor, it includes management labor as well. The term *manager* embraces a host of skills related to the planning, administration, and coordination of the production process.

Entrepreneurial ability also is known as enterprise. Entrepreneurs have four basic functions. First, they take initiative in using the resources of land, capital, and labor to produce goods and services. Second, entrepreneurs make basic business policy decisions. Third, they develop innovative new products, productive techniques, and forms of business organization. Finally, entrepreneurs bear the risk. In addition to time, effort, and business reputation, they risk their own personal funds, as well as those of associates and stockholders.

THE FIRM

The economic resources of land, capital, and labor are brought together in a production unit that is referred to as a business or a firm. The firm uses these resources to produce goods that are then sold. The money obtained from the sale of these goods is used to pay the economic resources. Payments to those providing labor services are called wages. Payments to those providing buildings, land, and equipment leased to the firm are called rent. Payments to those providing financial capital, such as loans, stocks, and bonds, are called dividends and interest. In other words, capital goods tend to increase the productivity of labor through being man-made and reproducible.

GROSS PRODUCT

The total dollar value of all the final goods produced by all the firms in an economy is called the gross product. This commonly is measured by one or both of the following:

1. Gross national product (GNP) includes the value of all goods and services produced by firms originating in a single nation. This means that foreign direct investment (FDI)—such as a Japanese auto plant in the United States—is not included in GNP, even though the plant might employ U.S. workers and sell its output exclusively to U.S. consumers. Conversely, the value of production by U.S.-based firms abroad would be considered part of the U.S. GNP.

2. Gross domestic product (GDP) includes the value of all goods and services produced within a nation, regardless of where the owners of production are based. In this case, FDI into the United States would contribute to U.S. GDP, while U.S. investment in other countries would contribute to those countries' GDP, not that of the United States.

GDP is the preferred measure of gross product for many kinds of economic analyses. This is because foreign investment has grown rapidly around the world, and because foreign-owned assets, such as a manufacturing facility, tend to have a greater net influence on the domestic economy in which they are situated. Both measures of gross product calculate the value of products and services on a value-added basis so that output is not double-counted, such as when products are resold through different phases of the supply and distribution chain.

In order to make comparisons, economists often use "real" GNP or GDP, which means the figure has been adjusted to hide the effects of inflation, or the general rise of prices relative to the quantity or quality of goods produced. Therefore, real gross product is commonly taken as an indicator of overall economic health. A rise at a moderate, sustainable pace is considered healthiest. However, if gross product is declining or rising at an unsustainably fast pace, it usually is interpreted as a negative signal.

INFLATION AND UNEMPLOYMENT

The economic health of a nation, of which gross product is one measure, is directly affected by two other important factors: inflation and unemployment.

Inflation. Inflation is an ongoing general rise in prices without a corresponding rise in the quantity or quality of the underlying merchandise or services (i.e., getting "less for more"). Ultimately, inflation represents an economic imbalance and diminishes a currency's real and nominal purchasing power. The steeper the rise, the faster the decline of the currency's purchasing power. Rapid economic expansion is one factor that can lead to price inflation, as can lax or inconsistent control of the money supply (such as through central bank monetary policy). Leading measures of inflation in the United States are the

Consumer Price Index (CPI) and the Producer Price Index (PPI). When inflation data are used to adjust the estimate of GDP, it is known as the GDP deflator.

Unemployment. The unemployment rate measures the percentage of the total number of workers in the labor force who are actively seeking employment but are unable to find jobs. While this seems straightforward, there are some measurement issues to consider, such as what constitutes looking for a job, how part-time labor is interpreted (i.e., being underemployed rather than unemployed), and what happens when an individual is technically employable but not actively seeking employment for whatever reason.

Measurement difficulties aside, in general the higher the unemployment rate, the more the economy is wasting labor resources by allowing people to sit idle. Still, when unemployment rates are low there is a tendency toward wage inflation because new employees are harder to find and workers often require additional incentives in order to take or keep a job. Because having a moderate pool of unemployed workers serves as a buffer to rising labor costs, most economists view full employment (zero or negligible unemployment) as impractical and even undesirable. Structural unemployment seemingly allows human capital to flow more freely (and cheaply) when there are changes in demand for labor in various parts of the economy. Of course, this does not mean that high unemployment is viewed as positive.

SCHOOLS OF ECONOMIC THOUGHT

While many of the aforementioned basic economic principles and ideas are widely accepted by economists, there have been—and continue to be—differing theories about some areas of economic behavior. Following is a brief overview of the three most influential theoretical perspectives.

Classical Economics. Dating back to eighteenth-century Europe, classical economics posited the market system would ensure full employment of the economy's resources. Classical economists acknowledged that abnormal circumstances such as wars, political upheavals, droughts, speculative crises, and gold rushes would occasionally deflect the economy from the path of full employment. However, when these deviations occurred, automatic adjustments in prices, wages, and interest rates within the market would soon restore the economy to the full-employment level. A decrease in employment would reduce prices, wages, and interest rates. Lower prices would increase consumer spending, lower wages would increase employment, and lower interest rates would boost investment spending. Classical economists believed in Say's Law, which states

that supply creates its own demand. Although more recent economic philosophies differ in some of the specifics, particularly on the role of governments, central banks, and international trade, many tenets of classical economics are still accepted today.

Keynesian Economics. As a consequence of the 1936 publication of British economist John Maynard Keynes's *General Theory of Employment, Interest, and Money*, mainstream economists came to give less importance to the role of money in the economy than had classical economists. Keynes sought to explain why there was cyclical employment in capitalistic economies. It was Keynes's analysis of how total demand determines total income, output, and employment, and the potentially key role for fiscal policy in the process, that captured the attention of most economists.

Moreover, the General Theory seemed to make compelling arguments for the use of government fiscal policy to avoid such problems and to smooth out economic instability. Keynesian followers believe that savings must be offset by investment. They termed propensity to consume as a person's decision on how much of total income will be allocated to savings and how much will be spent. The Keynesian view sees the causes of unemployment and inflation as the failure of certain fundamental economic decisions, particularly saving and investment decisions. In short, the Keynesian view is one of a demand-based economy.

Monetarism. More recently, the monetarists, led by Nobel laureate economist Milton Friedman, argued that money plays a much more important role in determining the level of economic activity than is granted to it by the Keynesians. Monetarism holds that markets are highly competitive and that a competitive market system gives the economy a high degree of macroeconomic stability. Monetarists argue that price and wage flexibility provided by competitive markets cause fluctuations in total demand rather than output and employment. Monetarism is thus concerned with controlling the money supply and not injecting excess liquidity into markets. This view is somewhat compatible with, but not identical to, the supply-side school of economics.

BIBLIOGRAPHY

Bell, Carolyn Shaw. "Thinking about Economics." *American Economist* 23, no. 1 (1998): 18–33.

Curtis, Roy Emerson. *Economics: Principles and Interpretation.* Chicago: A.W. Shaw and Company, 1928.

Eggert, James. *What is Economics?* 4th ed. Mountain View, CA: Mayfield Publishing Company, 1997.

Levine, Adam. "Bush Signs Stimulus Bill; Rebate Checks Expected in May." *CNNPolitics.com* 13 Feb 2008. Available

from: http://www.cnn.com/2008/POLITICS/02/13/bush.
stimulus/index.html.

Samuelson, Paul A. *Economics.* 10th ed. New York: McGraw-Hill,
1976.

Stern, Gary H. "Do We Know Enough about Economics?"
Fedgazette 11, no. 1 (1999): 12.

ECONOMIES OF SCALE AND ECONOMIES OF SCOPE

Economies of scale are reductions in average costs attributable to production volume increases. They typically are defined in relation to firms, which may seek to achieve economies of scale by becoming large or even dominant producers of a particular type of product or service. A distinction can be made between internal and external economies of scales. Internal economies of scale occur when a firm reduces costs by increasing production. External economies of scale occur when an entire industry benefits from expansion, for example, through the creation of an improved transportation system, a skilled labor force, or by sharing technology.

Economies of scope are reductions in average costs attributable to an increase in the number of goods produced. For example, fast food outlets have a lower average cost producing a multitude of goods than would separate firms producing the same goods. This occurs because the preparation of the multiple products can share storage, preparation, and customer service facilities (joint production).

ECONOMIES OF SCALE

The basic notion behind economies of scale is well known: As a plant gets larger and volume increases, the average cost per unit of output is expected to drop. This is partially because relative operating and capital costs decline, since a piece of equipment with twice the capacity of another piece does not cost twice as much to purchase or operate. If average unit production cost equals variable costs plus fixed costs/output, one can see that as output increases the fixed costs/output figure decreases, resulting in decreased overall costs.

Plants also gain efficiencies when they become large enough to fully utilize dedicated resources for tasks such as materials handling. The remaining cost reductions come from the ability to distribute nonmanufacturing costs, such as marketing and research and development, over a greater number of products. This reduction in average unit cost continues until the plant gets so big that coordination of material flow and staffing becomes very expensive, requiring new sources of capacity.

This concept can be related to best operating levels by comparing the average unit cost of different sized firms. In many types of production processes, the most efficient types of production facilities are practicable only at high output levels. It is very expensive to build custom-made cars by hand, and would be equally or more expensive to use a large General Motors assembly plant to build just a few Chevrolets per year. However, if the plant is used to build 6 million cars per year, the highly specialized techniques of the assembly line allow a significant reduction in costs per car.

Suppose, for example, that Honda were constrained to produce only 10,000 motorcycles a year instead of a possible 1 million. With this circumstance, the need for an assembly line would become obsolete. Each motorcycle could be produced by hand. Honda could rule out benefits that might be derived from the division and specialization of labor. In producing such a small number, the use of any production techniques that reduce average cost would become obsolete. In these two examples, Honda and General Motors would enjoy economies of scale with reduced average cost simply by increasing the scale of their operations.

More broadly, economies of scale can occur for a number of reasons, including specialization efficiencies, volume negotiating/purchasing benefits, better management of byproducts, and other benefits of size that translate into savings or greater profitability for a large-scale producer.

Specialization. In a small firm, labor and equipment must be used to perform a number of different tasks. It is more difficult for labor to become skilled at any one of them and thereby realize the gains in productivity and reduction in per-unit costs that specialization permits. In the same way, management functions cannot be as specialized in a smaller firm. Supervisors may have to devote time to screening job applicants, a task usually more efficiently handled by a personnel department in a larger firm. Executives may have to divide their attention between finance, accounting, and production functions that could be handled more proficiently by departments specializing in each of these areas in a larger firm.

According to Langlois, some economies of scale result from the specialization and division of labor. Mass production allows the use of specialized equipment and automation to perform repetitive tasks. The larger the output of a product, plant, or firm, the greater will be the opportunities for specialization of labor and capital equipment. Similarly, machinery and equipment cannot be used as efficiently when it has to be switched back and forth between tasks.

Increased specialization in the use of labor is feasible as a plant increases in size. Hiring more workers means

that jobs can be divided and subdivided. Instead of performing five or six distinct operations in the productive process, each worker may now have just one task to perform. Workers can be used full-time on those particular operations at which they have special skills. In a small plant a skilled machinist may spend half his time performing unskilled tasks, resulting in higher production costs. Furthermore, the division of work operations made possible by large-scale operations gives workers the opportunity to become very proficient at the specific tasks assigned to them. Finally, greater specialization tends to eliminate the loss of time that accompanies the shifting of workers from one job to another.

Volume Discounts. Oftentimes, the suppliers of raw materials, machinery, and other inputs will charge a lower price per unit for these items if a firm buys in large quantities. When a firm produces at high output levels, it needs a large volume of inputs and can take advantage of the associated price discounts to reduce its per-unit costs; if the company is large enough it may have strong negotiating power on this point. There may be similar economies of scale for stocks of raw materials, and intermediate and final products, part of which may be held to meet interruptions to the supply of raw materials, a temporary breakdown of firms, and the uncertain flow of orders from customers.

Economic Use of Byproducts. The production of many types of goods gives rise to economically valuable byproducts. Large-scale firms are often able to recycle "waste" byproducts that smaller size firms simply have to throw away because it is not economical to do anything else with them. For example, a small sawmill may simply throw away sawdust and old wood scraps. Many processing firms find that the volume of these waste products is large enough to warrant their resale. For example, sawdust can be sold as a sweeping compound for cleaning floors and hallways in large buildings. Wood scraps may be packaged, processed, and sold as kindling wood and artificial logs for home barbecues and fireplaces. In this way, the sale of byproducts effectively reduces the per-unit costs of producing lumber in large volumes. For the same reasons, large oil firms often produce a host of petroleum byproducts, and meatpacking firms produce fertilizers, glue, leather, and other byproducts of meat production.

External Economies of Scale. The growth of supporting facilities and services is encouraged by a firm's large scale of operation. As a firm's scale of operations gets larger, it often becomes worthwhile for other firms and local governments to provide it with unique services that result in direct or indirect cost advantages. If a firm builds a large plant in a particular area, an improvement in highways and expanded transportation services may soon follow.

Smaller suppliers that find a large part of their sales going to the larger firm may move closer to reduce transportation costs. All of these developments could result in lower per-unit costs for the large firm.

Large Economies of Scale. Larger firms have a cost advantage over their competitors. Not only does a larger plant gain from economies of scale, it also will produce more. Companies often use this advantage as a competitive strategy by first building a large plant with substantial economies of scale, and then using its lower costs to price aggressively and increase sales volume. Large economies of scale cause the firm's long-run average total cost curve to fall over a sizeable range as output is increased. In industries where the technology of production leads to economies of scale, the long-run average total cost curve for a single firm may fall over almost the entire range of output covered by the industry demand curve. When long-run average total cost falls in this fashion, it is possible for a firm that gets into this market ahead of others to obtain a competitive advantage. The ever lower per-unit costs it realizes at higher and higher levels of output permit the firm to charge a price lower than the average per-unit costs that prevail at lower levels of output. In this way, the firm is able to satisfy the entire market demand at a price below that which potential new rival firms must charge when getting started. These new firms would thus not be able to charge a price low enough to compete for sales with the established firm. Therefore, the established firm is able to keep rivals out of the market and maintain a monopoly position.

ECONOMIES OF SCOPE

According to David Kass in his 1998 article, "Economies of Scope and Home Healthcare," economies of scope exist if a firm can produce several product lines at a given output level more cheaply than a combination of separate firms each producing a single product at the same output level. Economies of scope differ from economies of scale in that a firm receives a cost advantage by producing a complementary variety of products with a concentration on a core competency. While economies of scope and scale are often positively correlated and interdependent, strictly speaking the benefits from scope have little to do with the size of output.

For instance, in the paper products industry it is common for large firms to produce their own pulp, the primary ingredient in paper, before manufacturing the paper goods themselves. However, smaller firms may have to purchase pulp from others at a higher net cost than the large companies pay. The savings from producing both pulp and paper would be an economy of scope for the large producers, although the large companies probably also have economies of scale that make it feasible to invest in pulping operations in the first place.

In another example, banks have economies of scope when they offer a variety of related financial services, such as retail banking and investment services, through a single service infrastructure (i.e., their branches, ATMs, and Internet site). Clearly, the costs of providing each service separately would be much greater than the costs of using a single infrastructure to provide multiple services.

Research concerning hospitals has suggested that other types of services, such as pediatric care, may have economies of scope. With increasing competition and emphasis on service, economies of scope are necessary for hospitals to provide these services profitably.

DISECONOMIES OF SCALE

When a firm grows beyond the scale of production that minimizes long-run average cost, diseconomies of scale may result. When diseconomies of scale occur, the firm sees an increase in marginal cost when output is increased. This can happen if processes become "out of balance," or when one process cannot produce the same output quantity as a related process. Diseconomies of scale also can occur when a firm becomes so large that:

- Transportation costs increase enough to offset the economies of scale.

- Monitoring worker productivity becomes too imperfect or costly.

- Coordinating the production process becomes too difficult.

- Frequent breakdowns result.

- Maintaining efficient flows of information becomes too expensive.

- Workers feel alienated and become less productive.

- The focus of the firm is reduced, leading to inefficiencies and loss of strategic position.

An example of long-perpetuated diseconomies of scale was provided in a 2008 report by the Pew Charitable Trusts and Johns Hopkins Bloomberg School of Public Health that showed that economies of scale used to justify factory-farming practices are largely false. Their continuing practice has resulted in a failure to account for associated costs, including human illnesses and the degradation of land, water, and air quality.

SEE ALSO *Economics*

BIBLIOGRAPHY
Anupindi, Ravi, et al. *Managing Business Process Flows: Principles of Operations Management.* 2nd ed. Upper Saddle River, NJ: Pearson/Prentice Hall, 2004.

"Diseconomies of Scale." Available from: http://www. investopedia.com/terms/d/diseconimiesofscale.asp.

"Diseconomies of Scale." Available from: http://www.tutor2u. net/economics/content/topics/buseconomics/diseconomies. htm.

"Economies of Scope." Available from: http://www.tutor2u.net/ economics/content/topics/buseconomics/economies_of_scope. htm.

Kass, David I. "Economies of Scope and Home Healthcare." *Health Services Research* 33, no. 4 (1998).

Raturi, Amitabh S., and James R. Evans. *Principles of Operations Management.* Mason, OH: Thomson/South-Western, 2005.

Weiss, Rick. "Report Urges Huge Changes to Factory-Farming Practices." *The Washington Post* 30 April 2008. Available from: http://www.washingtonpost.com/wp-dyn/content/article/ 2008/04/29/AR2008042902602.html.

"What Are Economies of Scale?" Available from: http:// www.investopedia.com/printable.asp?a=articles/03/ 012703.asp.

EFFECTIVENESS AND EFFICIENCY

Efficiency and effectiveness are two ways of judging the activities of an enterprise, whether business, government, or otherwise. Efficiency was originally an industrial engineering concept that came of age in the early twentieth century. Management theorists like Frederick Taylor and Frank and Lillian Gilbreth designed time and motion studies primarily to improve productive efficiency by eliminating waste in the production process. The concept of effectiveness, on the other hand, first became popular in the United States in the early 1980s, when Americans perceived Japanese products such as cars and electronics to offer greater value and quality. In contrast with efficiency, effectiveness takes into consideration creating value and pleasing the customer. While efficiency and effectiveness may be closely related in a given enterprise, they are actually two separate concepts. Each is used, separately and together, to evaluate an enterprise in an attempt to make improvements if possible.

EFFICIENCY V. EFFECTIVENESS

The words *efficiency* and *effectiveness* are often considered synonyms, along with terms like *competency, productivity,* and *proficiency.* However, in more formal management discussions, the words *efficiency* and *effectiveness* take on very different meanings. In the context of process reengineering, Lon Roberts defines efficiency as "to the degree of economy with which the process consumes resources—especially time and money," while he defines effectiveness as "how well the process actually accomplishes its intended purpose." Another way to look at it is this: efficiency is doing things right, and effectiveness is doing the right things.

Some examples might help elucidate the difference. Consider a company that was successfully making buggy whips as automobiles became the primary mode of transportation. Assume that the processes used to produce buggy whips had been highly perfected, and the buggy whips were delivered on or ahead of schedule at the lowest possible cost. This company was operating very efficiently. However, the company and its strategists were not very effective. The company was doing the wrong things efficiently. If they had been effective, they would have anticipated the impending changes in the transportation industry and begun developing new product lines in synch with industry developments.

Consider another example from medicine. A surgeon is very skilled, perhaps the best in the country. The impending job is to operate on the patient's left knee. However, the surgeon doesn't perform all the steps of the process leading up to the surgery. Someone else marks the right knee for surgery. However skilled this surgeon is, however fast he performs the surgery—that is, however efficient he or she is—this process is obviously not effective, as the injured knee is not fixed and a healthy knee is subjected to invasive surgery. When the patient awakens from the surgery, he or she will not be a satisfied customer. This is another case of a divorce between efficiency and effectiveness.

It should be evident from these examples that efficiency can occur in the absence of effectiveness, but the reverse is usually not the case. While an inefficient process may result in a product that meets the needs or wants of a given customer base, the possibility of improving this process means that costs could be reduced. If costs could be reduced, the firm is not being as effective as possible at meeting customers' desire for the lowest possible price. In other words, an efficient process may be ineffective, but an inefficient process cannot be optimally effective. Without efficiency, there cannot be optimal effectiveness.

PROBLEMS THAT LEAD TO INEFFICIENCY AND INEFFECTIVENESS

There are several ways for an enterprise to fall short of being efficient and effective. The examples above indicated how an efficient process might be an ineffective one. Processes may also be inefficient, hence ineffective, if there are unnecessary steps in the process, or if the steps of the process are completed serially when they could be completed simultaneously.

Consider a process for preparing a bulk mailing. Say that three clerical employees are assigned to this task. Before them are three piles of materials: first, a pile of letters to be folded and stuffed into the envelopes that make up the second pile, and third, a pile of address labels to be applied to the envelopes. One way of accomplishing

this job is for the three employees to divide the three piles into thirds and each work on one-third of the task. This, however, would not be as efficient as setting up an assembly line with one employee folding the letters, the second stuffing the envelopes, and the third applying the labels. The former process is inefficient because each employee will be required to perform extra movements as they move from one task to another; also, focusing on three tasks rather than one will reduce the possibility for learning to do each step more quickly. With an assembly line, wasted motion is eliminated, and each employee is able to focus solely on getting very good at his or her specific task.

Another problem can be a process that uses serial rather than simultaneous steps. Look at a university curriculum/course approval process done serially that takes an average of two to three years. The steps of the process are identified as follows:

1. A professor suggests to the department chairman that a quality management course be added to the curriculum.

2. The department chairman reviews the course, agrees, and submits the suggestion to all the colleagues in the department.

3. The colleagues review the course, agree, and submit their recommendation to the department chairman.

4. The department chairman reviews their recommendation and submits it, along with all materials, to the dean of the business school.

5. The dean reviews the materials and recommendations, agrees, and submits them to all the department chairmen in the school.

6. The chairmen all agree, and submit the recommendations and materials back to the dean with their recommendation.

7. The dean submits the materials and recommendations to the entire faculty in the business school.

8. The faculty reviews all materials and sends recommendations back to the dean.

9. The dean submits all materials and recommendations to the associate vice president for academic affairs.

10. The associate vice president agrees and submits everything to the vice president.

11. The vice president agrees and submits everything back to the associate.

12. The associate submits everything to the faculty senate.

13. The faculty senate agrees and submits everything, with its recommendation, back to the vice president.

14. The vice president submits everything to the president.

15. The president signs the materials and submits them back to the associate vice president.

16. The associate vice president submits the recommendation for course approval to the coordinating board.

17. The coordinating board approves and submits the materials back to the associate vice president.

It should be fairly obvious that this is not a particularly efficient process. A professor who wishes to add a new course to the curriculum—perhaps responding to an important change in the field—may be dissuaded from doing so by the daunting task ahead. If the process were streamlined by putting the material in a shared computer file, the first 14 steps (or, at least steps 4 through 14) of this process could occur simultaneously, or at least in overlapping fashion. As a result, the first 14 steps of this process could be accomplished in a matter of weeks, rather than months.

MEASURING EFFICIENCY, EFFECTIVENESS, AND FLEXIBILITY

Efficiency and *effectiveness* are often considered synonyms, but they mean different things when applied to process management. Efficiency is doing things right, while effectiveness is doing the right things. A third related concept is flexibility or adaptability, which is the capability of the organization to respond quickly to changing circumstances. It is this capability for an organization to reinvent itself that ensures its long-term survival and success.

Organizational leaders can't comprehend the extent to which their organizations and processes are efficient, effective, and flexible unless they know how to measure these things. Measures of efficiency, effectiveness, and flexibility are of great interest to all stakeholders: process owners, internal and external customers and suppliers, and executives. Inefficient processes are costly in terms of dollars, waste, rework, delays, resource utilization, and so on. Ineffective processes are costly as well because they don't do what they are supposed to do. Processes that are not capable of rapid adaptation (flexibility and innovation) are costly because they are not capable of rapidly responding to customers' needs in terms of customization and rapid decision-making. The greatest risk is that stakeholder loyalty will diminish.

In order to measure processes in terms of efficiency, effectiveness, and capability of rapid adaptations, people should ask themselves what, who, when, where, and how questions.

Perhaps the first question about a process is, why do it at all? Many steps exist simply because of organizational inertia ("We have always done it that way"). The second question might be, why do we do it this way? Then you might consider questions like these: What is being done? What should be done? What can be done? When should it happen? and so forth. These questions, and the concepts of efficiency and effectiveness, apply to all processes, all jobs, all types of organizations, all industries.

Some process efficiency measures are as follows:

- Cycle time per unit, transaction, or labor cost
- Queue time per unit, transaction, or process step
- Resources (dollars, labor) expended per unit of output
- Cost of poor quality per unit of output
- Percent of time items were out of stock when needed
- Percent on-time delivery
- Inventory turns

Here are some effectiveness measures:

- How well the output of the process meets the requirements of the end user or customer
- How well the output of the sub process meets the requirements of the next phase in the process (internal customers)
- How well the inputs from the external suppliers meet the requirements of the process

By contrast, measures of ineffectiveness include the following:

- Defective products
- Customer complaints
- High warranty costs
- Decreased market share
- Percent of activities that customers perceive to be non-value-added

Some measures of adaptability are as follows:

- The average time it takes to respond to special customer requests compared to routine requests
- The percent of time special customer requests are denied compared to the denial of routine requests
- The percent of special customer requests that have to be escalated to higher levels of management compared to the escalation of routine requests
- The capability to respond to product changes versus process changes

Organizations should establish baselines for efficiency, effectiveness, and adaptability metrics. In other words, they should determine their current performance levels. Then they should benchmark best-in-class or world-class organizations and set aggressive goals or targets for improvement. Finally, they should determine root causes of problems and eliminate them or minimize their impact.

TOOLS AND CONCEPTS

Generally, management and non-management employees have not had experience with the concepts and tools that will help them evaluate the processes which they own. In this case, training and opportunities to apply the concepts and tools should be provided. Examples of concepts and tools include the following:

- Statistical process control, which measures variability in a process.

- Trend charts, which measure performance over time.

- Pie charts, which depict measurements compared to each other.

- Process flow charts, which allow staff to quickly identify serial versus simultaneous processes, items which do not add value (like too many signatures, unnecessary travel and handling, long queues, etc.), and sub-processes that do not meet the needs of internal customers.

In addition to process concepts and tools, people should learn interrelationship concepts such as teamwork, communication, and leadership skills to streamline relationships as well as processes and organizations. This way, the results of measurements of efficiency, effectiveness, and flexibility can be fed back to the process owners so that they can improve the organization and the processes. This includes management processes as well as lower-level work processes. By their very nature, management processes can positively or negatively impact other work processes because they quite often deal with approvals (signature cycles) including requisitions for the purchase of essential equipment.

Answers to who, what, where, when, and how questions can be used to determine if the work should be done at all, who should do it, where and when it should be done, and how the work should be done. If these questions are answered truthfully, many activities in a process will be eliminated because they do not add value. Sometimes, entire processes will be eliminated.

ENHANCING EFFICIENCY, EFFECTIVENESS, AND FLEXIBILITY

Employees need to learn about and use various concepts and tools which will help them and their processes to be more efficient, effective, and flexible. For example, flow-charting the curriculum process mentioned above would have highlighted the need to replace serial sub-processes with sub-processes that were simultaneous and the need to eliminate duplications of effort and long waiting times. In addition, workers should learn interpersonal and leadership skills in order to be able to refine relationships as well as processes and organizations. Understanding the relationship between efficiency, effectiveness, and flexibility is an essential aspect of ensuring the success of any enterprise.

SEE ALSO *Time Management*

BIBLIOGRAPHY

Breyfogle, Forrest W., III. *The Integrated Enterprise Excellence System: An Enhanced, Unified Approach to Balanced Scorecards, Strategic Planning, and Business Improvement.* Austin, TX: Bridgeway Books, 2008.

"Efficiency or Effectiveness?" *Hindu* 20 January 2000.

Hunsaker, Phillip L. *Management: A Skills Approach.* 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Pryor, Mildred Golden, J. Chris White, and Leslie A. Toombs. *Strategic Quality Management: A Strategic Systems Approach to Quality.* Houston, TX: Dame Publications, 1999.

Roberts, Lon. *Process Reengineering.* Milwaukee, WS: ASQC Quality Press, 1994.

Timothy, Allen. "Address Call of Effectiveness not Efficiency." *Precision Marketing* 17 October 2003, 18.

Wittmann, Robert B. *Strategic Planning: How to Deliver Maximum Value Through Effective Business Strategy.* London: Kogan Page, 2008.

EFFICIENCY

SEE *Effectiveness and Efficiency*

ELECTRONIC COMMERCE

Electronic commerce (EC) consists of the buying and selling of products and services via the Internet. This can take many forms. Business to business (B2B) buying is estimated to be the most common e-commerce activity, comprising 70 percent to 80 percent of the business conducted online. Business to customer (B2C) activity makes extensive use of search engines and online tools such as easy price comparison. B2PA, or business to public administration, often involves online bidding and the downloading of documents. Public administration to public administration business is often the result of government initiatives to encourage e-commerce. PA2C, or public administration to consumers, usually involves providing e-services to the public. And finally, C2C, or consumer to consumer business, has been popularized by such auction sites as eBay.

These transactions can include online retail sales, supplier purchases, online bill paying, and Web-based auctions. Electronic commerce utilizes a variety of technologies including electronic data interchange, electronic fund transfers, credit cards, and e-mail.

The term e-commerce is often used interchangeably with e-business. The common element is the effective implementation of business activities using Internet technologies. However, e-business is the broader, more encompassing strategy and related activities. In addition to retail sales it includes vendor-partner communication, electronic procurement, customer relationship management, data-mining, and numerous other business functions.

DOT-COMS

Internet use gave a large jump toward the turn of the century, from being common in 26 percent of households in 1998 to 55 percent in 2003. Usage rates continue to climb in the United States and worldwide. This widespread use caused the rise—later followed by the collapse—of many Internet-based businesses, called "dot-coms" for their adoption of the suffix ".com" at the end of their names, referring to their Web site addresses. They used the three Cs method of business—commerce, content, and connection—offering one of the three to possible customers. Although the dot-coms formed the basis for today's e-commerce, inflated expectations and inexperience in online business transactions lead to the dot-com bubble of 2000 and 2001, when many purely online businesses imploded, costing investors millions. Some of the more famous dot-com busts include Flooz.com, 360Hiphop, Pets.com, Kibu.com, and GovWorks.com, which was featured in the documentary *Startup.com*.

After the dot-com bubble, the surviving companies dropped the coms from the end of their names and went on, some becoming successful businesses. For most companies, however, a combination of physical-based customer service and products with online components offering similar services has proven to be a more trustful method of incorporating e-commerce. In response to the dot-com bust and the continued growing interest in online trade, the Federal Trade Commission, or FTC, began to elaborate on their previous online business regulations.

Chief among the FTCs regulations is the policy that all online advertisement must tell the truth and not mislead customers. As in physical markets, all online claims must be substantiated. Disclaimers can be particularly complex on Web sites, and the FTC requires that all disclaimer information must be easily accessible and readable. In response to worries of online security issues such as account and identity theft, the FTC has also made it clear that online companies should notify customers when collecting personal data, and several Privacy Protection Acts created during the dot-com era were made to enforce that policy.

STRATEGIES

One of the first challenges involved in moving to online commerce is how to compete with other e-commerce sites. A common problem in addressing this challenge is that e-commerce is often analyzed from a technical standpoint, not a strategic or marketing perspective. E-commerce provides several technical advantages over off-line commerce. It is much more convenient for the buyer and the seller, as there is no need for face-to-face interaction and Web-based stores are open 24 hours a day. Also, e-commerce purchasing decisions can be made relatively quickly, because a vendor can present all relevant information immediately to the buyer. These factors lend themselves to a transactional approach, where e-commerce is seen as a way to reduce the costs of acquiring a customer and completing a sale.

In contrast, most successful e-commerce Web sites take a relational view of e-commerce. This perspective views an e-commerce transaction as one step among many in building a lasting relationship with the buyer. This approach requires a long-term, holistic view of the e-commerce purchasing experience, so that buyers are attracted by some unique aspect of an e-commerce Web site, and not by convenience. Since consumers can easily switch to a competing Web site, customer loyalty is the most precious asset for an e-commerce site.

While the primary focus of most Internet activity is on the business-to-business and business-to-consumer facets of e-commerce, other transaction methods are included. The success of eBay and its consumer-to-consumer portal for auction-based transactions has dramatically changed how people and companies conduct business. In addition to having a significant effect on business-to-business transactions, retailers are beginning to tap into this new and dynamic approach to commerce.

WIDGETS AND E-COMMERCE

A widget is a transferrable piece of code that can move itself in and out of Web site data, collecting information or executing a particular function for a metadata program. Some of the most visible widgets are the advertisements seen on most Web sites. These are in fact pieces of code from a third-party business that are being used to communicate marketing messages.

Widgets are one of the most important tools for e-commerce, used most often for distribution of information and online promotional activities. A 2008 article by Ori Soen with *TechNewWorld* explores the new possibilities widgets offer companies interested in e-commerce. Not only are widget-advertisements inexpensive and relatively

easy to employ, they can be combined with present marketing efforts and visual productions with the added effect of animation, if desired.

The problem most cited with present-day widget use by e-commerce companies is that online users no longer pay attention to widget advertisement. Most business Web sites accessible today have a multitude of widgets, and the advertisements are often diluted. Like emerging problems with TV commercials, users have learned to simply stop paying attention. Soen, however, sees this as an opportunity for companies to develop more innovative marketing techniques, better online animations, and more effective branding strategies aimed at online users.

Still, e-commerce Web sites are often crowded, and Soen suggests a different focus for widget advertisement: social networks. Social applications, such as MySpace and Facebook, are another field open to creative widget use, but they also offer a more open demographic, namely, people who are more likely to be attracted to creative widgets and—more importantly—have the ability to spread the word to their friends about advertisements that have caught their eye, giving companies two ways to promote instead of one.

Widgets serve a third purpose for e-commerce companies: the ability to collect important data concerning what advertisements are most effective to customers. When widgets are combined with analysis tools, they can be very useful gatherers of marketing information. They can judge how long a potential customer spends with the widget, and to what extent they interact with the animation. Promotional activities and marketing analysis can be effectively combined.

PERSONALIZATION

One of the key practices to a successful e-commerce company is personalization. Rachelle Crum's 2008 article, "Personalization: Telling E-tail Customers What They Really Want," lists several ways businesses can personalize their customers' online experiences.

When customers buy products online, they often receive a short list of other items they may be interested in. This is known as *recommendation*, and because of the ease and access in online business, it is relatively easy for businesses to include in their e-commerce activity. Customers are much more likely to order from the company when they receive a personalized list of products.

Tailored Web pages are another important part of personalization. Many companies have designed their e-commerce businesses to use the data from returning customers to create specific Web pages advertising new products the customer may be interested in, deals that may appeal particularly to the customer, and other information tailored especially for them.

MOBILE WEB

Certain devices, such as the iPhone, are becoming popular for their ability to access the Internet remotely. New technology has allowed remote Web access through phone and other handheld devices to become faster and easier to use. Some e-commerce companies have begun developing Web applications specifically for mobile Web users. This entails creating streamlined Web pages that condense information and allow customers to find what they looking for quickly and without hassle. Since these streamlined applications can be easier to navigate than normal Web pages, and can be accessed from nearly any location, some predictions say the mobile Web will become a powerful tool in the e-commerce field.

There are several different ways companies can make e-commerce more available to mobile Web users. Web designers can simply remove graphics from the Web site for mobile applications, giving users a simplified, text-only site to navigate. Style sheets can also be used, to create other versions of online stores, tailored to specific devices. Or, if a company wanted to devote more time to the project, a second Web site could be created solely for mobile Web users.

WEB SITE CREATION TIPS

Beyond technology tools such as widgets and mobile Web devices, there are simple ways to improve Web pages and how they read and look. Slight changes in the way a Web page integrates marketing, product information, and visuals can create an enormous difference in the perceptions of customers. Most Web surfers spend a very short time inspecting online stores before moving on, and the right words or the right information, displayed correctly, can make a great difference.

As David Needle says in his 2008 article for *Smallbusinesscomputing.com*, there are three different kinds of written cues or signposts that companies can place in their Web sites. The first type of signpost is navigation-oriented. This involves the way the online store is constructed—where the links to products are and where they go, how far down the Web site pages scroll, and links to related sites. "Bread crumbs," or easy ways for customers to return to the sites they have previously seen, are an excellent tool to give online stores structure and usability.

The second type of signpost is microcontent-related. This refers to Web site headings, URLs, and titles that organize online information. All information in the company's online store should be clear and easy to read and understand.

The third type of signpost is metadata, which is data concerning the information of the Web site itself, such as how many users have accessed it and the keywords

within the site that would come up in a search engine or analytical program.

BARRIERS TO SUCCESS

Despite the growing number of e-commerce success stories, plenty of e-commerce Web sites do not live up to their potential. There were two primary causes of e-commerce failures during the early 2000s.

First, most Web sites offer a truncated e-commerce model, meaning that they do not give Web users the capability to complete an entire sales cycle from initial inquiry to purchase. As analyzed by Forrester Research, the consumer sales cycle has four stages. First, consumers ask questions about what they want to buy. Second, they collect and compare answers. Third, the user makes a decision about the purchase. If the purchase is made, the fourth phase is order payment and fulfillment (delivery of the goods or services). The problem is that many Web sites do not provide enough information or options for all four phases. For example, a site may provide answers about a product, but not answers to the questions that the consumer has in mind. In other cases, the consumer gets to the point where he or she wants to make a purchase, but is not given an adequate variety of payment options to place the actual order.

The second problem occurs when e-commerce efforts are not integrated properly into the corporate organization. A survey by *Inter@ctiveWeek* magazine found that in most companies e-commerce is treated as part of the information system (IS) staff's responsibility, and not as a business function. While sales and marketing staff generally assist in the development of e-commerce Web sites, final profit and loss responsibility rests with the IS staff. This is a major source of breakdowns in e-commerce strategy because the units that actually make products and services do not have direct responsibility for selling them on the Web. One promising trend is that more companies are beginning to decentralize the authority to create e-commerce sites to individual business units, in the same way that each unit is responsible for its part of a corporate intranet.

SUCCESS FACTORS

After studying many aspects of electronic commerce, several consulting and analytic firms created guidelines on how to implement and leverage it successfully. In particular, two organizations have developed lists of critical success factors that seem to capture the state of thinking on this topic. First is the Patricia Seybold Group, which publishes trade newsletters and provides consulting services related to using information technology in corporations. This firm identified five critical e-commerce success factors:

1. **Support customer self-service.** If they so desire, Web users should be enabled to complete transactions without assistance.

2. **Nurture customer relationships.** Up-front efforts should focus on increasing customer loyalty, not necessarily on maximizing sales.

3. **Streamline customer-driven processes.** Firms should use Web technology to reengineer back-office processes as they are integrated with e-commerce systems.

4. **Target a market of one.** Each customer should be treated as an individual market, and personalization technology should be employed to tailor all services and content to the unique needs of each customer.

5. **Build communities of interest.** A company should make its e-commerce Web site a destination that customers look forward to visiting, not simply a resource people use because they have to conduct a transaction.

A quick review of two successful e-commerce sites, the Amazon.com bookstore site and Dell Computer's Web site, illustrate how many of these principles combine to help develop a strategic e-commerce capability.

Amazon.com, which has one of the highest sales volumes of any Web-based business, has optimized its site for the nature of its products and the preferences of its customers. The site is highly personalized; each visitor to the site, once registered, is greeted by name. The site content also is customized. Using software based on pattern recognition, Amazon.com compares a particular customer's purchase history to its overall record of transactions and generates a list of recommended books that seem to fit his or her interests and tastes. The company has a very integrated customer service support system, so that any customer service representative can access all data on the transactions, purchasing information, and security measures of each customer. The system also supports communications using e-mail, fax, and telephone.

Finally, Amazon.com helps to build a community of users through its Associates Program. Under this program, a Web site can host a hyperlink directly to the Amazon.com site. Any time that a visitor to that site buys books through Amazon.com, the Web site owner receives a share of the transaction revenues. This is a very inexpensive way for Amazon.com to extend its marketing and advertising reach across the Web.

Dell Computer also uses personalization and customization tools. For every major corporate customer, Dell creates a special Premier Page, which shows all products covered under purchasing contracts with that firm, as well as the special pricing under those contracts. This ensures

that employees of that firm always get the right price for each purchase. Ford Motor Company reports that by encouraging employees to buy PCs from its Premier Page, the company saved $2 million in one year.

Dell also has integrated its e-commerce Web site with all back-office systems, so that when a customer orders a custom-configured PC, that information is automatically transferred to the production system to ensure that the unit is built according to specifications. This also improves customer service; Dell will proactively notify any customer if a production problem or inventory shortage will delay delivery.

Electronic commerce, as used by U.S. firms, has already undergone several generations of evolution. Early experiences helped to stabilize e-commerce technology and set the development path for more sophisticated and useful technologies. Later experiences provided guidelines on strategic approaches and operational models that will help to improve e-commerce success.

Three key issues will determine the long-term viability of electronic commerce. These are:

1. Technological feasibility, or the extent to which technology—bandwidth availability and information reliability, tractability, and security—will be able to sustain exponentially increasing demands worldwide.

2. Socio-cultural acceptability, or the extent to which different global cultures and ways of doing business will accommodate this new mode of transacting, in terms of its nature (not face-to-face), speed, asynchronicity, and unidimensionality.

3. Business profitability, or the extent to which this way of doing business will allow for profit margins to exist at all (e.g., no intermediaries, instant access to sellers, global reach of buyers).

As technology continues to develop and mature, the ability to assess the impact of electronic commerce will become more cogent. Moreover, the significance of privacy, security, and intellectual property rights protection as prerequisites for the successful worldwide diffusion, adoption, and commercial success of Internet-related technologies—especially in places with less democratic political institutions and highly regulated economies—is continually increasing. The differentiation between the Internet (the global network of public computer networks) and intranets (corporate-based computer networks that involve well-defined communities and potentially more promising technology platforms for fostering Internet-related commerce) became significant in the late 1990s and early 2000s. Intranet development has surpassed the Internet in terms of revenue—by 2005 more than half of the world's Web sites were commercial in nature.

ADVERSE POSSIBILITIES OF E-COMMERCE

Ned Kock, in his book *Encyclopedia of E-collaboration* (2008), gives several possible negative effects of e-commerce, if the trend continues at the same rate it is currently growing.

Global companies with highly developed online stores may already possess the extra edge to attract potential customers. This may leave beginning companies, eager to enter the online market, without much chance to make an impact. International competition may become skewed and lead to an unhealthy type of oligopoly in the e-commerce world.

Some also fear that e-commerce will allow companies to evade certain tax laws, especially when it comes to international trade. New regulations might need to be set for customs concerning online exchanges.

Others wonder how e-commerce will change the job market. While online business offers jobs to those with newer IT skills, it can also displace many traditional jobs.

SEE ALSO *Consumer Behavior; Customer Relationship Management*

BIBLIOGRAPHY

"Advertising and Marketing on the Internet: Rules of the Road." *Federal Trade Commission,* 2007. Available from: http://www.ftc.gov/bcp/conline/pubs/buspubs/ruleroad.shtm.

Barnatt, Christopher. "Embracing E-Business." *Journal of General Management* 30, no. 1 (2004): 79–97.

Crum, Rachelle. "Personalization: Telling E-Tail Customers What They Really Want." *E-commerce Times.* June 2008. Available from: http://www.ecommercetimes.com/story/63472.html.

Domaracki, Gregory S., and Francois Millot. "The Dynamics of B2B E-Commerce." *AFP Exchange* 21, no. 4 (2001): 50–57.

Gay, Richard, Alan Charlesworth, and Rita Esen. *Online Marketing: A Customer-Led Approach.* Oxford University Press, 2007.

Hof, Robert D. "The eBay Economy." *Business Week,* 25 August 2003, 124–129.

Kock, Ned. *Encyclopedia of E-collaboration.* Idea Group, Inc, 2008.

Lumpkin, G.T., and Gregory G. Dess. "E-Business Strategies and Internet Business Models: How the Internet Adds Value." *Organizational Dynamics* 33, no. 2 (2004): 161–173.

Mullaney, Timothy J., Heather Green, Michael Arndt, Robert D. Hof, and Linda Himelstein. "The E-biz Surprise." *Business Week,* 12 May 2003, 60–68.

Needle, David. "Writing for the Web and Getting It Read." *Small Business Computing.com,* 2008. Available from: http://smallbusinesscomputing.com.

Scanlon, Jessie. "Moving to the Mobile Web." *E-commerce Times,* 2008. Available from: http://www.ecommercetimes.com.

Soen, Ori. "Widgets and Social Apps: The Rules of Engagement." *E-commerce Times,* 2008. Available from: http://ecommercetimes.com.

U.S. Department of Commerce: Economics and Statistics Administration. "Digital Economy." Available from:https://www.esa.doc.gov/2003.cfm.

Vulkan, Nir. *The Economics of E-Commerce: A Strategic Guide to Understanding and Designing the Online Marketplace.* Princeton, NJ: Princeton University Press, 2003.

Yamarone, Richard. *The Trader's guide to Economic Indicators: Updated and Expanded Edition.* Bloomberg Press, 2007.

ELECTRONIC DATA INTERCHANGE AND ELECTRONIC FUNDS TRANSFER

Electronic data interchange (EDI), or electronic data processing, is the electronic transmission of data between computers in a standard, structured format. EDI allows companies to process routine business transactions, such as orders and invoices, more rapidly, accurately, and efficiently than they could through conventional methods of transmission.

Electronic funds transfer (EFT) is the term used for EDI that involves the transfer of funds between financial institutions. Thus, EFTs are only one specific form of EDI, albeit the form most familiar to lay users and bank customers. While EDI has been around for decades, it wasn't until the late 1990s that this basic principle became a driving force in the rollout of electronic commerce, corporate extranets linking suppliers and customers, and related network-based technologies. Advances in EDI, combined with the rise and spread of the Internet, have led to wide use of EFTs at the same time that EDI has almost completely taken over business-to-business data transfers.

THE DEVELOPMENT OF EDI

EDI has been present in the United States in some form since the mid-1960s. Businesses had been trying to resolve the difficulties intrinsic to paper-dependent commercial transactions. These difficulties include transmission speed (because of delays in entering the data onto paper and transporting the paper from sender to receiver); accuracy (because the data had to be recreated with each paper entry); and labor costs (labor-based methods of transmitting data are more expensive than computer-based methods).

In 1968, a group of railroad companies—concerned with the accuracy and speed of intercompany transportation data transmissions—formed an organization called the Transportation Data Coordinating Committee (TDCC) to study the problem and recommend solutions. Large companies such as General Motors and Kmart also reviewed the problems, which arose when they used their intracompany proprietary formats to send electronic data transmis-

sions to outside parties. Because each company had its own proprietary format, there was no common standard among transmitting parties. A company doing business electronically with three other companies would need three different formats, one for each company.

By the 1970s, several industries had developed common EDI programs for their companies within those industries, and a third-party network often administered these systems. Some examples of these systems include ORDERNET, which was developed for the pharmaceutical industry, and IVANS, which was developed for the property and casualty insurance industry. While these systems were standardized for each industry, they likewise could not communicate with other industries' proprietary systems. By 1973 the TDCC began developing a set of standards for generic formats to handle this problem. What emerged were the EDI standards.

HOW EDI WORKS

EDI standards were intended to operate independently of the software and communication technologies responsible for sending and receiving information. EDI functions through a defined set of standards for transmitting business information, allowing data to be interpreted correctly, independent of the platforms used on the computers that transmit and receive the data. When a sender transmits data, such as a purchase order, the EDI translation software converts the proprietary format of the sender's document-processing software into a mutually recognized standard format. When the receiver obtains the data, the EDI translation software automatically converts the standard format into the receiver's proprietary document processing format. Because of the speed and accuracy of an EDI, users find that the system saves time and reduces costs over paper-based business transactions.

This makes EDI quite different from other types of electronic communication. It is unlike a facsimile transmission (fax), which is the transfer of completely unstructured data through a digitized image. EDI also differs from other types of electronic communications among computers, such as electronic mail, network file sharing, or downloading information through a modem. In order to access electronic mail messages, shared network files, or downloaded information, the format of the computer applications of both the sender and the receiver must agree.

MODERN EDI

By 2005, major retailers relied heavily on EDI to exchange purchase orders, invoices, and other information with their trading partners. In a June 2004 poll of twenty retailers, the majority said that they were either adding new trading partners or increasing the number of EDI transactions. Estimates place EDI usage at nearly 90

percent of business-to-business traffic. Retail giants such as Wal-Mart Stores Inc., J.C. Penney Co., Supervalu Inc., and Hallmark Cards Inc. have been regular users of EDI. In fact, Wal-Mart has been one of the most influential companies driving new technology trends.

Since 2003, many companies have turned to a new technology in which data is transmitted over the Internet using the Applicability Statement 2 (AS2) protocol. The AS2 rules describe how to send data securely and ensure that the messages are received. In September 2002, Wal-Mart asked its suppliers to switch from value-added networks (VANs) to AS2. Other companies have followed suit. One company claimed to have cut its costs by 70 percent after switching from a VAN to AS2. However, others have decided not to make the switch because of the costs involved.

Retailers are not the only businesses to take advantage of this technology. The healthcare industry also uses EDI to exchange patient information between medical providers and insurance companies. EDI is such a reliable means of transmitting data that a growing number of third-party payers, including Medicare, Medicaid, and commercial insurers, have started to require providers to submit claims electronically.

The Electronic Data Interchange rule was developed as part of the Health Insurance Portability and Accountability Act (HIPAA) and required compliance by October 16, 2003. This law requires all entities that transmit clinical data (including claims, referrals, and eligibility verification) to use the same electronic data file format. This can be accomplished by purchasing and maintaining a HIPAA-compliant practice management system (PMS) or by transmitting the data through a clearinghouse. The PMS is not the most cost-effective option for smaller entities, as it usually requires an administrator to maintain and upgrade the system as necessary. With the clearinghouse option, the entity sends data to a clearinghouse. The clearinghouse then sends the data to the appropriate recipients in the appropriate format.

EDI STANDARDS

Although the idea of EDI is to standardize data transfers between businesses, there are currently four different sets of EDI standards, all of which first appeared during the 1980s.

- UN/EDIFACT, the system recommended by the United Nations—used predominantly outside of North America.

- ANSI ASC X12, the U.S. system that predominates in North America.

- TRADACOMS, developed by the Article Numbering Association—dominant in the United Kingdom retail industry.

- ODETTE, used in the automotive industry in Europe.

All EDI standards prescribe the formatting, character sets, and data elements that are to be used in the electronic exchange of documents; they also indicate both mandatory and optional pieces of information for a given document and provide rules that structure the document itself. These standards leave a lot of room for constructing documents differently, according to the needs of different businesses and industries. For example, dairy companies may indicate a product's expiration date, while textile companies may indicate color, pattern, and material information. In essence, the standards operate like building codes, allowing different types of construction within a standardized set of rules. Just as two houses can be built "to code" but look completely different, two different documents can use the same EDI standard yet still contain different sets of information.

ELECTRONIC FUNDS TRANSFER

An electronic funds transfer (EFT) is an EDI among financial institutions in which money is transferred from one account to another. Some examples of EFTs include electronic wire transfers; automatic teller machine (ATM) transactions; direct deposit of payroll; business-to-business payments; and federal, state, and local tax payments.

In general, EFT transactions are transferred through an automated clearing house (ACH) operator. An ACH operator is a central clearing facility operated by a private organization or a Federal Reserve bank on behalf of participating financial institutions, to or from which financial institutions transmit or receive ACH transactions. The ACH network is a nationwide system for interbank transfers of electronic funds. It serves a network of regional Federal Reserve banks processing the distribution and settlement of electronic credits and debits among financial institutions.

ACH transactions are stored in an ACH file, which is a simple ASCII-format file that adheres to ACH specifications. A single ACH file holds multiple electronic transactions, each of which carries either a credit or debit value. Typically, a payroll ACH file contains many credit transactions to employees' checking or savings accounts, as well as a balancing debit transaction to the employer's payroll account. An originating bank sends electronic payment instructions to a receiving bank. In those instances, the electronic transfers are processed in batches and settled within a few days.

The National Automated Clearing House Association (NACHA) oversees the ACH network and is primarily responsible for establishing and maintaining its operating rules. All financial institutions moving electronic funds through the ACH system are bound by the NACHA Operating Rules, which cover everything from participant relationships and responsibilities

to implementation, compliance, and liabilities. While the NACHA rules are specific and quite detailed, adhering to a strict set of rules is crucial to the smooth and successful operation of the ACH system.

ONLINE BANKING

With the widespread ownership of PCs and the ever increasing use of the Internet, online banking has surged in popularity. By the beginning of 2005, there were nearly 40 million online banking customers in the United States, a trend largely driven by the popularity of electronic bill payment, a popular EFT function. Banks routinely allow their customers to access account information over the Internet, transfer funds between accounts, make investments, and pay bills online. Many credit card companies and utility companies allow customers to pay their bills online through EFTs, and most taxing authorities have developed systems to enable online filing and payment of taxes.

This trend towards greater use of online banking was given a further boost by the passage of the Check Clearing for the 21st Century Act of 2003, also known as Check 21. This federal law allows banks to transmit checks electronically and substitute electronic images for original paper checks. Check 21 provides many advantages for banks and financial institutions. By transmitting checks electronically, banks can reduce the amount of time it takes to receive funds. This is because they no longer have to wait for another bank to receive paper checks before they send the funds. In addition to saving time, Check 21 has the potential to save banks millions of dollars in transportation and storage costs.

While some consumer-advocacy groups complain that this law increases the chances of fraud, error, bounced check fees, and inconvenience, the Federal Reserve's 2007 Report to Congress on the first two years of the law's implementation indicates that few consumers have filed complaints or expressed concerns. However, the report also noted that during the first 18 months of the law's implementation, many banks had not yet completely adopted practices taking advantage of the new law. As the Federal Reserve report states, "Overall, the banking industry is still adjusting to the new business environment created by Check 21." However, the report also stated that there were indications that the use of Check 21 authority was about to grow rapidly. Given past trends in the use of EDIs and EFTs, it seems likely that the use of Check 21 provisions will soon come to dominate the banking industry.

SEE ALSO *Distribution and Distribution Requirements Planning; Electronic Commerce; The Internet*

BIBLIOGRAPHY
Board of Governors of the Federal Reserve System. *Report to Congress on the Check Clearing for the 21st Century Act of 2003.* April 2007. Available from: http://www.federalreserve.gov/paymentsystems/truncation.

"Check it Out. Check Clearing for the 21st Century Act of 2003 Allows Banks to Transmit Cheques Electronically." *U.S. News & World Report* 8 November 2004.

Jilovec, Nahid. *EDI, UCCnet & RFID: Synchronizing the Supply Chain.* Loveland, CO: 29th Street Press, 2004.

Mearian, Lucas. "First Horizon, SunTrust First Banks to Share Check Images; Southeastern Banks Overcome Technical Issues." *Computerworld* 3 January 2005.

Sliwa, Carol. "EDI: Alive and Well After All These Years. Transactions Increase, Despite XML Option." *Computerworld* 14 June 2004.

Stern, Linda. "That Check Won't Float." *Newsweek* 20 September 2004.

ELECTRONIC FUNDS TRANSFER

SEE *Electronic Data Interchange and Electronic Funds Transfer*

EMPLOYEE ASSISTANCE PROGRAMS

Employee assistance programs (EAPs) are employer-sponsored benefit programs designed to improve productivity by helping employees to identify and resolve personal concerns. Most EAPs employ mental health professionals (usually on a contract basis) to provide confidential counseling and referral services to workers who are experiencing personal problems that interfere with their work attendance or productivity. For example, an EAP might help employees to resolve problems such as drug or alcohol abuse, emotional distress, child or elder care issues, anxiety, marital or family relationship concerns, emotional distress, depression, or financial difficulties. Employees may seek help on a voluntary, confidential basis, or may be referred by a supervisor who suspects that declining job performance is being caused by personal problems.

WELLNESS PROGRAMS

EAPs are often instituted as part of an employee wellness program. Employee wellness is a relatively new human resource management focus that seeks to eliminate certain debilitating health problems (e.g., cancer, heart disease, respiratory problems, hypertension) that can be caused by poor lifestyle choices (e.g., smoking, poor nutrition, lack of exercise, obesity, stress). Stress, for instance, is being

called the fastest-growing occupational disease in the United States by some experts. Excessive amounts of stress can have debilitating health effects, leading to problems like ulcers, colitis, hypertension, headaches, lower back pain, and cardiac conditions. Stressed workers may perform poorly, quit their jobs, suffer low morale, generate conflicts among coworkers, miss work, or exhibit indifference toward coworkers and customers. These stress-induced outcomes cost U.S. businesses somewhere between $150 and $300 billion per year.

Lifestyle-related health problems have become quite prevalent: cancer, heart, and respiratory illnesses alone account for 55.5 percent of all hospital claims, and they can cause workplace problems such as absenteeism, turnover, lost productivity, and increased medical costs. For instance, people who have high blood pressure are 68 percent more likely than others to have medical claims of more than $5,000 per year, and the cost of medical claims for smokers is 18 percent higher than it is for nonsmokers.

To combat these problems, employee wellness programs provide employees with physical fitness facilities, on-site health screenings, and programs to help them quit smoking, manage stress, and improve nutritional habits. The employee wellness program at Apple Computer offers fitness facilities, health education, and preventative medicine that includes:

- A smoking cessation program.
- Seminars on nutrition and weight management.
- Health assessments that measure blood pressure and resting pulse.
- Fitness evaluations that assess cardiopulmonary fitness level, strength, flexibility, body composition, and nutritional status.
- Medical examinations that include physical exams and exercise strength tests to determine cardiovascular fitness.

OTHER FUNCTIONS OF EAPs

EAPs also play an important role in the prevention of (and intervention in) workplace violence incidents. Workplace violence and crisis intervention have received increased emphasis in EAPs since the terrorist attacks of September 11, 2001. Not only can counselors help employees to deal with the emotional impact of crises, they also can provide ongoing preparedness training for companies.

Many EAPs also provide management consultation services. In such cases, a supervisor may request assistance in dealing with a problem employee. EAP counselors might help the supervisor develop initiatives to change the employee's disruptive behavior. "Having an EAP sends a message to employees that the employer cares," noted Kevin M. Quin-

ley in his 2003 article in *Compensation and Benefits Report*. "Just knowing that can be a powerful incentive and hasten an employee's desire to return to work."

COST-EFFECTIVENESS

Companies that implement EAPs have documented improvements in worker health, functioning, productivity, and performance. They also have seen significant reductions in absenteeism, medical-benefits costs, disability and worker's compensation claims, workplace accidents, and employee turnover. Surveys indicate that between 50 and 80 percent of large companies offer EAPs. "Divorce, drug addiction, alcohol abuse, care-giving for a disabled relative, and uncontrolled gambling can all cause employee disabilities and absences that exact a high workplace toll," wrote Quinley. "Addressing these problems—even if they are rooted in nonoccupational causes—can boost employee productivity and curb disability costs."

Employee wellness programs can be both effective for employees and cost-effective for employers. Research indicates that participation in a wellness program increases productivity and reduces both absenteeism and turnover. A study conducted at Mesa Petroleum, for example, found that the productivity difference between participants and non-participants amounted to $700,000 in the program's first year and $1.3 million in the second.

The potential payoff of an EAP is evidenced by a study which found that every dollar spent on an EAP returned an estimated three to five dollars to the company in reduced absenteeism and greater productivity. Other studies have noted that even very small reductions in risk factors are enough to make wellness initiatives pay off. Many employers can expect to recover their costs with only a 0.2 percent reduction in risk factors, and nearly all employers could do so with only a 1 percent reduction. A 2004–2005 study funded by the Centers for Disease Control (CDC) that considered specific companies, found that Union Pacific would have to achieve a 0.49 percent reduction in risk factors for a wellness program to pay for itself, while Motorola's break-even point was 0.67 percent. The number for Dow Chemical was even lower—a mere 0.17 percent. In Dow's case, a 1 percent reduction would yield a return on investment of 300 percent—that is, a return of three dollars for every one dollar spent. For a company with 26,000 employees, that translates to $50 million over five years.

OBSTACLES

Wellness programs can be relatively inexpensive and cost effective, but if they are to work most effectively, they must successfully enlist "high-risk" individuals—those in greatest need of the program. Unfortunately, most employees who participate in wellness programs exhibit fewer risk factors to

begin with, while employees at high-risk tend to stay away. Because at-risk individuals do not seek help, many employee wellness programs fail to meet their objectives. As human-resources consultant Bob Brady noted in *HR Daily Advisor* in 2007, "people with the most severe problems have little interest in lifestyle changes, and even those that are interested find making the changes very difficult."

Employers must, then, find some way to motivate high-risk individuals to participate. Some companies offer incentives such as cash bonuses to individuals who participate, while others impose certain penalties on non-participants. Examples of penalties include higher insurance premiums and deductibles. Other motivational approaches include involving family, bringing initiatives directly to employees in their workplaces, and focusing on high-level management who can model best practices for their employees.

Even with the potential obstacles, human resource managers recognize that wellness programs not only pay their own way, they can be extremely effective tools for improving the workplace, employee morale, productivity, and profits.

SEE ALSO *Human Resource Management; Safety in the Workplace; Stress*

BIBLIOGRAPHY

Attridge, Mark, Tom Amaral, and Mark Hyde. "Completing the Business Case for EAPs: Research on EAP Organizational Services Shows They Save Money and Create Opportunities to Participate in Management Initiatives and Strategic Planning." *Journal of Employee Assistance* 33, no. 3 (August 2003): 23.

Brady, Bob. "Workplace Wellness Programs: Can They Really Pay a 300% Return on Investment?" *HR Daily Advisor* 4 May 2007. Available from: http://hrdailyadvisor.blr.com/archive/2007/05/04/Workplace_employee_wellness_programs_return_on_investment.aspx.

Erfurt, J.C., A. Foote, and M.A. Heirich. "The Cost-Effectiveness of Worksite Wellness Programs for Hypertension Control, Weight Loss, Smoking Cessation, and Exercise." *Personnel Psychology* 45, no. 1 (1992): 5–27.

Kinder, Andrew, Rick Hughes, and Cary L. Cooper. *Employee Well-being Support: A Workplace Resource.* Hoboken, NJ: John Wiley & Sons, 2008.

Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* 4th ed. Cincinnati: South-Western College Publishing, 2006.

Mannion, Lawrence P. *Employee Assistance Programs: What Works and What Doesn't.* Westport, CT: Praeger, 2004.

Quinley, Kevin M. "EAPs: A Benefit That Can Trim Your Disability and Absenteeism Costs." *Compensation & Benefits Report* 17, no. 2 (February 2003): 6.

U.S. Department of Health and Human Services, Federal Occupational Health Service. "Documenting the Value of Employee Assistance Programs." Available from: http://www.foh.dhhs.gov.

Van Den Bergh, Nan. *Emerging Trends for EAPs in the 21st Century.* New York: Haworth Press, 2000.

EMPLOYEE BENEFITS

Employee benefits, sometimes called fringe benefits, are indirect forms of compensation provided to employees as part of an employment relationship. To compete for quality employees in today's marketplace, employers must do more than offer a "fair day's pay." Workers also want a good benefits package. In fact, employees have grown accustomed to generous benefits programs, and have come to expect them.

Employee benefits exist in companies worldwide, but the types and levels of benefits vary greatly from country to country. Generally speaking, companies in industrialized countries in Europe and North America offer employees the most generous benefit packages. Even within the industrialized world, however, employee benefits can vary significantly. For example, employees in Germany and other European countries receive more vacation days than the average U.S. employee. Conversely, most employers in the United States offer some form of medical/health insurance to employees. But most companies in European countries don't offer this employee benefit, because it is provided through government-sponsored socialized medicine programs.

HISTORICAL OVERVIEW

Employee benefits were not a significant part of most employees' compensation packages until the mid-twentieth century. In the United States, for example, benefits comprised only about 3 percent of total payroll costs for companies in 1929. According to the U.S. Chamber of Commerce, however, employee benefits in the United States now comprise approximately 42 percent of total payroll costs. Several things account for the tremendous increase in the importance of employee benefits in the United States. In the 1930s, the Wagner Act significantly increased the ability of labor unions to organize workers and bargain for better wages, benefits, and working conditions. Labor unions from the 1930s to 1950s took advantage of the favorable legal climate and negotiated for new employee benefits that have since become common in both unionized and non-union companies. Federal and state legislation requires companies to offer certain benefits to employees. Finally, employers may find themselves at a disadvantage in the labor market if they do not offer competitive benefit packages.

LEGALLY REQUIRED BENEFITS

In the United States, legislation requires almost all employers to offer the social security benefit, unemployment insurance, and workers' compensation insurance. Larger companies (those with fifty or more employees) are also required to offer employees an unpaid family and medical leave benefit. Each of these legally required benefits is discussed briefly below.

Social Security. The Social Security Act of 1935, as amended, provides monthly benefits to retired workers who are at least sixty-two years of age, disabled workers, and their eligible spouses and dependents. Social Security is financed by contributions made by the employee and matched by the employer, computed as a percentage of the employee's earnings. Monthly benefits are based on a worker's earnings, which are adjusted to account for wage inflation. The Social Security Act also provides Medicare health insurance coverage for anyone who is entitled to retirement benefits. Medicare is funded by a tax paid by the employer and employee. The tax rate for Medicare is a combined 2.9 percent of the employee's total wage or salary income.

Unemployment Insurance. Unemployment compensation provides income to unemployed individuals who lose a job through no fault of their own. Eligible workers receive weekly stipends for twenty-six weeks. The specific amount of the stipend is determined by the wages the claimant was paid during the previous year. Unemployment compensation laws in most states disqualify workers from receiving benefits under the following conditions:

1. Quitting one's job without good cause
2. Being discharged for misconduct connected with work
3. Refusing suitable work while unemployed

Workers' Compensation Insurance. Millions of workers are hurt or become sick for job-related reasons each year. All fifty states have workers compensation insurance laws that are designed to provide financial protection for such individuals. Specifically, these laws require the creation of a no-fault insurance system, paid for by employers. When workers suffer job-related injuries or illnesses, the insurance system provides compensation for medical expenses; lost wages from the time of injury until their return to the job (employees are given a percentage of their income, the size of which varies from state to state); and death (paid to family members), dismemberment, or permanent disability resulting from job-related injuries.

Nationwide, payouts for workers' compensation are relatively high and curbing costs is a priority for many U.S. companies. The increase in costs is primarily due to rising medical costs that now account for as much as 60 percent of total workers' compensation costs in some states. Fraudulent claims also increase costs.

PARENTAL LEAVE
Maternal and paternal leave are both popular topics in today's business world. Currently, federal law requires up to twelve weeks of unpaid leave for new parents, although legislation has been considered to raise the time limit. Globally, this is a very low amount of time, and many other nations, including Canada, offer a longer leave and pay their employees.

While some American employers use the national minimum, other companies recognize the global imbalance and offer their employees paid parental leave, or a contribution plan that will allow them to take more time off with their newborn child. Only California and Washington require paid leave for employees, but recent trends are encouraging more generous behavior in the private sector. One popular method companies are currently practicing is the inclusion of maternal benefits other than parental leave. This can include compensation plans for medical visits, extended health coverage for pregnant workers, or on-site facilities to make newborn and childcare easier for the employee.

OPTIONAL EMPLOYEE BENEFITS
Other employee benefits are quite common, but are not required by federal law in the United States. Some of the more significant optional benefits are summarized below.

Health Insurance. Basic health-care plans cover hospitalization, physician care, and surgery. Traditional fee-for-service health care coverage became increasingly expensive in the late twentieth century. As a result, many U.S. companies adopted "managed care" health care plans. In general, managed care plans cut health care costs for employers by requiring them to contract with health care providers to perform medical services for their employees at an agreed upon fee schedule, in exchange for the employer encouraging (sometimes requiring) the employees to receive their medical care within the approved network of health care providers.

Health Maintenance Organizations (HMOs) are one type of managed care plan. HMOs are organizations of physicians and other health care professionals who provide a wide range of services for a fixed fee. When participants need medical services, they pay a nominal per-visit charge of $5 or $10. Because members visit their health care facility more frequently, potential problems can be discovered and eliminated before they can become major health threats. Thus, HMOs can save money through preventative medicine. However, employees have a limited number of doctors from which to choose and must get approval from a primary care physician for specialized treatment.

Preferred Provider Organizations (PPOs) provide services at a discounted fee in return for the company's participation, which creates increased business for the health facility. Employees may choose the member facility of their choice. PPOs are somewhat less restrictive of patient choice than HMOs, since they allow employees

to receive health care outside the approved network if the employee is willing to shoulder a higher percentage of their health care expenses.

Point of Service (POS) plans are more flexible versions of PPO plans. In a point of service plan, there is a company-authorized network of medical centers and physicians that the employees can choose from, but the employee can also go outside the network for particular medical needs. Some sort of discount usually applies to the medical network the company offers, to encourage employees to stay within the plan, but the choice is theirs.

Employers are not legally required to offer health insurance to employees. If they do, however, the Consolidated Omnibus Budget Reconciliation Act (COBRA) provides for a continuation of health insurance coverage for a period of up to three years for employees who leave a company through no fault of their own. Such employees are required to pay the premiums themselves, but at the company's group rate.

CDHPs and FSAs. Due to rising health costs, many companies are choosing to repeal their health care benefits or offer alternative plans for their employees to find health insurance. In 2004 alone, the average cost of health premiums rose 7.5 percent, and companies continued to raise copayments and deductibles to follow the market. This has resulted in high costs all around for employees seeking competent health insurance, especially for those working in small to mid-sized companies. The smaller companies cannot handle the higher premiums very easily, so they must move the cost onto their employees. Larger companies are able to shoulder more of the cost, but they, too, are struggling under the rising costs.

In response to these issues, several alternative employee benefit plans have gained popularity. One of these options is the Consumer Directed Health Plan, or CDHP, which has gained more support in recent years. In CDHPs, employees work with companies to choose their own health coverage plan, tailored for them specifically. Companies offer CDHPs because analysis has shown employees often chose more streamlined, simpler plans that result in less cost for the companies. Many organizations also give employees the necessary resources to research health coverage so that they can choose the best components for themselves.

According to a 2008 study by Watson Wyatt and the National Business Group on Health (NBGH), more than half of United States companies are expected to offer some kind of CDHP by 2009, and the number is expected to increase even more. In 2006, a similar study found that only 33 percent of companies offered consumer-directed health plans. This increased to 39 percent in 2007, and then to 47 percent in 2008.

Nearly a third of American companies offering CDHP also offer a health savings account, or HSA. Deposits in an HSA account can be used by the employee in the event of a medical crisis, and provide yet another supplement to CDHPs.

Another form of the HSA is the flexible spending account (FSA), an option some companies are offering instead of—or in addition to—the CDHP. At the beginning of each year, employees are able to select specific health benefits and the amount they are willing to pay for the insurance. The cost is then deducted from their pre-tax salary, giving better benefits to both the company and the employee than they would receive.

Voluntary Leave. Voluntary leave includes all the leave companies offer employees for extraneous reasons (vacations, holidays, emergencies, etc). Paid sick leave is especially common for companies to establish and can be offered in a variety of ways. Employers can offer sick days based on how long an employee has been with a company and what position the employee has, or they can offer a flat number of sick days for all employees alike. Other companies use a paid-time-off plan that incorporates sick days, vacation days, and other types of voluntary leave into one cache of days that an employee can draw from when needed. Some states are considering making a certain amount of paid sick leave mandatory.

Long-Term Disability (LTD) Insurance. This benefit provides replacement income for an employee who cannot return to work for an extended period of time due to illness or injury. An LTD program may be temporary or permanent. The benefits paid to employees are customarily set between 50 and 67 percent of that person's income.

Pensions. Pensions, or retirement incomes, may be the largest single benefit most employees receive. In most instances, employees become eligible to participate in company pension plans when they reach 21 years of age and have completed one year of service. After they have satisfied certain age and time requirements, employees become vested, meaning that the pension benefits they have earned are theirs and cannot be revoked. If they leave their jobs after vesting, but before retirement, employees may receive these benefits immediately or may have to wait until retirement age to collect them, depending on the provisions of their specific pension plan.

Employers may choose from two types of pension plans—defined benefit plans or defined contribution plans. Defined benefit plans specify the amount of pension a worker will receive on retirement. Defined contribution plans specify the rate of employer and employee contributions, but not the ultimate pension benefit received by the employee. If a defined benefit plan is

chosen, an employer is committing itself to an unknown cost that can be affected by rates of return on investments, changes in regulations, and future pay levels. Consequently, most employers have adopted defined contribution plans.

Companies establish pension plans voluntarily, but once established, the Employee Retirement Income Security Act of 1974 (ERISA) requires that employers follow certain rules. ERISA ensures that employees will receive the pension benefits due them, even if the company goes bankrupt or merges with another firm. Employers must pay annual insurance premiums to a government agency in order to provide funds from which guaranteed pensions can be paid. Additionally, ERISA requires that employers inform workers what their pension-related benefits include.

Stock Options. A publicly traded company has the ability to offer its employees stock option benefits, if it chooses. If an employee takes part in a stock option plan, then part of their annual income will be invested in the company's own stock, usually at a lower than market price. This allows the company to gain extra investment from willing employees, if so needed, and also to bolster employee interest in the success of the company.

The company must come to an agreement on several factors before offering a stock option benefit plan to employees. First, the company must decide how many shares to set aside for stock option possibilities; this is usually somewhere between 5 percent and 20 percent of outstanding stocks. Many companies also choose to create a vesting time, a period that the employee must stay with the company before his shares become exercisable. This period differs for all companies.

Of course, companies should have full approval of the stockholders before installing an employee stock option plan. If they are too careless, the company can lose a controlling interest through overselling their stock. Along with shareholder approval, the corporate board should create applicable caveats for employee termination, options to exercise stock by employees, and refusal rights to limit the number of shareholders.

401(k) Plans. A 401(k) plan is a retirement plan offered by many companies. Essentially, it offers employees a possible contribution of their income into several different investment opportunities. Some companies offer a limited list of investment plans, while others work with the customer to form an investment plan including stocks the employee is interested in. A portion of the employee's income is then automatically contributed to that investment, with the employer acting as fiduciary. 401(k) plans are protected from creditors under national legislation and have an annual contribution limit of $15,000.

The money withdrawn for 401(k) plans is not taxed as an investment, but only as earned income. If an employee withdraws investment money before retirement, then a fee is taken, usually 10 percent, payable to the IRS. Some employees are allowed to take loans from their 401(k) plans. Such investment opportunities are becoming more commonly considered necessary for a successful retirement in the United States. It is a helpful benefit to offer employees who are not part of a public company, so that they can still participate in a company-contribution stock plan.

Life Insurance Plans. These employee benefits are very common. The premiums for basic life insurance plans are usually paid by the employer. Employee contributions, if required, are typically a set amount per $1,000 in coverage based on age. Employees are often given the opportunity to expand their coverage by purchasing additional insurance.

BENEFITS ADMINISTRATION

Two issues that are crucial to the management of employee benefits are flexible benefit plans and cost containment. Many employers now offer flexible benefit plans, also known as cafeteria plans. These plans allow employees to choose among various benefits and levels of coverage. Under a cafeteria plan, employees may choose to receive cash or purchase benefits from among the options provided under the plan. Flexible benefit plans present a number of advantages:

- Such plans enable employees to choose options that best fit their own needs. New workers, for example, may prefer cash; parents may prefer to invest their benefit dollars in employer-sponsored childcare programs; and older workers may decide to increase their pension and health care coverage.

- Deciding among the various options makes employees more aware of the cost of the benefits, giving them a real sense of the value of the benefits their employers provide.

- Flexible benefit plans can lower compensation costs because employers no longer have to pay for unwanted benefits.

- Employers and employees can save on taxes. Many of the premiums may be paid with pretax dollars, thus lowering the amount of taxes to be paid by both the employee and the employer.

Because of these advantages, flexible benefit plans have become quite popular: such plans are now being offered by many U.S. companies. However, some companies are shying away from cafeteria plans because they create such an administrative burden. Moreover, the use

of such plans can lead to increased insurance premiums because of adverse selection. Adverse selection means that people at high risk are more inclined than others to choose a particular insurance option. For instance, a dental plan option would be chosen primarily by employees with a history of dental problems. Consequently, insurance rates would increase because the number of low-risk individuals enrolled in the programs would be insufficient to offset the claims of high-risk individuals.

Companies can contain costs in several ways. Because an employer's workers' compensation premiums increase with each payout, firms can prevent unnecessary costs by scrutinizing the validity of each claim. Some employers cut costs by deleting or reducing some of the benefits they offer employees. This approach, however, can negatively affect both recruitment and retention. A more viable approach is to offer benefits that are less costly, but equally desirable. Companies can continue to offer attractive benefits by implementing some of the cost-containment strategies discussed next.

Many companies implement utilization review programs in order to cut health care costs by ensuring that each medical treatment is necessary before authorizing payment, and ensuring that the medical services have been rendered appropriately at a reasonable cost. These programs require hospital pre-admission certification, continued stay review, hospital discharge planning, and comprehensive medical case management for catastrophic injuries or illnesses.

Some employers have been able to increase the attractiveness of their benefit programs while holding costs constant, allowing an organization to get more of a "bang for its buck" from these programs.

CURRENT TRENDS IN EMPLOYEE BENEFITS

According to a 2008 article in the *Insurance Journal*, employee benefits are likely to remain balanced in the coming years, despite rising health care costs. Alternatives such as FSAs and other flexible plans are allowing employees to have more choice in health coverage and giving employers ways to save money. In addition to the new forms of coverage, employers are offering more subtle benefits at a lesser cost—benefits such as telecommuting options, stipends for gas, childcare options, and cross-training for skill development.

While some of the more traditional forms of employee benefits have declined in the past few years, other more innovative forms are on the rise. Personal use of company-sponsored cell phones is one of the growing benefit fields, as are fitness-center memberships and on-site vaccinations for employees. Companies are also becoming more family conscious, offering more long-distance calling for business trips, compressing work weeks, and providing legal assistance and other personal benefits.

SEE ALSO *Employee Assistance Programs; Employment Law and Compliance*

BIBLIOGRAPHY

"401(k) Retirement Plan," *Street Authority,* 2008. Available from: http://www.streetauthority.com/terms/num/401k.asp.

Associated Press. "Parental Leave Elusive for Many U.S. Workers." *CNN.com,* 2008. Available from: http://www.cnn.com/2008/LIVING/worklife/06/04/baby.timeoff.ap.

Bridgeford, Lydell C. "Watson/NBGH Study: Employees Still Smitten on CDHPs." *Employee Benefit News.* March 13, 2008.

Cornell Law School. Legal Information Institute. *U.S. Workers Compensation Law.* Ithaca, NY: 1999. Available from:www.law.cornell.edu/topics/workers_compensation.html.

"Despite Slowed Economy, Employee Benefits Remain Stable in 2008." *Insurance Journal,* 2008. Available from: http://www.insurancejournal.com/news/national/2008/06/23/91242.htm.

DiMase, Robert M. "All about Health Care Flexible Spending Accounts." *About.com,* 2008. Available from: http://humanresources.about.com/od/benefits/a/flex_spending.htm.

"Employees bearing more of health cost burden, study shows." *Texas Coalitions Inc,* 2004. Available from: http://texascoalitions.blogspot.com/2004/12/employees-bearing-more-of-health-cost.html.

Heathfield, Susan M. "Paid Sick Days." *About.com,* 2008. http://humanresources.about.com/od/glossarys/g/sick_days.htm.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* Cincinnati: South-Western College Publishing, 2000.

Newman, J.M. *Compensation.* 2nd ed. Boston: Irwin, 1999.

Social Security Administration. Available from: http://www.ssa.gov.

"Stock Option Plans." *All Business,* 2007. Availble from http://www.allbusiness.com /human-resources/benefits-employee-ownership-stock-options/575-1.html.

U.S. Chamber of Commerce. Available from: http://www.uschamber.com.

EMPLOYEE COMPENSATION

Employees receive compensation from a company in return for work performed. While most people think compensation and pay are the same, the fact is that compensation is much more than just the monetary rewards provided by an employer. According to Milkovitch and Newman in their 2005 book, *Compensation,* it is "all forms of financial returns and tangible services and benefits employees receive as part of an employment relationship." The phrase "financial returns" refers to an individual's base salary, as well as short- and long-term incentives. "Tangible services and

benefits" are such things as insurance, paid vacation and sick days, pension plans, and employee discounts.

An organization's compensation practices can have far-reaching effects on its competitive advantage. As compensation expert Richard Henderson notes, "To develop a competitive advantage in a global economy, the compensation program of the organization must support totally the strategic plans and actions of the organization." Labor costs greatly affect competitive advantage because they represent a large portion of a company's operating budget. By effectively controlling these costs, a firm can achieve cost leadership. The impact of labor costs on competitive advantage is particularly strong in service and other labor-intensive organizations, where employers spend between 40 and 80 cents of each revenue dollar on such costs. This means that for each dollar of revenue generated, as much as 80 cents may go to employee pay and benefits.

EXEMPT AND NONEXEMPT JOBS

In terms of compensation, employee payment is divided into different subcategories based on what sort of job the employee has and what payment plan the organization follows for that particular job.

Jobs generally have two classifications, exempt and non-exempt, based on the qualities and position of the employment. Management positions, professional jobs, and many other higher-level positions within an organization are exempt, meaning that they are paid by salary instead of wage. Exempt positions are salary positions, where the employee is paid not by the hour but by a certain interval of time, upon which the employee receives a predetermined amount of payment. Most exempt positions receive higher compensation and benefits than non-exempt jobs but do not receive any added payment for overtime; indeed, people in exempt positions are expected to fulfill expectations often requiring more effort and longer hours than non-exempt positions.

Non-exempt jobs are paid with a wage, an hourly amount. Nearly all entry-level positions and "unskilled" jobs fall in this category, with the employee receiving payment based on a predetermined, hourly wage. This wage, like the salary, is subject to change based on performance reviews. A different wage is usually available for the employee when working overtime, over 40 hours a week, or on holidays. This wage is higher than the normal hourly rate.

Payment systems are also divided according to two different classifications. First, payment can include a base pay, or set amount that the employee will receive. This is the amount that defines the salary or wage; it is set by the organization through the study of many factors, including the market rate and the history of payment for that position. The base pay and the definition of the job are closely connected. The other type of employee compensation is variable pay, or payment based on some type of performance by the employee. Variable pay can take many forms, including incentives and commissions. Most American jobs are a combination of base and variable pay, the ratio changing for different positions, although American jobs tend to have a higher variable pay component than other nations previously did, an organizational decision that is now being adopted globally.

LEGISLATION

Several important forms of national legislation have had a significant effect on employee compensation over the last hundred years of United States business. State legislation has often added onto national legislation, increasing compensation for wages or creating additional requirements for organizations, but federal law has led the way in changing compensation practices.

The Fair Labor Standards Act of 1938 (FLSA) applied to all commercial jobs and set the foundation of regulation of employee compensation. Among other things, the act established the first national minimum wage, set restrictions against the employment of minors by defining oppressive child labor, and enforced time-and-a-half policies for overtime work (the law stating that, for certain positions, employees must be paid 50 percent more per hour for overtime). Several other acts throughout American history have affected the FLSA. The Portal-to-Portal Act, enacted in the 1940s, defined work time and what sort of work had to be paid. Other amendments defined more specifically what businesses were covered by the FLSA, made coverage a requirement for care facilities, public establishments, and all government positions, and raised the federal minimum wage several times.

Also important to the history of employee compensation is the Equal Pay Act of 1963, which was created in order to prevent discrimination in pay, especially sexual discrimination. This act included several reasons Congress had for enforcing equal payment for the sexes, citing economic gain and living standards. The act also focused on requiring payment systems to be based solely on skills and experience, rather than gender.

The Employee Retirement Income Security Act of 1974 required a minimum pension plan amount for businesses, and established a series of tax laws to govern the use of pension plan payments.

In 2004, the government enacted several changes to the FLSA, called FairPay. FairPay dealt mostly with reclassifying job positions and their definitions. This caused many jobs to be switched between the categories of exempt and non-exempt. Some supervisors who had previously been on wages were required to switch to salaries, losing their overtime benefits. Other employees,

especially in supportive roles of business administration, were moved from wages to exempt status. These changes were made in order to classify jobs more according to their functions and responsibilities than to their titles.

Most recently, the *Fair Minimum Wage Act of 2007* again raised the federal wage level, from $5.25 to $7.25 an hour, to better represent state and private wages across the nation. This act will reach completion in 2009.

INFLUENCE OF PAY ON EMPLOYEE ATTITUDES AND BEHAVIOR

Since compensation practices heavily influence recruitment, turnover, and employee productivity, it is important that applicants and employees view these practices in a favorable light. In the following section, we discuss how people form perceptions about a firm's compensation system and how these perceptions ultimately affect their behavior.

Equity is an important concern, so individuals responsible for developing a firm's compensation system need to understand how perceptions of equity are formed. Equity theory, formulated by J. Stacy Adams, attempts to provide such an understanding. The theory states that people form equity beliefs based on two factors: inputs and outcomes. Inputs (I) refer to the perceptions that people have concerning what they contribute to the job (e.g., skill and effort). Outcomes (O) refer to the perceptions that people have regarding the returns they get (e.g., pay) for the work they perform. People judge the equity of their pay by comparing their outcome-to-input ratio (O/I) with another person's ratio. This comparison person is referred to as one's "referent other." People feel equity when the O/I ratios of the individual and his or her referent other are perceived as being equal. A feeling of inequity occurs when the two ratios are perceived as being unequal. For example, inequity occurs if a person feels that he or she contributes the same input as a referent other, but earns a lower salary.

A person's referent other could be any one of several people. People may compare themselves to others:

- Doing the same job within the same organization
- Working in the same organization, but performing different jobs
- Doing the same job in other organizations

For example, an assistant manager at a Wal-Mart department store might compare her pay to other assistant managers at Wal-Mart, to Wal-Mart employees in other positions (either above or below her in the organizational hierarchy), or to assistant managers at Kmart department stores.

While the mechanism for choosing a referent other is largely unknown, one study found that people do not limit their comparisons to just one person; they have several referent others. Thus, people make several com-

parisons when they assess the fairness of their pay; perceived fairness is achieved only when all comparisons are viewed as equitable. When employees' O/I ratios are less than that of their referent others, they feel they are being underpaid; when greater, they feel they are being overpaid. According to equity theory, both conditions produce feelings of tension that employees will attempt to reduce in one of the following ways:

1. Decrease inputs by reducing effort or performance.

2. Attempt to increase outcomes by seeking a raise in salary.

3. Distort perceptions of inputs and/or outcomes by convincing themselves that their O/I ratio already is equal to that of their referent other.

4. Attempt to change the inputs and/or outcomes of their referent other(s). For example, they may try to convince their referent other(s) to increase inputs (e.g., work harder for their pay).

5. Choose a new referent other whose O/I ratio already is equal to their own.

6. Escape the situation. This response may be manifested by a variety of behaviors, such as absenteeism, tardiness, excessive work-breaks, or quitting.

While equity theory poses six possible responses to inequity, only two of them typically occur (namely, numbers 1 and 6). Research findings, for example, have linked underpayment to increases in absenteeism and turnover, and to decreases in the amount of effort exerted on the job. These linkages are especially strong among individuals earning low salaries.

Contrary to equity theory's predictions, these responses occur only when employees believe they are underpaid. Overpaid individuals do not respond because they feel little, if any tension, and thus have no need to reduce it. (The research findings on the issue of overpayment find overpayment to be either just as satisfying as equity, or somewhat dissatisfying but not nearly as dissatisfying as underpayment.) When feeling underpaid, why do some people choose to decrease their inputs, while others choose to escape the situation? A study found that reaction to inequity depends on the source of the comparison; people react differently depending on whether they judge equity on the basis of external (referents outside of the organization) or internal (referents employed by the individual's own organization) comparisons. When perceptions of inequity are based on external comparisons, people are more likely to quit their jobs. For instance, a nurse working for Hospital A may move to Hospital B if the latter pays a higher salary. When based on internal comparisons, people are more likely to remain at work, but reduce their inputs (e.g., become less willing to help others with problems, meet deadlines, and/or take initiative).

From the previous discussion, one may conclude that employees will believe their pay is equitable when they perceive that it:

- Is fair relative to the pay received by coworkers in the same organization (internal consistency).

- Is fair relative to the pay received by workers in other organizations who hold similar positions (external competitiveness).

- Fairly reflects their input to the organization (employee contributions).

ACHIEVING INTERNAL CONSISTENCY

To achieve internal consistency, a firm's employees must believe that all jobs are paid what they are "worth." In other words, they must be confident that company pay rates reflect the overall importance of each person's job to the success of the organization. Because some jobs afford a greater opportunity than others to contribute, those holding such jobs should receive greater pay. For instance, most would agree that nurses should be paid more than orderlies because their work is more important; that is, it contributes more to patient care, which is a primary goal of hospitals.

For pay rates to be internally consistent, an organization first must determine the overall importance or worth of each job. A job's worth typically is assessed through a systematic process known as job evaluation. In general, the evaluation is based on "informed judgments" regarding such things as the amount of skill and effort required to perform the job, the difficulty of the job, and the amount of responsibility assumed by the jobholder.

Job evaluation judgments must be accurate and fair, given that the pay each employee receives is so heavily influenced by them. Most firms create a committee of individuals, called a job evaluation committee, for the purpose of making the evaluations. Because those serving on the committee represent the organization's various functional areas, collectively they are familiar with all the jobs being evaluated. Such individuals typically include department managers, vice presidents, plant managers, and HR professionals (e.g., employee relations specialists and compensation managers). The committee chair usually is an HR professional or an outside consultant.

Perhaps the two most serious problems with job evaluation ratings are subjectivity and the rapidity with which jobs fundamentally change, both of which can cause inaccurate and unreliable ratings. In order to minimize subjectivity, the rating scales used to evaluate jobs must be clearly defined, and evaluators should be thoroughly trained on how to use them. Moreover, the evaluators should be provided with complete, accurate, and up-to-date job descriptions. The second issue is more difficult to address. Due largely to changes in technology,

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Exhibit 1

Compensable Factors Used in the Point-Factor Method of Job Evaluation

Compensable Factor	Rating Criteria
Skill/know-how	Education Experience Knowledge
Effort	Physical effort Mental effort
Responsibility	Judgement/decision-making Internal business contacts Consequence of error Degree of influence Supervisory responsibilities Responsibility for independent action Responsibility for machinery/equipment Fiscal responsibility Responsibility for confidential information
Working conditions	Risks Comfort Physical demands Personal demands

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jobs now change so rapidly and so fundamentally that evaluation results quickly become out of date.

Job evaluation process is analogous to performance appraisal in that evaluators are asked to provide certain ratings on a form. Job evaluation ratings, however, focus on the requirements of the job rather than on the performance of the individual jobholder. Although several methods may be used to evaluate jobs, the most common approach is the point-factor method. Using this method, jobs are evaluated separately on several criteria, called compensable factors. These factors represent the most important determinants of a job's worth. A list of some commonly used factors and the criteria upon which they are judged appear in Exhibit 1.

The development of a point-factor rating scale consists of the following steps:

1. Select and carefully define the compensable factors that will be used to determine job worth.

2. Determine the number of levels or degrees for each factor. The only rule for establishing the number of degrees is that some jobs should fall at each level.

3. Carefully define each degree level. Each adjacent level must be clearly distinguishable.

4. Weight each compensable factor in terms of its relative importance for determining job worth.

5. Assign point values to the degrees associated with each compensable factor. Factors assigned greater weights in Step 4 would be allotted a greater number of possible points for each degree level.

When completing the job evaluation ratings, the evaluators use job descriptions to rate each job, one factor at a time until all jobs have been evaluated on all factors. They then calculate a total point value for a job by summing the points earned on each compensable factor.

This approach to job evaluation is difficult and time-consuming. However, most organizations believe that it is well worth the effort. If properly conducted, the overall score for each job should reflect its relative worth to the organization, thus enabling the firm to establish internal consistency.

When job evaluations have been completed, jobs are grouped into pay grades based on the total number of points received. Jobs with the same or similar point values are placed in the same grade. For example, consider jobs that are rated on a scale from 1 to 1,000. All jobs earning up to 100 points could be assigned to pay grade one, jobs earning 101 to 200 to pay grade two, and so forth.

Administrators use pay grades because, without them, firms would need to establish separate pay rates for each job evaluation point score. Once jobs are classified into grades, all jobs within the same grade are treated alike for pay purposes; that is, the same range of pay applies to each job in a grade.

As companies develop pay grade systems, they must decide how many pay grades to establish. Most firms use thirty to fifty pay grades. However, some use as many as one hundred or more, while others use as few as five or six. The practice of limiting the number of pay grades eases the firm's administrative burdens. However, using a limited number of grades creates a situation in which jobs of significantly different worth fall into the same grade and receive the same pay. This outcome could lead to equity problems. For instance, registered nurses may feel underpaid if classified in the same pay grade as nursing aides.

ACHIEVING EXTERNAL COMPETITIVENESS

A firm achieves external competitiveness when employees perceive that their pay is fair in relation to what their counterparts in other organizations earn. To become externally competitive, organizations must first learn what other employers are paying and then make a decision regarding just how competitive they want to be. They then establish pay rates consistent with this decision. Following is an examination of how these steps are carried out.

The firm begins by conducting or acquiring a salary survey. This survey provides information on pay rates offered by a firm's competitors for certain benchmark jobs (i.e., jobs that are performed in a similar manner in all companies and can thus serve as a basis for making meaningful comparisons). Some firms gather this information from existing surveys already conducted by others, such as those produced by the Bureau of Labor Statistics. Trade associations also conduct surveys routinely for their members, or companies may hire consulting firms to gather such information. Salary surveys conducted by others should be used when they contain all the information needed by the company in question. When no such surveys exist, companies generally conduct their own.

After the pay practices of other companies have been identified, the organization must determine how competitive it wants to be (or can afford to be). Specifically, it must set a pay policy stipulating how well it will pay its employees relative to the market (i.e., what competitors pay for similar jobs). The determination of a pay policy is a crucial step in the design of a pay system. If pay rates are set too low, the organization is likely to experience recruitment and turnover problems. If set too high, however, the organization is likely to experience budget problems that ultimately may lead to higher prices, pay freezes, and layoffs.

Once market rates for jobs are determined and a pay policy is established, an organization must price each of its jobs. Since market rates identified by a salary survey usually are restricted to benchmark jobs, how do organizations determine these rates for their non-benchmark jobs? Using the data collected on the benchmark jobs, an organization would determine the statistical relationship (i.e., simple linear regression) between job evaluation points and prevailing market rates. This regression line is referred to as the pay policy line. The appropriate pay rates for non-benchmark jobs are set based on this line.

EXECUTIVE COMPENSATION

Recently, the payment plans and benefits for the top executives in American business have been questioned. The national attention that the tax and fraud scandals of 2000–2002 brought to companies also shed light on the profits chief executives were making, especially their bonus and benefit packages, which many felt to be unfairly inflated based on the returns investors were receiving and the compensation of other employees in the companies. Amendments to the Sarbanes-Oxley Act, carried out in 2006, require that executive compensation pertaining directly to investor information must be disclosed in a separate section of financial reports. This led to a wider knowledge of executive payment practices among the public than had previously been seen before, and began a series of critical examinations of companies and their treatment of top management.

These questionable compensation plans applied to many in top management, including chief executive officers, mergers and acquisitions executives, top tax executives, top sales executives, and top diversity executives. According to a Watson Wyatt analysis, people in these positions received a

2007 pay increase of 11.4 percent or more, with merger and acquisition officers receiving the highest average pay increase. Recent legislation pertaining to executive payment includes the Office of Federal Procurement Policy's 2008 compensation cap establishing a maximum yearly salary for contracted companies and certain management positions within them. The maximum amount for government contract management positions—which combines salaries, benefits, and other extra executive profits—is $612,196.

In response to the continuing criticism, companies are taking a closer look at how they pay executives and how much payment is financially responsible, healthy for their business, and encouraging to their stockholders. According to a 2008 *Wall Street Journal* article by Phred Dvorak, approximately 15 percent of Fortune 500 companies took a closer look at their payment systems when paying executives the 2007 salary, taking into account such factors as accumulated wealth. This number is nearly double the amount of firms who accounted for such factors in 2006.

As an example, in 2007 Waddell & Reed Financial Inc. decided to halt further contributions to the retirement fund of the CEO Henry Herrmann. Their review of his accumulated wealth showed that, during his thirty-six-year career, he had amassed roughly $70 million in stocks, deferred compensation, bonuses, and other benefits. The company decided he had sufficient funds to retire and stopped the retirement contribution plan. Although companies' reactions are varied, Waddell & Reed may not be alone in their compensation dilemmas—compensation tracker Equilar has found the average stock owned by a large-company CEO in 2007 was worth about 56.7 million dollars. While some companies are declaring such stock gains to be prohibitive, others argue that such stock investments give executives incentives to perform well.

Performance Plans for Executives. There are many forms of performance plans for executives, but most involve the company reaching certain goals under the executive's supervision. Often, a third-party compensation committee is created solely to supervise the compensation plans for top executives, and avoid public criticism or unfair payment practices.

Some performance plans divide compensation requirements into two different areas. First, the compensation committee looks at what accomplishments the company intended to make in the past year under the executive's guidance, and how far the company has progressed in reaching those goals. Second, the committee takes into account leadership qualities and judgment decisions made by the executive, a more flexible factor including personal skills and management talent. A ratio can be formed for these two areas, assigning each a percentage of overall importance.

Other plans divide the executive's accomplishments down even further, taking into account vision, team-building, and accountability. Often, such plans are either long-term or short-term. Short-term plans will evaluate recent goals and decisions made by the executive, while long-term analysis extends throughout the past year. Benefits are awarded based on similar plans, which can factor in growth of company stock and evaluation by other board members.

According to revenue laws established in 1993 to help create fair practice in executive compensation, there are limitations to how much overall tax deductions a company can take from the benefits and payment of its five top executives, *unless the payment is performance based*. The tax deduction limit was $1 million, which was intended to be the cap for executive salaries for commercial companies, all other benefits being limited to stock options. Performance plans have since evolved to include other benefit forms, but the key component remains stock options.

Deferred Compensation. Most executive retirement plans, granted in the form of a salary percentage or stock options, are considered deferred compensation. It is deferred because the money is set aside in some type of savings account or investment for the executive, until such time as it can be accessed. This is different from the retirement package an executive often receives when stepping down.

Deferred compensation can be of two different types, qualified and nonqualified, as pertaining to taxes. Qualified deferred compensations are those which are subject to tax laws, including the million dollar limit deductable for the company granting the compensation. These are the more traditional, common sort of deferred compensation plan. Some companies, however, choose to grant their executives unqualified deferred compensation, which is not subject to the same tax laws and usually results in a larger retirement package for the executive. The company accomplishes unqualified compensation by setting the money aside within the organization, not legally granting it to the executive but retaining it in a separate account. Any money earned by the fund is reinvested, until the executive retires. The deferred compensation, however, is based upon the success of the company, and if the company becomes insolvent, the fund—and the retirement package—are at risk.

Legislation is currently being debated in Congress on increasing taxes and restrictions for nonqualified deferred compensation, since it is seen by some as a loophole in the current laws.

Intermediate Sanctions. Intermediate sanctions are used by the IRS to administer excise taxes to individuals who are believed to have improperly or illegally benefited from a commercial company transaction. Although this is a broad definition, it is meant to apply primarily to family

members, organizations, and company executives who receive benefits from their company greater than the IRS considers reasonable. The sanctions can be applied to the individual receiving the benefits and to anyone who has given permission for such benefits, such as other members of the corporate board.

While these sanctions limit the amount of payment and extra benefits executives can be granted, they also function on more subtle levels. Intermediate sanctions are most often applied by the IRS in cases where the individual profits indirectly from the company's actions. For instance, the executive might receive a certain amount of stock as part of a deferred compensation plan, but also receives a second amount of stock from a dummy organization as a "gift" or "bonus." Overall, the executive has profited more from the exchange than the company could have, and is open to intermediate sanctions. Other arrangements can also lead to sanction penalties by the IRS.

Usually, the money from such activities, plus interest, is returned to the company, and the individual is penalized, usually at 25 percent of the excess benefit as decided by the IRS. If the individual does not return the profits to the organization, or pay the penalty fee within the taxable period, the required tax shoots up to 200 percent of the excess benefit received. A tax of 10 percent might also be imposed on any manager or board member who took part in the decision to impart the excess benefit.

Shareholder Voting. There is a current push for legislation requiring some sort of shareholder vote authorizing executive compensation, known as the "Say on Pay" law. This would require an annual vote by all shareholders in the company on compensation methods and amounts. Although this legislation has not yet been passed by Congress, it has been submitted numerous times in 2007–2008. Many organizations are against the "Say on Pay" law, fearing it would turn compensation plans in a lengthy bureaucratic bargaining system.

FORMS OF COMPENSATION

As stated before, American companies often used a mixture of base and variable pay to determine an employee's compensation. The amount of variable pay is usually larger in American than internationally, where the term "compensation" most often means extra benefits and "remuneration" means the wages or salaries received.

Globally, there are several considerations that must be made when creating a compensation (or remuneration) plan for outsourced workers or international plants. A company should understand what counts as a healthy standard of living for the nation they are working with, as well as knowing what forms of benefits are acceptable. Some changes might be needed for incentive plans in different cultures that put a stronger emphasis on different values or company qualities than the United States does in its incentives. Also, tax laws and data security may be different in other countries, leading to necessary changes in compensation plans.

When creating forms of compensation, whether at home or internationally, there are several factors companies should take into consideration. For instance, any changes in employee compensation will affect the value propositions made to potential employees, Skilled employees will naturally be more attracted to companies that offer above-market rates.

SEE ALSO *Employee Benefits; Employee Evaluation and Performance Appraisals; Human Resource Management*

BIBLIOGRAPHY

Adams, J.S. "Injustices in Social Exchange." In *Advances in Experimental Social Psychology.* 2nd ed., ed. Berkowitz. New York: Academic Press, 1965.

Cummings, John. "Rightsizing the Risks Around Employee Rewards." *Business Finance,* 2008. Available from: http://businessfinancemag.com/.

Dvorak, Phred. "Firms Measure a CEO's (Net) Worth." *Wall Street Journal,* 2008. Available from: http://online.wsj.com/article/SB121418172473595653.html.

Henderson, Richard I. *Compensation Management in a Knowledge-Based World.* 9th ed. Upper Saddle River, NJ: Prentice Hall, 2003.

"Intermediate Sanctions." *Compensation Resources, Inc.* Compensation Resources, 2008.

"Issues." *Center on Executive Compensation,* 2008. Available from: http://www.execcomp.org/positions/index.aspx.

Kleiman, Lawrence S. *Human Resource Management: A Tool for Competitive Advantage.* Cincinnati, OH: South-Western College Publishing, 2000.

Mathis, Robert L., and John H. Jackson. *Human Resource Management.* 11th ed. Mason, OH: Thomson/South-Western, 2006.

McNamara, Carter. "Employee Compensation in the U.S." *Field Guide to Leadership and Supervision,* 2008. Available from: http://www.managementhelp.org/pay_ben/cmpnstn/cmpnstn.htm.

"Mergers and Acquisitions Executives Get Biggest Raises, Watson Wyatt Data Services Reports." *Watson Wyatt Data Services,* 2007. Available from: http://www.wwds.com/SurveyPDFs/PR_MA_0711.pdf.

Milkovich, George T., and Jerry M. Newman. *Compensation.* 8th ed. New York: McGraw-Hill/Irwin, 2005.

"OFPP Issues 2008 Executive Compensation Cap." *Cherry, Bekaert, & Holland,* 2008. Available from: http://www.cbh.com/n_govcon-enews-0308-exec-comp.php.

Parker, Gary L. "Adapting to Global and Local Compensation Trends." *Executive Resources Ltd,* 2003. Available from: http://www.erlimited.com/.

"SEC Updates Executive Compensation Reporting Guidance." *Goodwin Procter LLP.* Goodwin Procter, 2008.

U.S. Department of Labor, Bureau of Labor Statistics. "Compensation and Working Conditions." Available from: http://bls.gov/opub/cwc.

EMPLOYEE EVALUATION AND PERFORMANCE APPRAISALS

Most companies have a formal performance appraisal system in which employee job performance is rated on a regular basis, usually once a year. A good performance appraisal system can greatly benefit an organization. It helps direct employee behavior toward organizational goals by letting employees know what is expected of them, and it yields information for making employment decisions, such as those regarding pay raises, promotions, and discharges.

Developing and implementing an effective system is no easy task, however. For instance, one study found that a majority of companies—65 percent—are dissatisfied with their performance appraisal systems. Analysts have found that a fairly low degree of reliability and validity remains a major bug in most appraisal systems. Many such systems are met with considerable resistance by those whose performance is being appraised, thus hampering the possibilities for effectiveness. While accurate and informative appraisal systems can be a major asset to a business, they are too often an unrealized goal.

There are three major steps in the performance appraisal process: identification, measurement, and management. With identification, the behaviors necessary for successful performance are determined. Measurement involves choosing the appropriate instrument for appraisal and assessing performance. Management, which is the ultimate goal, is the reinforcing of good performance and the correction of poor performance. Each step is described below. Additionally, management by objectives, which involves evaluating performance without a traditional performance appraisal, is described.

IDENTIFICATION

The organization must determine for each job family the skills and behaviors that are necessary to achieve effective performance. The organization should identify dimensions, which are broad aspects of performance. For instance, "quality of work" is a dimension required in many jobs. To determine which dimensions are important to job performance, the organization should rely on an accurate and up-to-date job analysis. Job descriptions written from job analyses should offer a detailed and valid picture of which job behaviors are necessary for successful performance.

In the identification stage, the company must also choose who will rate employee performance. Supervisors, peers, and the employees themselves may provide performance ratings. In most instances, performance appraisals are the responsibility of the immediate supervisor of an employee. Supervisors rate performance because they are usually the ones most familiar with the employee's work. Additionally, appraisals serve as management tools for supervisors, giving them a means to direct and monitor employee behavior. Indeed, if supervisors are not allowed to make the appraisals, their authority and control over their subordinates could be diminished.

While supervisory ratings can be quite valuable, some companies have added peer appraisals to replace or supplement those given by the supervisor. Naturally, peers and supervisors each view an individual's performance from different perspectives. Supervisors usually possess greater information about job requirements and performance outcomes. On the other hand, peers often see a different, more realistic view of the employee's job performance because people often behave differently when the boss is present. Using peer ratings to supplement supervisory ratings may thus help to develop a consensus about an individual's performance. It may also help eliminate biases and lead to greater employee acceptance of appraisal systems.

Potential problems may limit the usefulness of peer ratings, however, especially if they are used in lieu of supervisory ratings. First, the company must consider the nature of its reward system. If the system is highly competitive, peers may perceive a conflict of interest. High ratings given to a peer may be perceived as harming an individual's own chances for advancement. Second, friendships may influence peer ratings. A peer may fear that low ratings given to a colleague will harm their friendship or hurt the cohesiveness of the work group. On the other hand, some peer ratings may be influenced by a dislike for the employee being rated.

Some organizations use self-ratings to supplement supervisory ratings. As one might expect, self-ratings are generally more favorable than those made by supervisors and peers and therefore may not be effective as an evaluative tool. However, self-ratings may be used for employee development. Their use may uncover areas of subordinate-supervisor disagreement, encourage employees to reflect on their strengths and weaknesses, lead to more constructive appraisal interviews, and make employees more receptive to suggestions.

With 360-degree feedback, employee performance appraisals are a group effort. The employee receives performance feedback from his or her supervisor and four to eight peers, reporting staff members, coworkers and customers. Most 360-degree feedback tools also include a self-assessment. Using 360-degree feedback, each employee understands how his effectiveness—as an employee, coworker, or staff member—is viewed by others. The most effective 360-degree feedback processes provide feedback based on behaviors that other employees can see. The feedback provides insight about the skills and behaviors

desired in the organization to accomplish the mission, vision, and goals, and live the values.

Companies using 360-degree feedback have high expectations of the process, yet these often are not realized. Using this system, appraisers fail to connect the employee's work to the corporate goals. The anonymity of the process leaves employees with insufficient information and it is difficult for employees to attain follow-up information. Inexperienced raters (a problem in itself) tend to spend too much time focusing on employees' negative attributes. Finally, the 360-degree process is a daunting administrative task that creates paper and data entry overload.

MEASUREMENT

Once the appropriate performance dimensions have been established for jobs, the organization must determine how best to measure the performance of employees. This raises the critical issue of which rating form to use. In the vast majority of organizations, managers rate employee job performance on a standardized form. A variety of forms exist, but they are not equally effective. To be effective, the form must be relevant and the rating standards must be clear. Relevance refers to the degree to which the rating form includes necessary information, that is, information that indicates the level or merit of a person's job performance. To be relevant, the form must include all the pertinent criteria for evaluating performance and exclude criteria that are irrelevant to job performance.

The omission of pertinent performance criteria is referred to as criterion deficiency. For example, an appraisal form that rates the performance of police officers solely on the basis of the number of arrests made is deficient because it fails to include other aspects of job performance, such as conviction record, court perform-ance, number of commendations, and so on. Such a deficient form may steer employee behavior away from organizational goals; imagine if police officers focused only on arrests and neglected their other important duties.

When irrelevant criteria are included on the rating form, criterion contamination occurs, causing employees to be unfairly evaluated on factors that are irrelevant to the job. For example, criterion contamination would occur if an auto mechanic were evaluated on the basis of personal cleanliness, despite the fact that this characteristic has nothing to do with effective job performance.

Performance standards indicate the level of performance an employee is expected to achieve. Such standards should be clearly defined so that employees know exactly what the company expects of them. For instance, the standard "load a truck within one hour" is much clearer than "work quickly." Not only does the use of clear performance standards help direct employee behavior, it also helps supervisors provide more accurate ratings; two supervisors may disagree on what the term "quickly" means, but both attribute the same meaning to "one hour."

To meet the standards described in the previous section, a firm must use an effective rating form. The form provides the basis for the appraisal, indicating the aspects or dimensions of performance that are to be evaluated and the rating scale for judging that performance. Human resources (HR) experts have developed a variety of instruments for appraising performance. A description of the most commonly used instruments, along with their strengths and weaknesses, is given in the following paragraphs. A summary of these instruments appears in Exhibit 1. It should be noted, however, that companies can create additional types of instruments. For instance, they can rate employees on job task performance using graphic or behavior rating scales.

Exhibit 1

Rating Errors and their Likely Causes

Errors	Causes					
	A	B	C	D	E	F
Leniency		X		X		X
Severity		X		X		
Central tendency	X	X				
Halo		X				X
Implicit personality theory					X	
Recency			X			

Key:
A   administrative procedures
B   poorly defined rating standards
C   memory decay
D   political considerations
E   incomplete information
F   rater's lack of conscientiousness

Employee Comparison Systems. Most appraisal instruments require raters to evaluate employees in relation to some standard of excellence. With employee comparison systems, however, employee performance is evaluated relative to the performance of other employees. In other words, employee comparison systems use rankings, rather than ratings. A number of formats can be used to rank employees, such as simple rankings, paired comparisons, or forced distributions. Simple rankings require raters to rank-order their employees from best to worst, according to their job performance. When using the paired comparison approach, a rater compares each possible pair of employees. For example, Employee 1 is compared to Employees 2 and 3, and Employee 2 is compared to Employee 3. The employee winning the most "contests" receives the highest ranking. A forced distribution approach requires a rater to assign a certain percentage of employees to each category of excellence, such as best, average, or worst. Forced distribution is analogous to grading on a curve, where a certain percentage of students get As, a certain percentage get Bs, and so forth.

Employee comparison systems are low cost and practical; the ratings take very little time and effort. Moreover, this approach to performance appraisal effectively eliminates some of the rating errors discussed earlier. Leniency is eliminated, for instance, because the rater cannot give every employee an outstanding rating. In fact, by definition, only 50 percent can be rated as being above average. By forcing raters to specify their best and worst performers, employment decisions such as pay raises and promotions become much easier to make.

Employee comparison systems are plagued with several weaknesses. Because the rating standards for judging performance are vague or nonexistent, the accuracy and fairness of the ratings can be seriously questioned. Moreover, employee comparison systems do not specify what a worker must do to receive a good rating and, thus, they fail to adequately direct or monitor employee behavior. Finally, companies using such systems cannot compare the performance of people from different departments fairly. For example, the sixth-ranked employee in Department A may be a better performer than the top-ranked employee in Department B.

Graphic Rating Scale. A graphic rating scale (GRS) presents appraisers with a list of dimensions, which are aspects of performance that determine an employee's effectiveness. Examples of performance dimensions are cooperativeness, adaptability, maturity, and motivation. Each dimension is accompanied by a multi-point (e.g., 3, 5, or 7) rating scale. The points along the scale are defined by numbers and/or descriptive words or phrases that indicate the level of performance. The midpoint of the scale is usually anchored by such words as "average," "adequate," "satisfactory," or "meets standards."

Many organizations use graphic rating scales because they are easy to use and cost little to develop. HR professionals can develop such forms quickly, and because the dimensions and anchors are written at a general level, a single form is applicable to all or most jobs within an organization. Graphic rating scales do present a number of problems, however. Such scales may not effectively direct behavior; that is, the rating scale does not clearly indicate what a person must do to achieve a given rating, thus employees are left in the dark as to what is expected of them. For instance, an employee given a rating of 2 on "attitude" may have a difficult time figuring out how to improve.

Graphic rating scales also fail to provide a good mechanism for providing specific, non-threatening feedback. Negative feedback should focus on specific behaviors rather than on the vaguely defined dimensions the GRSs describe. For example, if told that they are not dependable, most employees would become angered and defensive; they would become less angry and defensive if such feedback were given in behavioral terms: "Six customers complained to me last week that you did not return their phone calls."

Another problem with GRSs concerns rating accuracy. Accurate ratings are not likely to be achieved because the points on the rating scale are not clearly defined. For instance, two raters may interpret the standard of "average" in very different ways. The failure to clearly define performance standards can lead to a multitude of rating errors (as noted earlier) and provides a ready mechanism for the occurrence of bias. U.S. courts consequently frown on the use of GRSs. One court noted that ratings made on a graphic rating scale amounted to no more than a "subjective judgment call," and ruled that such rating scales should not be used for promotion decisions because of the potential bias inherent in such a subjective process.

Behaviorally Anchored Rating Scales. A behaviorally anchored rating scale (BARS), like a graphic rating scale, requires appraisers to rate employees on different performance dimensions. The typical BARS includes seven or eight performance dimensions, each anchored by a multi-point scale. But the rating scales used on BARS are constructed differently than those used on graphic rating scales. Rather than using numbers or adjectives, a BARS anchors each dimension with examples of specific job behaviors that reflect varying levels of performance.

The process for developing a BARS is rather complex. Briefly, it starts with a job analysis, using the critical incident technique. This involves having experts generate a list of critical incidents—or specific examples of poor, average, and excellent behaviors—that are related to a certain job. The incidents are then categorized by dimension. Finally, a

rating scale is developed for each dimension, using these behaviors as "anchors" to define points along the scale.

When initially formulated, BARS were expected to be vastly superior to graphic rating scales. HR experts thought the behavioral anchors would lead to more accurate ratings because they enabled appraisers to better interpret the meaning of the various points along the rating scale. That is, rather than having the rater try to pinpoint the meaning of a vague anchor such as "excellent," the rater would have improved accuracy by having a critical incident as an anchor. As we shall see, however, this expectation has not been met. Perhaps the greatest strength of BARS is its ability to direct and monitor behavior. The behavioral anchors let employees know which types of behavior are expected of them and gives appraisers the opportunity to provide behaviorally-based feedback.

The superiority of BARS over graphic rating scales has not been substantiated by research. In fact, the great majority of studies on this topic have failed to provide evidence that justifies the tremendous amount of time and effort involved in developing and implementing BARS. The failures of BARS may lie in the difficulty raters experience when trying to select the one behavior on the scale that is most indicative of the employee's performance level. Sometimes an employee may exhibit behaviors at both ends of the scale, so the rater does not know which rating to assign.

Behavior Observation Scales. A behavior observation scale (BOS) contains a list of desired behaviors required for the successful performance of specific jobs, which are assessed based on the frequency with which they occur. The development of BOS, like BARS, also begins with experts generating critical incidents for the jobs in the organization and categorizing these incidents into dimensions. One major difference between BARS and BOS is that, with BOS, each behavior is rated by the appraiser.

When using BOS, an appraiser rates job performance by indicating the frequency with which the employee engages in each behavior. A multi-point scale is used ranging from "almost never" to "almost always." An overall rating is derived by adding the employee's score on each behavioral item. A high score means that an individual frequently engages in desired behaviors, and a low score means that an individual does not often engage in desired behaviors.

Because it was developed more recently, the research on BOS is far less extensive than that on BARS. The available evidence, however, is favorable. One study found that both managers and subordinates preferred appraisals based on BOS to both BARS and graphic rating scales. The same study found that equal employment opportunity attorneys believed BOS is more legally defensible than the other two approaches.

Because raters do not have to choose one behavior most descriptive of an employee's performance level, the problem noted earlier regarding BARS does not arise. Moreover, like BARS, BOS is effective in directing employees' behavior because it specifies what they need to do in order to receive high performance ratings. Managers can also effectively use BOS to monitor behavior and give feedback in specific behavioral terms so that the employees know what they are doing right and which behavior needs to be corrected. Like BARS, however, a BOS instrument takes a great deal of time to develop. Moreover, a separate instrument is needed for each job (since different jobs call for different behaviors), so the method is not always practical. Developing a BOS for a particular job would not be cost-efficient unless the job had many incumbents.

Accuracy of the Ratings. Accurate ratings reflect the employees' actual job performance levels. Employment decisions that are based on inaccurate ratings are not valid and would thus be difficult to justify if legally challenged. Moreover, employees tend to lose their trust in the system when ratings do not accurately reflect their performance levels, and this causes morale and turnover problems. Unfortunately, accurate ratings seem to be rare. Inaccuracy is most often attributable to the presence of rater errors, such as leniency, severity, central tendency, halo, and recency errors. These rating errors occur because of problems with human judgment. Typically, raters do not consciously choose to make these errors, and they may not even recognize when they do make them.

Leniency error occurs when individuals are given ratings that are higher than actual performance warrants. Leniency errors most often occur when performance standards are vaguely defined. That is, an individual who has not earned an excellent rating is most likely to receive one when "excellent" is not clearly defined. Why do appraisers distort their ratings in an upward or downward direction? Some do it for political reasons; that is, they manipulate the ratings to enhance or protect their self-interests. In other instances, leniency and severity come about from a rater's lack of conscientiousness. Raters may allow personal feelings to affect their judgments; a lenient rating may be given simply because the rater likes the employee.

Severity error occurs when individuals are given ratings that are lower than actual performance warrants. Severe ratings may be assigned out of a dislike for an individual, perhaps due to personal bias. A male appraiser may, for example, underrate a highly-performing female employee because she threatens his self-esteem; a disabled employee may receive an unduly low rating because the

employee's presence makes the appraiser feel embarrassed and tense; or an appraiser may provide harsh ratings to minorities out of a fear and distrust of people with different nationalities or skin color. Alternately, a severe rating may be due to the very high standards of a rater, or to "send a message" to motivate employees to improve.

When raters make leniency and severity errors, a firm is unable to provide its employees with useful feedback regarding their performance. An employee who receives a lenient rating may be lulled into thinking that performance improvement is unnecessary. Severity errors, on the other hand, can create morale and motivation problems and possibly lead to discrimination lawsuits.

Central tendency error occurs when appraisers purposely avoid giving extreme ratings even when such ratings are warranted. For example, when rating subordinates on a scale that ranges from one to five, an appraiser would avoid giving any ones or fives. When this error occurs, all employees end up being rated as average or near average, and the employer is thus unable to discern who its best and worst performers are. Central tendency error is likely the result of administrative procedures. That is, it frequently occurs when an organization requires appraisers to provide extensive documentation to support extreme ratings. The extra paperwork often discourages appraisers from assigning high or low ratings. Central tendency errors also occur when the end points of the rating scale are unrealistically defined (i.e., a five effectively means "the employee can walk on water" and a one means "the employee would drown in a puddle").

Appraisals are also subject to the halo effect, which occurs when an appraiser's overall impression of an employee is based on a particular characteristic, such as intelligence or appearance. When rating each aspect of an employee's work, the rater may be unduly influenced by his or her overall impression. For example, a rater who is impressed by an employee's intelligence may overlook some deficiencies and give that employee all fives on a one-to-five scale; an employee perceived to be of average intelligence may be given all threes. The halo effect acts as a barrier to accurate appraisals because those guilty of it fail to identify the specific strengths and weaknesses of their employees. It occurs most often when the rating standards are vague and the rater fails to conscientiously complete the rating form. For instance, the rater may simply go down the form checking all fives or all threes.

Most organizations require that employee performance be assessed once a year. When rating an employee on a particular characteristic, a rater may be unable to recall all of the employee's pertinent job behaviors that took place during that rating period. The failure to recall such information is called memory decay. The usual consequence of memory decay is the occurrence of recency error; that is, ratings are heavily influenced by recent events that are more easily remembered. Ratings that unduly reflect recent events can present a false picture of the individual's job performance during the entire rating period. For instance, the employee may have received a poor rating because he or she performed poorly during the most recent month, despite an excellent performance during the preceding eleven months.

MANAGEMENT

In the management phase of performance appraisal, employees are given feedback about their performance and that performance is either reinforced or modified. The feedback is typically given in an appraisal interview, in which a manager formally addresses the results of the performance appraisal with the employee. Ideally, the employee will be able to understand his or her performance deficiencies and can ask questions about the appraisal and his or her future performance. The manager should give feedback in a way that it will be heard and accepted by the employee; otherwise, the appraisal interview may not be effective.

The appraisal interview may also have an appeals process, in which an employee can rebut or challenge the appraisal if he or she feels that it is inaccurate or unfair. Such a system is beneficial because it:

- Allows employees to voice their concerns
- Fosters more accurate ratings—the fear of a possible challenge may discourage raters from assigning arbitrary or biased ratings
- Often prevents the involvement of outside third parties (e.g., unions, courts)

The downside of using an appeals system is that it tends to undermine the authority of the supervisor and may encourage leniency error. For example, a supervisor may give lenient ratings to avoid going through the hassle of an appeal.

MANAGEMENT BY OBJECTIVES

Management by objectives (MBO) is a management system designed to achieve organizational effectiveness by steering each employee's behavior toward the organization's mission. MBO is often used in place of traditional performance appraisals. The MBO process includes goal setting, planning, and evaluation. Goal setting starts at the top of the organization with the establishment of the organization's mission statement and strategic goals. The goal-setting process then cascades down through the organizational hierarchy to the level of the individual employee. An individual's goals should represent outcomes that, if achieved, would most contribute to the

attainment of the organization's strategic goals. In most instances, individual goals are mutually set by employees and their supervisors, at which time they also set specific performance standards and determine how goal attainment will be measured.

As they plan, employees and supervisors work together to identify potential obstacles to reaching goals and devise strategies to overcome these obstacles. The two parties periodically meet to discuss the employee's progress to date and to identify any changes in goals necessitated by organizational circumstances. In the evaluation phase, the employee's success at meeting goals is evaluated against the agreed-on performance standards. The final evaluation, occurring annually in most cases, serves as a measure of the employee's performance effectiveness.

MBO is widely practiced throughout the United States. The research evaluating its effectiveness as a performance appraisal tool has been quite favorable. These findings suggest that the MBO improves job performance by monitoring and directing behavior; that is, it serves as an effective feedback device, and it lets people know what is expected of them so that they can spend their time and energy in ways that maximize the attainment of important organizational objectives. Research further suggests that employees perform best when goals are specific and challenging, when workers are provided with feedback on goal attainment, and when they are rewarded for accomplishing the goal.

MBO presents several potential problems, however, five of which are addressed here.

1. Although it focuses an employee's attention on goals, it does not specify the behaviors required to reach them. This may be a problem for some employees, especially new ones, who may require more guidance. Such employees should be provided with action steps specifying what they need to do to successfully reach their goals.

2. MBO also tends to focus on short-term goals, goals that can be measured by year's end. As a result, workers may be tempted to achieve short-term goals at the expense of long-term ones. For example, a manager of a baseball team who is faced with the goal of winning a pennant this year may trade all of the team's promising young players for proven veterans who can win now. This action may jeopardize the team's future success (i.e., its achievement of long-term goals).

3. The successful achievement of MBO goals may be partly a function of factors outside the worker's control. For instance, the baseball manager just described may fail to win the pennant because of injuries to key players, which is a factor beyond his control. Should individuals be held responsible for outcomes influenced by such outside factors? For instance, should the team owner fire the manager for failing to win the pennant? While some HRM experts (and baseball team owners) would say "yes," because winning is ultimately the responsibility of the manager, others would disagree. The dissenters would claim that the team's poor showing is not indicative of poor management and, therefore, the manager should not be penalized.

4. Performance standards vary from employee to employee, and thus MBO provides no common basis for comparison. For instance, the goals set for an "average" employee may be less challenging than those set for a "superior" employee. How can the two be compared? Because of this problem, the instrument's usefulness as a decision-making tool is limited.

5. MBO systems often fail to gain user acceptance. Managers often dislike the amount of paperwork these systems require and may also be concerned that employee participation in goal setting robs them of their authority. Managers who feel this way may not properly follow the procedures. Moreover, employees often dislike the performance pressure that MBO places on them and the stress that it creates.

SEE ALSO *Human Resource Management; Job Analysis*

BIBLIOGRAPHY

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources.* 4th ed. Upper Saddle River, NJ: Prentice Hall, 2004.

Grote, Richard C. *The Performance Appraisal Question and Answer Book: A Survival Guide for Managers.* New York: AMACOM Books, 2002.

Heathfield, Susan. "360 Degree Feedback: The Good, the Bad, and the Ugly." *About.com.* Available from: http://humanresources.about.com/od/360feedback/a/360feedback.htm.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* Cincinnati: South-Western College Publishing, 2000.

Latham, G.P., and K.N. Wexley. *Increasing Productivity Through Performance Appraisal.* 2nd ed. Reading, MA: Addison-Wesley, 1994.

Martin, Tracy and Heidi Spirgi. "Increasing the Value of Performance Appraisals." *Workplace Performance Solutions,* September 2006. Available from: http://www.wpsmag.com/content/templates/wps_article.asp?articleid=539&zoneid=17.

Noe, Raymond A., John R. Hollenbeck, Barry Gerhart, and Patrick M. Wright. *Human Resource Management: Gaining a Competitive Advantage.* 5th ed. Boston: McGraw-Hill/Irwin, 2006.

EMPLOYEE HANDBOOK AND ORIENTATION

The employee handbook is a document an organization compiles in order to inform employees of rules, regulations, and policies. It is a consistent, formalized way for organizations to communicate with employees, and it is one of the most important forms of information that the company can provide its employees. Employees can refer to the handbook to answer basic questions throughout their tenure with the organization. Additionally, managers in the organization can use the handbook to help them make uniform and consistent decisions regarding employees. By avoiding arbitrary or uninformed decisions by managers, the company may prevent problems that stem from the unfair or even illegal treatment of employees, problems that can result in reduced worker motivation, lower performance, or even litigation.

Orientation is a training program that introduces new employees to the company, their work units, and their particular jobs; it is used to familiarize employees with the organization's rules, policies, and procedures. Often the employee handbook is used as a reference during a company's orientation sessions. The typical elements of both the employee handbook and orientation are described in detail below.

THE EMPLOYEE HANDBOOK

Employee handbooks are likely to include information on the following topics: employee compensation and benefits, performance appraisal procedures, smoking restrictions, drug-testing procedures, leave policies, dress code, sexual harassment, workplace dating, disciplinary procedures, and safety rules.

Compensation and Benefits. An employee handbook should provide information about compensation and benefits, and in particular, fringe benefits. Employees need to know how often they will receive paychecks and when and if pay raises will be given. Any variable pay (e.g., merit pay or incentive pay) should also be explained, since this pay is dependent upon employee performance. Employees should also be informed about who is eligible for which fringe benefits, what options they have, and when they are allowed to make changes to their benefits package. Additionally, detailed information about the benefits that are available is often included in employee handbooks.

Performance Appraisal Procedures. Employee handbooks should inform the employee about the procedure for performance appraisal. In addition to providing details about the instruments and required documentation in general, several questions should be answered. First, when will the appraisals be conducted? Some organizations conduct appraisals annually, while others do so more often (e.g., every six months). Additionally, will appraisals take place on a common date for everyone in a work unit (or company-wide), or are they conducted on the anniversary of an employee's hire date? Second, who will conduct the appraisal? Third, when and how will results be communicated to the employee? That is, will there be an appraisal meeting in which the employee is told the results of the performance appraisal? Fourth, what options are available to employees who disagree with their appraisal? These questions and any other details about the procedure should be addressed in this section of the handbook.

Smoking Restrictions. Most organizations have a policy on smoking that indicates whether smoking is allowed in the physical facility, outside of the physical facility (and how far away from the building smokers must be), or outside of work altogether. Any restrictions on smoking should be detailed in the employee handbook. In some organizations, smoking inside or around physical facilities may be hazardous, such as when flammable substances are present. In other organizations, smoking may be prohibited within a building for the comfort of non-smokers. In America, twenty-two states as well as the District of Columbia and Puerto Rico have laws forbidding smoking in nearly all workplaces as well as public spaces. Some employers have gone so far as to prohibit smoking even when employees are not on the job, a reaction to increased health care costs for smokers. In 2005, Michigan employee benefits firm Weyco instituted mandatory nicotine testing for its employees, and eventually required the employees' spouses to submit to testing as well. The company was acquired the next year, but the impact of the experiment lives on: in 2008 Michigan passed a bill protecting workers from off-hours restrictions on their personal behavior.

Drug Testing Procedures. If a company tests its employees for illegal drug use, then the policies and procedures associated with the tests should be included in the employee handbook. The organization should inform employees of the type of test—urinalysis, hair analysis, or blood analysis—and of the specific sample collection procedures. Additionally, the handbook should indicate when tests will be used. Testing may occur before employment begins, or it may occur randomly, for a cause, or after an accident. Finally, details about possible actions associated with positive test results, and procedures to appeal test results, should be provided.

Leave Policies. Paid leave (such as sick leave, vacation days, and personal days) requires rules for administration. The employee handbook should detail the number of sick or personal days available to each employee, the reasons

for which this leave may be taken, any documentation or verification that may be required to take a sick day, and who to contact in the event of an illness.

Employees must also be informed as to how and when vacations can be scheduled, how the time can be taken (e.g., intermittently or all at once), and whether days not taken in one year are carried over into the next year, or lost, or paid back to the employee in the form of cash. Additionally, the handbook should inform employees about the number of vacation days they have, particularly if the number increases with an employee's tenure.

The handbook should also detail information about who is eligible for unpaid leave under the Family and Medical Leave Act (FMLA), and what the procedure is for requesting such leave. Some organizations may not be covered by this act because of their size, but for those that are, informing employees of their rights under this law is important. Some employers require that employees exhaust their other paid leave (e.g., sick days and vacation days) before taking FMLA leave, and if this is the case, it should be detailed in the employee handbook.

Dress Code. Many employee handbooks include a dress code that informs employees which type of clothing is appropriate for the office. This is particularly important if an employer has a "casual Friday" policy that allows employees to dress less formally on Fridays. Employees are often confused or unsure as to what is appropriate for casual Friday, so a detailed dress code is important. A dress code should provide specific detailed information about what employees may and may not wear in the workplace. See Exhibit 1 for a sample, casual Friday dress code.

Sexual Harassment Policy. A typical sexual harassment policy includes definitions as to what constitutes sexual harassment, a procedure for reporting claims of sexual harassment within the company, the process the organization follows for investigating a sexual harassment claim, and the penalties for engaging in sexual harassment. First, the policy should explain the two types of sexual harassment: quid pro quo and hostile environment. This will help employees to understand which behaviors are acceptable or unacceptable in the workplace. Second, the policy should indicate reporting procedures, or how an employee should go about reporting a claim of sexual harassment. Typically, employees are encouraged to report to their direct supervisor and to present evidence of the alleged harassment. However, the organization should have an exception in the policy for those employees who are being harassed by their supervisor and therefore do not want to report to that person. Third, the details of the investigation of sexual harassment claims should be included in the policy: what evidence is necessary, which parties will be involved, the steps taken to resolve the problem. Finally, the policy should detail the disciplinary procedures for sexual harassment violations as some types of sexual harassment may be punishable by immediate dismissal.

Workplace Dating. Many organizations are creating workplace dating policies that may restrict personal relationships between employees. Workplace dating has increased dramatically due to a number of factors, including the presence of more women in the workforce, an older average age for first marriage in the U.S., and the longer working hours of many employees. Companies often choose to limit workplace romance because of concerns of favoritism and/or sexual harassment. Despite their legality, many workplace dating policies have come under fire because some employees feel that these policies

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Exhibit 1

Sample Casual Friday Dress Code

Although professional dress is required at the workplace Monday through Thursday, on Fridays employees may wear more casual clothing. Please follow these guidelines when deciding how to dress on Fridays.

All casual Friday clothing should be clean, unwrinkled, and conservative in nature. Men may wear slacks, khaki pants, or high quality blue jeans. Men's shirts must have a collar, but may be short- or long-sleeved. Men may wear loafers, but may not wear athletic shoes or sandals. As with the professional dress code, men may not wear earrings.

Women may wear slacks, khaki pants, high quality jeans, skirts (high quality denim skirts are acceptable), or dresses. Women may wear sleeveless tops, but may not wear spaghetti straps, halter tops, or strapless tops. Women may wear open-toed shoes, but may not wear flip-flop sandals or athletic shoes.

No employees, male or female, may wear the following items: shorts, athletic clothing (e.g., track pants, sweat pants, sweatshirts), t-shirts, hats, flip-flop sandals, or athletic shoes.

Even on Fridays, clothing should still be office appropriate. It should not be dirty, stained, have tears or holes, or be threadbare. Additionally, clothes should not have unprofessional prints (e.g., animal prints, neon colors) or advertisements on them. Finally, clothing should not be too revealing. Women's skirts must not be too short, and no employee's clothing should be too tightly fitted to their body.

If you are unsure about whether a clothing item is appropriate for this office, please consult with your manager or with a member of the human resources management department before you wear it.

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are an invasion of privacy. Additionally, because some couples may keep their relationship secret while other couples do not, there are concerns that such policies may be enforced inconsistently.

There are many different forms of workplace dating policies; they range in degree of restrictiveness. The least restrictive allows dating between anyone at any level of the organization. A slightly more strict policy would require that, if a relationship is established, a manager must be informed of such a relationship. Some policies allow for dating employees in other work units or at the same level of hierarchy, but prohibit relationships between supervisors and subordinates. The most restrictive policies prohibit any dating relationships whatsoever between any employees of the company.

Disciplinary Procedures. The employee handbook should include information about the disciplinary procedures that will be used if work rules are broken. This means that specific work rules will need to be listed, if they are not presented elsewhere in the employee handbook. Then, the company must identify actions that result in immediate termination, such as proof of theft, drug use on the job, quid pro quo sexual harassment, violence toward an employee or customer, or other types of extreme behavior. Additionally, the company must detail the procedures by which it will discipline less severe rule infractions.

Many organizations use progressive discipline, in which harsher punishments are given for each subsequent rule violation. The typical progression of punishments is a verbal warning, a written warning, a short suspension, and then termination of employment. Progressive disciplinary procedures allow the employee to change his or her behavior on minor issues before they result in termination; thus, this type of discipline provides appropriate due process for employees. Managers find the prescribed steps of a progressive discipline procedure easy to follow, particularly because they do not have to determine the punishment to give.

One element of a successful disciplinary procedure, which should be documented in the employee handbook, is the right to appeal disciplinary decisions. If an employee feels that he or she has been unfairly disciplined, the organization should have a procedure by which the employee can have others examine the process to make sure that it is free from bias. Two of the most useful procedures for an appeals process are an open-door management policy and the use of an employee relations representative.

Safety Rules. Any rules related to safety and security need to be detailed in the employee handbook, not only to inform employees of proper procedures but also to protect the company from liability. This section of the handbook should identify any required safety clothing or equipment, proper use of machinery and other equipment, and any necessary security measures (e.g., locking exterior doors of the building).

LEGAL CONCERNS WITH EMPLOYEE HANDBOOKS

There are two major legal concerns associated with the employee handbook: (1) when organizations do not follow their own documented policies and procedures, and (2) a possible implied contract exception to employment-at-will. When an employee handbook details procedures for discipline, for investigation of sexual harassment or other topics on which improper procedures may result in litigation from employees, it is crucial that managers closely follow the handbook procedures. If managers deviate from procedures, they may be susceptible to claims of wrongful discharge or sexual harassment. For instance, if an employee is fired after only one minor rule violation, yet the handbook indicates that the first step with such a violation is a verbal warning, the employee is likely to have a viable claim for wrongful discharge. Similarly, if managers do not follow their own printed policies for the investigation of sexual harassment claims and an employee suffers continued harassment, the organization is likely to be found liable for that harassment. Thus, it is critical that managers be aware of the policies and procedures documented in the employee handbook particularly if there has been a recent change to them.

The second major legal issue associated with employee handbooks is the possibility that they may be seen as implied contracts and thus exempt employees from employment-at-will. Employment-at-will is a common employment agreement that allows employers to release an employee from the organization at any time for any non-discriminatory reason, and allows the employee to quit at any time. Most U.S. workers are at-will employees; those who are not have employment contracts that specify job duties, the length of employment, and possible reasons for termination of employment.

There are three major exceptions to the employment-at-will doctrine for which the employer is not legally able to terminate employment at their discretion. One is the implied contract exception in which an employee is led to believe that he or she has an employment contract with the employer and is therefore not an at-will employee. This issue comes into play with the employee handbook because the handbook details specific, possible rule violations and because many employers now ask employees to sign a document indicating that they have read and understand the information provided in the employee handbook. By requiring a signature, the company can indicate at a later date that the employee was aware of certain rules and

regulations that they violated, thus protecting the company from employee claims of ignorance. However, while requiring a signature on the employee handbook has become very popular in many organizations, the company must make evident that the signature does not create an employment contract. That is, an employee may perceive their signature to indicate that he or she is no longer an at-will employee and will only be terminated if the rules in the handbook are violated. If the employer does not intend that an employment contract exist, then a statement such as "I understand that I am an at-will employee and can be terminated for any reason at any time" can be useful to protect the employer from claims of wrongful discharge.

ORIENTATION

Orientation is a training session intended to familiarize an employee with the workplace and its rules. An orientation session typically takes place within the first few working days that an employee is on the job, although it may occur before the job begins. A typical orientation program includes information about the company, the work unit, and other miscellaneous areas. To be effective, the orientation program should provide key information without overwhelming individuals and prepare them for their first work experience with the company. The employee handbook is a key supporting document throughout orientation.

Company-Level Orientation Information. Orientation programs often include information about the company as a whole. This information may be a company overview, such as the origination and history of the company, its mission, and its values. This allows the employee to put the information about the current organization into its historical context.

Policies and procedures (regarding work rules, disciplinary procedures, etc.) should be reviewed in the orientation session so that employees are sure to be aware of them and so that they can ask questions if necessary.

Compensation and benefits should be reviewed, from the basics of when paychecks are issued to more detailed information about incentives and benefits. Many organizations provide detailed information about fringe benefits because new employees often need guidance in understanding their benefits or in selecting from a list of benefit options.

Safety and accident prevention should be addressed in orientation and depending on the type of work done in the company, further safety training programs may also be required. In many office settings, safety regulations are brief and easy to cover. However, in manufacturing settings, a great deal of time may need to be spent on educating employees about safe behaviors and the proper use of equipment. In such circumstances, orientation is likely to provide only an overview of safety issues before further training is offered.

Employee relations information should cover any employee assistance programs or wellness plans. It should also review employee rights, such as the right to appeal disciplinary actions or other managerial decisions related to human resources.

Orientation often includes an overview of the company's physical facilities and may include a tour of those facilities. New employees need to know which entrances and exits to use, how to maintain building security, where to park vehicles, where different work units are located, and even where the restrooms are. Such information will reduce new employees' anxiety and may prevent other problems such as having a car towed, leaving an exterior door unlocked, or getting lost in a large building.

Work Unit Orientation Information. In orientation, employees need to know specific information about the particular work unit in which they will be employed. This portion of the orientation may begin with an overview of the departmental functions and continue with information about the new employee's specific job duties and responsibilities, and the performance expectations of that position. Employees should then be told of any policies or procedures that may be specific to the work unit. Finally, work unit orientation should include a tour of the department (where offices are, where supplies are kept, etc.), and an introduction to other employees and managers.

Miscellaneous Information. Many orientation programs go beyond company and work unit information to provide new employees with details about the community, housing options, or other issues associated with adjusting to a new location. This is particularly important if the organization hires employees who relocate from a distance, especially if new employees arrive from overseas.

NEWCOMER SOCIALIZATION

Both the employee handbook and the orientation session aid the organization in socializing newcomers. Socialization is the process by which new employees learn the values, norms, and necessary behaviors to effectively participate as members of the organization. Socialization may begin even before a person is hired and may continue for weeks, or even months, after the person is on the job. Formal socialization occurs when employees review the employee handbook and attend new employee orientation. Socialization continues informally through advice from co-workers, the employee's observation of the workplace, and by trial-and-error.

Socialization involves three phases: anticipatory socialization, encounter phase, and settling in. Anticipatory

socialization occurs before an individual begins work at an organization. Through interactions with representatives of the company during the recruitment and selection process, the job applicant learns a lot about an organization. The encounter phase of socialization starts when an employee begins the new job, and typically the employee learns a great deal of new information. Regardless of how well-prepared an employee may feel to begin a new job with a new employer, there is likely to be something unexpected or even shocking that occurs when the employee is actually on the job. Finally, when the employee reaches the settling in stage of socialization, he or she begins to feel comfortable with both the job demands and the interpersonal relationships with others in the workplace.

The employee handbook and new employee orientation training are critical elements in preparing employees to be effective members of an organization. Thus, it is important that the handbook and orientation sessions include information that employees need to know about workplace policies and procedures. In addition, attention to the stages of newcomer socialization will help managers to ease the difficulties in transition that new employees may face.

SEE ALSO *Employee Assistance Programs; Employee Benefits; Employee Compensation; Employee Evaluation and Performance Appraisals; Employee Recruitment Planning; Employee Screening and Selection; Employment Law and Compliance; Human Resource Management*

BIBLIOGRAPHY

Compliance Assistance–Family and Medical Leave Act (FMLA). U.S. Department of Labor. Available from: http://www.dol.gov/esa/whd/fmla/.

Felsberg, Eric J. "Composing Effective Employee Handbooks." *Employment Relations Today* 31, no. 2 (Summer 2004): 117.

Goldstein, Irwin L., and J. Kevin Ford. *Training in Organizations*. 4th ed. Belmont, CA: Wadsworth Group, 2002.

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources*. 4th ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Guerin, Lisa and Amy Delpo. *Create Your Own Employee Handbook: A Legal & Practical Guide*. 3rd ed. Berkeley, CA: NOLO, 2007.

Klein, Howard J., and Natasha A. Weaver. "The Effectiveness of an Organizational-Level Orientation Training Program in the Socialization of New Hires." *Personnel Psychology* 53 (2000): 47–66.

Martin, Tim. *Michigan House OKs bills protecting workers' off-duty activities*. MLive.com. Available from: http://www.mlive.com/news/index.ssf/2008/05/michigan_house_oks_bills_prote.html.

Noe, Raymond A. *Employee Training and Development*. Boston, MA: Irwin/McGraw-Hill, 1999.

Noe, Raymond A., John R. Hollenbeck, Barry Gerhart, and Patrick M. Wright. *Human Resource Management: Gaining a Competitive Advantage*. 5th ed. Boston, MA: McGraw-Hill/Irwin, 2006.

Smoking Policies in the Workplace Fact Sheet. American Lung Association. Available from: http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=44459.

EMPLOYEE RECRUITMENT PLANNING

STEP 1: IDENTIFY THE JOB OPENING

Ideally, organizations should attempt to identify job openings well in advance of an announced resignation. The human resource (HR) department should plan for future openings in both the short and long term. The projection of future openings provides organizations with the time needed to plan and implement recruitment strategies so that they do not fall prey to the "must-hire-by-last-week" syndrome. The HR plan should answer at least the following questions:

- Are any newly budgeted positions opening soon?

- Is a contract under negotiation that may result in the need for additional hires?

- What is the amount of expected turnover in the next several months?

STEP 2: DECIDE HOW TO FILL THE JOB OPENING

The first question to ask after determining that an opening exists is "Do we need to find a new person to fill the vacant position?" Sometimes it is unnecessary to staff a vacant position because the firm can rely on other alternatives. For instance, it may be more prudent to provide overtime opportunities to current workers to complete the needed work. Other alternatives include job elimination and job redesign (i.e., incorporating the tasks of the vacant position into currently existing positions). If the firm chooses to fill the vacancy, it must address two issues: (1) whether to outsource, and (2) in the absence of outsourcing, whether to recruit candidates internally or externally.

STEP 3: IDENTIFY THE TARGET POPULATION

Now the organization must determine what types of individuals it is looking for to fill the vacant positions. To address this question, an organization must define its target population. Two issues arise here: (1) specifying worker requirements and (2) deciding whether to target a certain segment of the applicant population.

An organization must identify specific requirements of the job: the duties, reporting relationships, salary range for hiring, and competencies required of a new worker (e.g., education, experience, knowledge, skills, and abilities). Ideally, much of this information will have been gathered during a job analysis and thus will be contained in the job description. If not, the recruiter should gather it from the hiring manager. An organization must also decide at this point whether to target all qualified applicants or to focus its recruitment efforts on certain segments of the qualified applicant population.

When recruiting internally, the issue is this: Should the company post the job so that all qualified employees can be considered? Or should the company select certain high-potential employees and groom them for the position? When recruiting externally, the company must decide whether to inform all potential applicants or target certain types. Companies may reap advantages when they target members of certain groups. Another strategy is to target graduates of specific schools that have exceptionally strong programs in the functional areas of concern. Additionally, some companies target top-performing employees working for other companies. Recruitment of such individuals poses some unique problems, however; these individuals may be difficult to reach because they are not actively seeking a new job. Moreover, the practice of pirating employees from other firms raises some serious ethical questions.

STEP 4: NOTIFY THE TARGET POPULATION

Once an applicant population has been targeted, the company must determine how to notify these individuals of the vacant position. A variety of recruitment methods may be used for communicating vacancies. A firm can benefit from both low-involvement and high-involvement strategies at this stage of the recruitment process. Low-involvement strategies are things such as corporate sponsorship or advertisements of the company's product or service may influence applicants' positive perceptions of that firm and therefore increase applicant attraction, but do not specifically identify a job opening. High-involvement recruitment strategies involve things such as detailed recruitment advertisements or employee endorsements, which occur when potential applicants meet with current employees to hear more about their experiences with that company. Both low-involvement and high-involvement strategies have a positive effect on the number of applicants who apply for jobs with an organization and on the quality of the applicants who apply.

When choosing a specific way to notify the target population, different recruitment methods may be used. Some popular options are internal job postings; newspaper, radio, and television advertisements; trade magazine advertisements; Internet job sites; college campus interviews; and current employee referrals. The choice of which to use depends on the number of positions to be filled, the cost of each recruitment method, the characteristics of the target audience, and economic conditions.

The more positions to be filled, the more widely the firm may choose to advertise, perhaps using a newspaper or radio advertisement. Costs differ for recruitment methods and a firm may be willing to invest more in recruitment when suitable applicants are difficult to find or when poor hiring decisions may be costly. The characteristics of the target audience influence recruitment method; for example, using an Internet posting would be fruitless if most of the applicant pool is unlikely to have access to a computer. Poor economic conditions, where unemployment is high, will result in higher numbers of job applicants and possibly a lower average level of quality of applicants. In this situation, to avoid spending an inordinate amount of time weeding through applications, firms must discourage all but the best applicants from applying.

STEP 5: MEET WITH THE CANDIDATES

Finally, the most qualified candidates are brought in for interviews and other assessment procedures. These serve both selection and recruitment purposes. From a selection perspective, they give the firm a chance to further assess the candidates' qualifications. From a recruitment perspective, they provide the candidates with an opportunity to learn more about the employment opportunity.

Candidates should be provided with information about the company and the job. Failure to provide a sufficient amount of information could be detrimental to the recruiting process. For example, it may be interpreted by the candidates as an attempt to evade discussion of unattractive job attributes, or it may be viewed as an indication of the recruiter's disinterest in them. Without specific information, applicants might accept a job offer without knowing about aspects of it that might affect their long-term job satisfaction, or they may refuse an offer without knowing about some of the job's attractive attributes.

KASH SYSTEM

Bea Quirk, in a 2008 article for the *Charlotte Business Journal*, spotlights a system of recruitment called KASH, which stands for knowledge, attitudes, skills, and habits. These are four of the most important qualities to know about potential employees before hiring. Recruitment policies, according to Quirk, should focus on discovering the KASH qualities of potential employees. Résumés often help to identity the knowledge and skills job seekers have in the form of experience. Attitudes and habits are

harder to define, but employers should seek for those in interviews, using in-depth questions to help find the more ingrained practices of employees.

ONLINE RECRUITMENT

According to a 2008 NORAS report, online job seekers in the United Kingdom have grown by 50 percent within the last year alone. In America, many companies are looking to change the way they use online job boards, giving more attention to using the Internet as a chief recruitment tool. Companies are seeking to cut costs and increase the effectiveness of their recruiting efforts, which means the increase in seeking employees online will continue to grow as a cheap, efficient way to contact a skilled workforce. With online job ads producing quick results at very little cost, companies are seeking new ways to use online tools for recruitment purposes.

Job boards are the most common way to advertise for positions online, whether a company chooses to use a specialty job board to fill a particular position, or a general job board to attract a wide range of job seekers. There are other electronic recruitment methods as well; many companies are using their corporate Web sites as an outreach to job seekers, while others are making use of mass emailing and intranet, in-company recruitment. Companies can also use online recruitment techniques to spread their name and improve their brand–every internet post for job seekers is an ability for companies to advertise themselves.

Social networks are also becoming an important recruitment tool for businesses. Sites such as MySpace and Facebook draw a great number of job seekers, many with newly developed skills. This is a new market for recruitment endeavors, and businesses are still exploring how to use social networks effectively. Employers can set up personalized recruitment pages on MySpace to communicate their messages and seek to fill specific positions. Other applications for networks such as Facebook allow for the creation of résumés and job-seeking profiles. Some companies use social networks as a tool to review potential employees before hiring.

RECRUITMENT OPTIONS

A 2008 article by Penelope Trunk, "Advantage, Employees," suggests that the new wave of recruitment tools, including online advertising and social networking, will make more traditional methods, such as résumés, increasingly obsolete. Job listings, currently overloaded with information, may eventually become inefficient, background noise to the talented job seekers who are looking for more than a detailed report on job functions. As Trunk advises, there may be other ways to appeal to the most skilled employees, different recruiting methods that focus more on value-propositions and personal advance-

ment than time-consuming lists of job qualifications and necessary experience.

Encouraging employee advancement—both within and outside of the company—is an excellent way to attract ambitious and talented job seekers. For instance, when an employee leaves the company, their manager can send out a public notice thanking them for a job well done. If they are moving to a different organization or a better position, the note can include congratulations for the employee's success as well as appreciation for the mark they left on the company. Employers can also use the opportunity for advancement and experience as a company advantage, advertising themselves as a "stepping stone" to reach higher positions or more prestigious businesses.

Many potential employees are concerned with who they will be working with and for. A thoughtful manager can put in a good word for the employee when they move on, give them important and necessary skills for their jobs, and coach them into better emotional intelligence and stronger values. Employees will be looking for these sorts of opportunities, so Trunk suggests companies advertise the qualities of their managers and employees as well the functions of the job. Outlining the advantages of working under a particular supervisor or executive is a great way to attract serious and skilled workers who are looking for a strong relationship with their company.

Recruiters also play a large role in the employment process, often working closely with job seekers to find them the best positions available. Job seekers will even spend a large amount of time working with recruitment agencies or online boards looking for suitable jobs. Because of this time spent with recruiters, employees will often have loyalty to their connectors. In the rapid transitions common today among workers, employees can be more comfortable with their recruiters than with the companies they currently work for. For this reason, employers should be sure to have an equally friendly relationship with recruiters. If recruiters know and respect organizations, they will be more likely to recommend suitable employees for the right positions.

Job seekers also belong to many communities outside of the business world. Companies can capitalize on these small communities by advertising opportunities and services meant specifically for them. For instance, managers and recruitment officers can become parts of blog networks specializing in computer software or engineering, where they can keep up on technological advancements and find the talent they need for their positions. Other communities with blogs and activities that companies can become a part of include working mothers, sports enthusiasts, and environmental activists.

RECRUITMENT MISTAKES

There are a number of methods companies should avoid when putting their recruitment plans into practice. For

instance, many businesses have the necessary talent within their organizations, but are too busy looking outside to recruit the skilled employees they already have. Others try to look for a mirror-replacement to the employee they have lost, duplicates with the same attitudes and skills, when companies can benefit more from employees with new experience and outlooks on the position. Some employers forget to include their employees in the recruitment process, or attempt to find the "perfect" employee without noticing the talents of the job seekers they interview.

SEE ALSO *Employee Screening and Selection; Human Resource Management*

BIBLIOGRAPHY

Barber, A.E. *Recruiting Employees: Individual and Organizational Perspectives.* Thousand Oaks: Sage Publications, 1998.

Collins, C.J., and J. Han. "Exploring Applicant Pool Quantity and Quality: The Effects of Early Recruitment Practice Strategies, Corporate Advertising, and Firm Reputation." *Personnel Psychology* 57 (2004): 684–717.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* Cincinnati: South-Western College Publishing, 2000.

"Online Recruitment Is Best Money Saver." *Personneltoday,* 2008. Available from: http://www.personneltoday.com/articles/2008/02/29/44652/online-recruitment-is-best-money-saver.html.

"Procedure for Online Recruitment and Selection." *Silicon Valley Resources,* 2008. Available from: http://siliconvalley resources.com/recruitment/the-procedure-for-online-recruitment-and-selection.

Quirk, Bea. "Create an Employment Recruitment Strategy." *Charlotte Business Journal.* 18, April 2008.

Santonocito, Paula. "Online Social Networking: What It Really Means for Employees." *Online Recruitment Magazine.* Beyond.com, 2008.

"Top 10 Employee Recruitment Methods." *SmallBiz,* 2008. Available from: http://www.smsmallbiz.com/benefits/Top_10_Employee_Recruitment_Mistakes.html.

Trunk, Penelope. "Advantages, Employees." *Boston.com.* 2008. Available from: http://www.boston.com/jobs/news/articles/2008/02/17/advantage_employees/

EMPLOYEE SCREENING AND SELECTION

Effective employee selection is a critical component of a successful organization. How employees perform their jobs is a major factor in determining how successful an organization will be. Job performance is essentially determined by the ability of an individual to do a particular job and the effort the individual is willing to put forth in performing the job. Through effective selection, the organization can maximize the probability that its new employees will have the necessary knowledge, skills, and abilities (referred to collectively as "KSAs") to do the jobs they were hired to do. Employee selection is one of the two major ways, along with orientation and training, to make sure that new employees have the abilities required to do their jobs.

THE STAFFING PROCESS

Employee screening and selection is one part of the overall staffing process of the organization. This process also includes human resource (HR) planning, recruitment, evaluation, and retention activities. By doing human resource planning, the organization projects its likely demand for personnel with particular KSAs, and compares that to the anticipated availability of such personnel in the internal or external labor markets. During the recruitment phase of staffing, the organization attempts to establish contact with potential job applicants by job postings within the organization, advertising to attract external applicants, employee referrals, and many other methods, depending on the type of organization and the nature of the job in question. Employee selection begins when a pool of applicants is generated by the organization's recruitment efforts.

During the employee selection process, a firm decides which of the recruited candidates will be offered a position based on the use of available information and employer-generated criteria. As Gatewood, Field, and Barrick put it, employee selection is the "process of collecting and evaluating information about an individual in order to extend an offer of employment." This process lays the groundwork for future HR activities, such as evaluation and retention. As employment offers are generated by the screening and selection process, this process also provides the basis for other essential HR practices—such as effective job design, goal setting and performance evaluation, and promotion and compensation—that motivate workers to exert the effort needed to do their jobs effectively.

THE SCREENING AND SELECTION PROCESS

Job applicants differ along many dimensions, such as educational and work experience, personality characteristics, and innate ability and motivation levels. The logic of employee selection begins with the assumption that at least some of these individual differences are relevant to a person's suitability for a particular job. Thus, in employee selection the organization has two distinct but interrelated tasks: first, to determine the relevant individual differences needed to do the job—that is, the KSAs associated with the position; and second, to identify and utilize selection methods that will reliably and validly assess the extent to which job applicants possess the needed KSAs. The organization must achieve these tasks in a way that does not illegally discriminate against any job applicants on the basis of race, color, religion, sex, national origin, disability, or veteran's status.

The employee screening and selection process consists of several important stages, as shown in Exhibit 1. Since the organization must determine the individual KSAs needed to perform a job, the selection process begins with job analysis, which is the systematic study of the content of jobs in an organization. Effective job analysis tells the organization what people occupying particular jobs "do" in the course of performing their jobs. It also helps the organization determine the major duties and responsibilities of the job, as well as aspects of the job that are of minor or tangential importance to job performance. The job analysis often results in a document called the job description, which is a comprehensive document that details the duties, responsibilities, and tasks that make up a job. Because job analysis can be complex, time-consuming, and expensive, standardized job descriptions have been developed that can be adapted to thousands of jobs in organizations across the world. Two examples of such databases are the U.S. government's *Standard Occupational Classification* (SOC), which has information on at least 821 occupations, and the Occupational Information Network, which is also known as O*NET. O*NET provides job descriptions for thousands of jobs.

An understanding of the content of a job assists an organization in specifying the knowledge, skills, and abilities needed to do the job. These KSAs can be expressed in terms of a job specification, which is an organizational document that details what is required to successfully perform a given job. The necessary KSAs are called job requirements, which simply means they are thought to be necessary to perform the job. Job requirements are expressed in terms of desired education or training, work experience, specific aptitudes or abilities, and in many other ways. Care must be taken to ensure that the job requirements are based on the actual duties and responsibilities of the job and that they do not include irrelevant requirements that may discriminate against some applicants; in recent years, many organizations have revamped their job descriptions and specifications to ensure that these documents contain only job-relevant content in order to comply with the Americans with Disabilities Act. Furthermore, because the job description is frequently used as a recruitment tool, care is taken to ensure that the description will draw an applicant pool with an appropriate level of knowledge, skills, and abilities.

SELECTION METHODS

Once the necessary KSAs are identified, the organization must either develop a selection method to accurately assess whether applicants possess the needed KSAs, or adapt selection methods developed by others. There are many selection methods available to organizations. The most common is the job interview, but organizations also use some or all of the following:

- Reference and background checks
- Personality testing
- Cognitive ability testing
- Aptitude testing
- Assessment centers
- Drug tests

These and many other methods are used in an attempt to assess accurately the extent to which applicants possess the required KSAs and whether they have unfavorable characteristics that would prevent them from successfully performing the job. For both legal and practical reasons, it is important that the selection methods used are relevant to the job in question and that the methods are as accurate as possible in the information they provide. Selection methods cannot be accurate unless they possess reliability and validity.

VALIDITY OF SELECTION METHODS

Validity refers to the quality of a measure that exists when the measure assesses a construct. In the selection context, validity refers to the appropriateness, meaningfulness, and

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Exhibit 1

Selection Process

1. Job Analysis
The systematic study of job content in order to determine the major duties and responsibilities of the job. Allows the organization to determine the important dimensions of job performance. The major duties and responsibilities of a job are often detailed in the job description.

2. The Identification of KSAs or Job Requirements
Drawing upon the information obtained through job analysis or from secondary sources such as O*NET, the organization identifies the knowledge, skills, and abilities necessary to perform the job. The job requirements are often detailed in a document called the job specification.

3. The Identification of Selection Methods to Assess KSAs
Once the organization knows the KSAs needed by job applicants, it must be able to determine the degree to which job applicants possess them. The organization must develop its own selection methods or adapt methods developed by others. Selection methods include, but are not limited to, reference and background checks, interviews, cognitive testing, personality testing, aptitude testing, drug testing, and assessment centers.

4. The Assessment of the Reliability and Validity of Selection Methods
The organization should be sure that the selection methods they use are reliable and valid. In terms of validity, selection methods should actually assess the knowledge, skill, or ability they purport to measure and should distinguish between job applicants who will be successful on the job and those who will not.

5. The Use of Selection Methods to Process Job Applicants
The organization should use its selection methods to make selection decisions. Typically, the organization will first try to determine which applicants possess the minimum KSAs required. Once unqualified applicants are screened, other selection methods are used to make distinctions among the remaining job candidates and to decide which applicants will receive offers.

Source: Adapted from Gatewood and Field, 2001.

Exhibit 2

**A Menu of Possible Qualities
Needed for Job Success**

A. Technical KSAs or aptitude for learning them

B. Nontechnical skills, such as

    1. Communication

    2. Interpersonal

    3. Reasoning ability

    4. Ability to handle stress

    5. Assertiveness

C. Work habits

    1. Conscientiousness

    2. Motivation

    3. Organizational citizenship

    4. Initiative

    5. Self-discipline

D. Absence of dysfunctional behavior, such as

    1. Substance abuse

    2. Theft

    3. Violent tendencies

E. Job-person fit; the applicant

    1. is motivated by the organization's reward system

    2. fits the organization's culture regarding such things as risk-taking and innovation

    3. would enjoy performing the job

    4. has ambitions that are congruent with the promotional opportunities available at the firm

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usefulness of the inferences made about applicants during the selection process. It is concerned with the issue of whether applicants will actually perform the job as well as expected based on the inferences made during the selection process. For example, when a personality test such as the Myers-Briggs Type Indicator (MBTI) is used, the organization should have a clear idea of what personality type(s) will fit in with the identified KSAs, and more importantly, whether or not personality type is in fact an important dimension of job performance. The closer the applicants' actual job performances match their expected performances, the greater the validity of the measures used in the selection process.

In order to achieve validity, the organization must have a clear notion of the job requirements and use selection methods that reliably and accurately measure these qualifications. A list of typical job requirements is shown in Exhibit 2. Some qualifications—such as technical KSAs and nontechnical skills—are job-specific, meaning that each job has a unique set. The other qualifications listed in the exhibit are universal in that nearly all employers consider these qualities important, regardless of the job. For instance, employers want all their employees to be motivated and have good work habits.

The job specification derived from job analysis should describe the KSAs needed to perform each important task of a job. By basing qualifications on job analysis information, a company ensures that the qualities being assessed are important for the job. Job analyses are also needed for legal reasons. In discrimination suits, courts often judge the job-relatedness of a selection practice on whether or not the selection criteria was based on job analysis information. For instance, if someone lodges a complaint that a particular test discriminates against a protected group, the court would (1) determine whether the qualities measured by the test were selected on the basis of job analysis findings and (2) scrutinize the job analysis study itself to determine whether it had been properly conducted.

The attainment of validity depends heavily on the appropriateness of the particular selection technique used. Organizations should pay close attention to how reliable and accurate their selection methods are in order to ensure that effective employment choices are made.

Reliability. The reliability of a measure refers to its consistency. It is defined as "the degree of self-consistency among the scores earned by an individual." Reliable evaluations are consistent across both people and time. Reliability is maximized when two people evaluating the same candidate provide the same or very similar ratings, and when the ratings of a candidate taken at two different times are the same or very similar. When selection scores vary widely, they should be considered unreliable, which diminishes their validity.

Various factors can affect the reliability of a selection method. These include the following:

- *Emotional and physical state of the candidate*. Reliability suffers if candidates are particularly nervous during the assessment process.

- *Lack of rapport with the administrator of the measure.* Reliability suffers if candidates are "turned off" by the interviewer and thus do not "show their stuff" during the interview.

- *Inadequate knowledge of how to respond to a measure.* Reliability suffers if candidates are asked questions that are vague or confusing.

- *Individual differences among respondents.* If the range or differences in scores on the attribute measured by a selection device is large, that means the device can reliably distinguish among people.

- *Question difficulty.* Questions of moderate difficulty produce the most reliable measures. If questions are too easy, many applicants will give the correct answer and individual differences are lessened; if questions are too difficult, few applicants will give the correct answer and, again, individual differences are lessened.

- *Length of measure.* As the length of a measure increases, its reliability also increases. For example, an interviewer can better gauge an applicant's level of interpersonal skills by asking several questions, rather than just one or two.

Accuracy. In addition to providing reliable assessments, the firm's assessments should accurately measure the required worker attributes. Many selection techniques are available for assessing candidates. How does a company decide which ones to use? A particularly effective approach to follow when making this decision is known as the behavior consistency model. This model specifies that the best predictor of future job behavior is past behavior performed under similar circumstances. The model implies that the most effective selection procedures are those that focus on the candidates' past or present behaviors in situations that closely match those they will encounter on the job. The closer the selection procedure simulates actual work behaviors, the greater its validity.

In implementing the behavioral consistency model, employers should thoroughly assess each applicant's previous work experience to determine if the candidate has exhibited relevant behaviors in the past. If such behaviors are found, evaluate the applicant's past success on each behavior based on carefully developed rating scales. If the applicant has not had an opportunity to exhibit such behaviors, employers must estimate the future likelihood of these behaviors by administering various types of assessments (listed above). The more closely an assessment simulates actual job behaviors, the better the prediction.

ASSESSING AND DOCUMENTING VALIDITY

Validity, reliability, and accuracy are essential features of the criteria employed during the screening and selection process. Due to their importance, an effective selection process must itself undergo a process of evaluation. This evaluation process should focus on determining the validity of the selection methods used.

Three strategies can be used to determine the validity of a selection method:

1. **Content-oriented strategy:** Demonstrates that the company followed proper procedures in the development and use of its selection devices.

2. **Criterion-related strategy:** Provides statistical evidence showing a relationship between applicant selection scores and subsequent job performance levels.

3. **Validity generalization strategy:** Demonstrates that other companies have already established the validity of the selection practice.

Content-oriented strategy. When using a content-oriented strategy to document validity, a firm gathers evidence that it followed appropriate procedures in developing its selection program. The evidence should show that the selection devices were properly designed and were accurate measures of the worker requirements. Most importantly,

the employer must demonstrate that the selection devices were chosen on the basis of an acceptable job analysis and that they measured a representative sample of the KSAs identified. The sole use of a content-oriented strategy for demonstrating validity is most appropriate for selection devices that directly assess job behavior. For example, one could safely infer that a candidate who performs well on a properly-developed typing test would type well on the job because the test directly measures the actual behavior required on the job.

When the connection between the selection device and job behavior is less direct, content-oriented evidence alone is insufficient. Consider, for example, an item once found on a civil service exam for police officers: "In the Northern Hemisphere, what direction does water circulate when going down the drain?" The aim of the question is to measure mental alertness, which is an important trait for good police officers. However, can one really be sure that the ability to answer this question is a measure of mental alertness? Perhaps, but the inferential leap is a rather large one. Whether or not there is an indirect relationship, it should be clear that there is not a direct relationship between this assessment item and the specific tasks required to perform the job.

Criteria-related strategy. A criterion-related strategy is needed when employers must make such large inferential leaps; a content-oriented strategy, by itself, is insufficient to document validity. The use of this strategy is an attempt to demonstrate statistically that someone who does well on a selection instrument is more likely to be a good job performer than someone who does poorly on the selection instrument. To gather criterion-related evidence, the HR professional needs to collect two pieces of information on each person: a predictor score and a criterion score. Predictor scores represent how well the individual fared during the selection process as indicated by a test score, an interview rating, or an overall selection score. Criterion scores represent the job performance level achieved by the individual and are usually based on supervisor evaluations.

Validity is calculated by statistically correlating predictor scores with criterion scores (statistical formulas for computing correlation can be found in most introductory statistical texts). This correlation coefficient (designated as r) is called a validity coefficient. To be considered valid, r must be statistically significant and its magnitude must be sufficiently large to be of practical value. When a suitable correlation is obtained ($r > 0.3$, as a rule of thumb), the firm can conclude that the inferences made during the selection process have been confirmed. That is, it can conclude that, in general, applicants who score well during selection turn out to be good performers, while those who do not score as well become poor performers.

Exhibit 3

Steps in the Predictive and Concurrent Validation Processes

Predictive Validation

1. Perform a job analysis to identify needed competencies.
2. Develop/choose selection procedures to assess needed competencies.
3. Administer the selection procedures to a group of applicants.
4. Randomly select applicants or select all applicants.
5. Obtain measures of the job performance for the applicant after they have been employed for a sufficient amount of time. For most jobs, this would be six months to a year.
6. Correlate job performance scores of this group with the scores they received on the selection procedures.

Concurrent Validation

1 and 2. These steps are identical to those taken in a predictive validation study.
3. Administer the selection procedures to a representative group of job incumbents.
4. Obtain measures of the current job performance level of the job incumbents who have been assessed in step 3.
5. Identical to step 6 in a predictive study.

A criterion-related validation study may be conducted in one of two ways: a predictive validation study or a concurrent validation study. The two approaches differ primarily in terms of the individuals assessed. In a predictive validation study, information is gathered on actual job applicants; in a concurrent study, current employees are used. The steps to each approach are shown in Exhibit 3.

Concurrent studies are more commonly used than predictive ones because they can be conducted more quickly; the assessed individuals are already on the job and performance measures can thus be more quickly obtained. (In a predictive study, the criterion scores cannot be gathered until the applicants have been hired and have been on the job for several months.) Although concurrent validity studies have certain disadvantages compared to predictive ones, available research indicates that the two types of studies seem to yield approximately the same results.

Validity generalization strategy. The discussion of content-oriented and criteria-related strategies assumes that an employer needs to validate each of its selection practices. But many organizations employ selection methods that have been used and properly validated by other companies. This raises the question of whether or not this organization can rely on the validity evidence gathered by others, and thus avoid having to conduct its own study. This can be done by using a validity generalization strategy. Validity generalization is established by demonstrating that a selection device has been consistently found to be valid in many other similar settings. An impressive amount of evidence points to the validity generalization of

many specific devices. For example, some mental aptitude tests have been found to be valid predictors for nearly all jobs and thus can be justified without performing a new validation study to demonstrate job relatedness. To use validity generalization evidence, an organization must present the following data:

- Studies summarizing a selection measure's validity for similar jobs in other settings.

- Data showing the similarity between the jobs for which the validity evidence is reported and the job in the new employment setting.

- Data showing the similarity between the selection measures in the other studies composing the validity evidence and those measures to be used in the new employment setting.

MAKING A FINAL SELECTION

The extensiveness and complexity of selection processes vary greatly depending on factors such as the nature of the job, the number of applicants for each opening, and the size of the organization. A typical way of applying selection methods to a large number of applicants for a job requiring relatively high levels of KSAs would be the following:

1. Use application blanks, resumes, and short interviews to determine which job applicants meet the minimum requirements for the job. If the number of applicants is not too large, the information provided by applicants can be verified with reference and/or background checks.

2. Use extensive interviews and appropriate testing to determine which of the minimally qualified job candidates have the highest degree of the KSAs required by the job.

3. Make contingent offers to one or more job finalists as identified by step 2. Job offers may be contingent upon successful completion of a drug test or other forms of background checks. General medical exams can only be given after a contingent offer is made.

One viable strategy for arriving at a sound selection decision is to first evaluate the applicants on each individual attribute needed for the job. That is, at the conclusion of the selection process, each applicant could be rated on a scale for each important attribute based on all the information collected during the selection process. For example, one could arrive at an overall rating of a candidate's dependability by combining information derived from references, interviews, and tests that relate to this attribute.

Decision-making is often facilitated by statistically combining applicants' ratings on different attributes to form a ranking or rating of each applicant. The applicant

with the highest score is then selected. This approach is appropriate when a compensatory model is operating, that is, when it is correct to assume that a high score on one attribute can compensate for a low score on another. For example, a baseball player may compensate for a lack of power in hitting by being a fast base runner.

In some selection situations, however, proficiency in one area cannot compensate for deficiencies in another. When such a non-compensatory model is operating, a deficiency in any one area would eliminate the candidate from further consideration. Lack of honesty or an inability to get along with people, for example, may serve to eliminate candidates for some jobs, regardless of their other abilities.

When a non-compensatory model is operating, the "successive hurdles" approach may be most appropriate. Under this approach, candidates are eliminated during various stages of the selection process as their non-compensable deficiencies are discovered. For example, some applicants may be eliminated during the first stage if they do not meet the minimum education and experience requirements. Additional candidates may be eliminated at later points after failing a drug test or honesty test or after demonstrating poor interpersonal skills during an interview. The use of successive hurdles lowers selection costs by requiring fewer assessments to be made as the list of viable candidates shrinks.

SEE ALSO *Employee Evaluation and Performance Appraisals; Employee Handbook and Orientation; Employee Recruitment Planning; Human Resource Information Systems; Human Resource Management*

BIBLIOGRAPHY

Barrick, M.R., and R.D. Zimmerman. "Reducing Voluntary Turnover Through Selection." *Journal of Applied Psychology* 80, no. 1 (2005): 159–66.

Gatewood, R.D., Hubert S. Field, and Murray Barrick. *Human Resource Selection.* 6th ed. Fort Worth, TX: Dryden Press, 2007.

Hausknecht, J.P., D.V. Day, and S.C. Thomas. "Applicant Reactions to Selection Procedures: An Updated Model and Meta-Analysis." *Personnel Psychology* 57, no. 3 (2004): 639–83.

Kleiman, Lawrence. *Human Resource Management: A Tool for Competitive Advantage.* 4th ed. Cincinnati: South-Western College Publishing, 2006.

Occupational Information Network. Available from: http://online. onetcenter.org.

Potosky, D., and P. Bobko. "Selection Testing Via the Internet: Practical Considerations and Exploratory Empirical Findings." *Personnel Psychology* 57, no. 4 (2004): 1003–1034.

Ryan, A.M., and N.T. Tippins. "Attracting and Selecting: What Psychological Research Tells Us." *Human Resource Management* 43, no. 4 (2004): 305–318.

"Using Individual Assessments in the Workplace: A Practical Guide for HR Professionals, Trainers, and Managers." *Personnel Psychology*, 60, no. 3 (2007): 793–796.

EMPLOYMENT LAW AND COMPLIANCE

Employment law and compliance concerns the legal framework within which organizations must operate in their treatment of employees. Laws and regulations exist covering a wide range of human resource practices, including recruiting, hiring and firing, performance appraisal, compensation, health and safety, and labor relations. Employers must comply with a myriad of federal and state laws and regulations.

This article will focus on identifying and summarizing the major federal laws that comprise employment law. Exhibit 1 shows some of the more important federal employment laws. The exhibit is divided into four sections: anti-discrimination law, compensation law, health and safety law, and labor relations law. The sections that follow provide additional information on each of these areas, with special emphasis on anti-discrimination laws, which probably have a broad impact on the activities of employers.

ANTI-DISCRIMINATION LAWS

Anti-discrimination law has had a growing impact on U.S. businesses over the past five decades. The body of federal law has increased in size and complexity and developed into new areas since passage of the Civil Rights Act of 1964. Additionally, developments in Supreme Court doctrine have had an important impact on anti-discrimination law, prompting changes in judicial interpretation as well as responses from Congress that have led to further developments in anti-discrimination policy. Throughout this ongoing process, employers have been required to keep up with the current status of the laws, a task that is often complicated not only by the sheer size of the body of anti-discrimination law, but by uncertainties about court rulings and future legislative actions.

Title VII. Without a doubt, the most important anti-discrimination law is Title VII of the Civil Rights Act of 1964. Title VII was initially motivated by the U.S. government's desire to end workplace discrimination against African Americans, which was brought to national attention by the civil rights movement of the 1950s and 1960s. However, by the time the law was passed and signed into law in 1964, it had become a comprehensive workplace anti-discrimination law.

Title VII prohibits workplace discrimination on the basis of race, color, religion, national origin, and sex. Affected organizations must not discriminate in any employment decision or in regard to any term or condition of employment. Title VII applies to all U.S. organizations with fifteen or more employees, as well as labor unions and public sector employers. Only a few U.S. employers with more than fifteen employees are exempt from Title VII.

Exhibit 1
Sampling of Major Federal Employment Laws

Anti-Discrimination Laws	Major Provisions
Title VII of the Civil Rights Act 1964	Prohibits employment discrimination based on race, color, religion, national origin, and sex.
Age Discrimination in Employment Act 1967	Prohibits employment discrimination against applicants or employees aged 40 and older.
Americans with Disabilities Act 1990	Prohibits employment discrimination against qualified applicants or employees with a physical or mental disability.
Civil Rights Act 1991	Codifies the "adverse impact" theory of discrimination. Clarifies and strengthens rules for enforcement of the anti-discrimination provisions in Title VII.
Compensation Laws	
Fair Labor Standards Act 1938	Requires employers to pay a federal minimum wage to non-exempt workers. Requires employers to pay overtime pay to non-exempt workers.
Equal Pay Act 1963	Requires employers to pay men and women equally for doing substantially the same work, unless differences in pay are based on merit, quantity or quality of production, or any other factor other than sex.
Labor Laws	
Wagner Act 1935	Establishes the National Labor Relation Board. Lays out the framework for union organizing activities. Identifies and bans unfair management practices in regard to unionization.
Taft Hartley Act 1947	Identifies and bans unfair labor union practices in regard to union organizing efforts. Bans the closed shop and allows states to pass "right-to-work" laws that give workers the right to refuse to join a union. Allows the president to temporarily stop strikes that imperil the national interest.
Health and Safety Laws	
Occupational Safety and Health Act	Establishes general safety standards and standards for specific industries. Requires employers to record and report accidents that occur in the workplace. Lays out rules for federal workplace inspections and penalties for violations of the act.

Title VII was amended in 1972 by the Equal Employment Opportunity Act. This law strengthened the enforcement of Title VII, which up to that time had been largely ineffective in changing workplace practices. The Equal Employment Opportunity Commission, a quasi-independent federal government agency, is in charge of enforcing Title VII, as well as many other anti-discrimination laws.

Employees alleging workplace discrimination that falls under the purview of the EEOC must report the alleged discrimination to the EEOC or one of the state-level fair employment offices that exists in every state. The EEOC has the right to investigate claims of discrimination or to initiate investigations itself. Many times the EEOC will attempt to work out a solution with the affected organization, which may or may not involve an admission of guilt by the employer. If conciliation fails, the EEOC also has the right to bring class-action discrimination lawsuits against organizations on behalf of a "class" of employees who have allegedly suffered from discrimination.

If the EEOC's investigation does not reveal a strong case of discrimination, the agency can still issue a "right-to-sue" letter to a plaintiff, which gives that person the right to bring their charges of discrimination against an employer to state or federal court, whichever is appropriate in a given case. Some claims of discrimination filed with the EEOC do not have merit and the EEOC often issues findings to that effect—but such findings still do not prevent the individual plaintiff from filing his or her own lawsuit against an employer.

Civil Rights Act of 1991. In the late 1980s, the Supreme Court decided several employment discrimination cases that made it more difficult for employees to prove discrimination cases in court. Concerned about these cases, the U.S. Congress addressed several issues by passing the 1991 Civil Rights Act. This act modified some of the procedures and rights in discrimination cases and strengthened Title VII protections.

One of the major changes made by this act was the codification of the "disparate impact" theory of discrimination, which makes it easier for employees alleging discrimination to prove their case. Instead of requiring plaintiffs to prove discriminatory intent, the theory means that plaintiffs only have to show that there was a discriminatory effect. This act also allowed plaintiffs to have jury trials under some circumstances, instead of "bench" trials decided by a federal judge. Juries tend to be sympathetic to plaintiffs, particularly those suing large corporations, so this was a major victory for employees. Another major change was that Title VII protections were extended to certain types of organizations that had not been covered before (for example, the law extended the reach of Title VII to the federal government, which prior to passage had been exempt). Finally, the law banned the "race norming" of employment test scores.

Sexual Harassment. For many years, most discrimination claims filed under Title VII were race discrimination cases. However, with the advent of sexual harassment lawsuits in the late 1970s and 1980s, sex discrimination cases became quite common. Sexual harassment at the workplace is a long-standing problem, affecting working women, as well as many men. Sexual harassment came to light during the mid-1970s and has since gained a great

deal of national attention. The growing attention to the topic stems from a number of well-publicized events in the 1990s—the Clarence Thomas hearings, the 1991 Tailhook Convention where several women were severely harassed by naval pilots, and the accusations made by Arkansas state employee Paula Jones about then-governor Bill Clinton.

Sexual harassment is a form of sex discrimination and therefore violates Title VII of the Civil Rights Act. The number of sexual harassment complaints filed with the Equal Employment Opportunity Commission (EEOC) rose significantly throughout the 1990s, going from about 6,000 in 1991 to a peak of over 15,000 in 1997. That number held steady throughout the late 1990s and early 2000s, but it began to decline in the mid 2000s, and by 2007 was down to just over 12,000. However, this is still more than double the number in 1991. The majority of these complaints involve claims of unwanted physical contact, offensive language, sexual propositions, and socialization or date requests.

An employer should establish a written sexual harassment policy. The policy should specify grievance procedures by which employees can bring claims of harassment to management's attention. These procedures should provide employees with opportunities to bypass their supervisor if the supervisor is the one being accused. The company should also provide supervisory training that focuses on the legal definition of sexual harassment.

In addition to holding formal training sessions, top management should also meet with employees to emphasize management's strong commitment to keep the workplace free of harassment. The employer should also have investigative guidelines that maintain employee confidentiality. The EEOC recommends that a committee that consists of both men and women should investigate sexual harassment claims. Committee members should receive investigative training.

Age Discrimination in Employment Act. The federal government added to employment law with the passage of the Age Discrimination in Employment Act (ADEA) of 1967. This law prohibited discrimination in employment decisions on the basis of age, provided the person affected was between 40 and 70 years old. Initially, the law allowed mandatory retirement policies, but later amendments phased out and eventually prohibited mandatory retirement. The ADEA also contains specific guidelines for the operation of benefit, pension, and retirement plans.

The heart of the ADEA is the prohibition of discrimination in employment decisions on the basis of age. For many years, age discrimination suits have been more difficult to prove against organizations because the person alleging discrimination had to show that the employer had a specific intent to discriminate on the basis of age, that there was no other explanation for the employment decision other than age, and that there was a specific employer policy or procedures that was discriminatory. In short, the person had to prove what is called "disparate treatment" under employment law.

However, the Supreme Court decision in *Smith v. City of Jackson*, handed down in 2005, changed the interpretation of this law, allowing those alleging age discrimination to proceed under what is called the "disparate impact" theory of discrimination. This means that the person or persons alleging age discrimination would not have to prove discriminatory intent. Instead, the person would only have to show that some action by the employer had a disproportionately negative effect on workers age 40 and older. Once this was done, the employer would have the burden to show that the discriminatory action was job-related or consistent with business necessity. After the ruling was handed down, commentators remarked that this new interpretation would increase the instance of age discrimination suits and make it more likely for these suits to be successful; however, some legal scholars pointed out that this was not the case, and it has turned out that age discrimination suits have not significantly increased in number or success since the *Smith* ruling.

Americans with Disabilities Act. The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination in any employment decision against qualified applicants or employees with a disability. It also requires employers to reasonably accommodate the disabilities of applicants and employees. The ADA applies to the same set of companies covered by Title VII.

Three definitions are key to understanding the ADA. First, is the definition of disability, which is any physical or mental impairment that prevents the person from engaging in a major life activity. Covered disabilities include both physical and mental impairments. The extent of the disabilities covered is one of the more controversial aspects of the law. Some conditions are specifically excluded from coverage, including pyromania and kleptomania.

A second key definition is that of qualification. Under the ADA, a person with a disability is qualified for a job if he or she can perform the essential functions of the job with or without accommodation. This means that the person does not have to be able to do every single duty of the job, if they are very minor, but that he or she must be able to perform the major responsibilities of the job.

A third important definition under the law is reasonable accommodation. A reasonable accommodation is one that does not cause an undue hardship on the employer. Undue hardship would be determined on a case-by-case

basis and would consider the cost and inconvenience to the employer of accommodating the disability.

The ADA has resulted in many disability discrimination complaints with the EEOC, as well as many lawsuits against employers. Although the law, like most, has had unintended consequences, its net effect appears to have been a positive one, as it seems to have increased opportunities for qualified, disabled workers.

The ADA has been a frequent target of criticism for allowing claims by people with only minor disabilities (such as chronic neck or back pain), for creating a group of professional plaintiffs who make a living out of suing non-compliant businesses, and for placing undue financial burdens on businesses to accommodate persons with disabilities. The Supreme Court has signaled its support of the ADA by ruling in a number of cases to uphold its provisions or apply them in challenged areas. One example, *Barden v. The City of Sacramento* (1999), involved applying the ADA to the construction of city sidewalks. The Supreme Court let stand a lower court ruling that sidewalks must be made accessible to persons with disabilities. In a 2005 case, the Supreme Court ruled that the ADA applied to employment on ships flying foreign flags if the businesses had headquarters in the United States. Given the direction of case law in this area, it seems likely that the Court will continue to take a supportive stand on the ADA.

COMPENSATION LAWS

Since the first minimum wage law was passed in 1938, the federal government has enacted a wide variety of compensation laws.

Fair Labor Standards Act. The most important compensation law is the Fair Labor Standards Act (FLSA), passed in 1938. This law provides the basic framework within which millions of U.S. workers are paid. These workers are called "non-exempt" workers. These workers are those who, by virtue of the type of jobs they hold, must be paid in accordance with the FLSA. Exempt workers, who are not covered by the law, are primarily executive, managerial, professional, and highly-paid technical workers.

Perhaps the most important provision of this law is the federal minimum wage provision. Because of this law, non-exempt workers must be paid a basic minimum wage. This wage has periodically been raised to higher levels. Non-exempt workers must also be paid overtime for hours worked in excess of a standard workweek, which in most industries is forty hours per week. The current federal minimum wage law is the Fair Minimum Wage Act of 2007, which gradually raises the minimum wage from its 1997 level of $5.15 per hour to $7.25 per hour by the middle of 2009; the 2007 increase to $5.85 was the first increase in the minimum wage in ten years.

A final provision of the act does not involve compensation directly, but the employment of minors. The law prevents the employment of minors in almost all jobs before the age of fourteen, and places fairly stringent restrictions on the employment of children between the ages of fourteen and eighteen.

Equal Pay Act. The Equal Pay Act (EPA) was passed in 1963 as an amendment to the FLSA. The Equal Pay Act requires a single employer to pay men and women equally for doing "substantially" the same job for the employer. An employer is allowed to pay men and women differently if the difference is based on merit, quantity of production, quality of production, or any other factor other than gender. Thus, the law does not mean that men and women doing the same work can't be paid differently, only that the difference must not be based on the sex of the worker.

Since the passage of the EPA, women's pay as a percentage of men's pay has risen significantly, from 62 percent in 1970 to 80 percent in 2004. Because the EPA's goals have not been fully achieved, Senator Hillary Clinton introduced the "Paycheck Fairness Act" in 2007. This proposed law would expand damages under the EPA, amend one of the very broad defenses of unequal pay available to employers, and call on the EEOC to propose guidelines for employers to evaluate jobs in order to eliminate unfair gender disparities.

LABOR RELATIONS LAWS

The National Labor Relations Act of 1935, known popularly as the Wagner Act, was the first law to provide a full framework within which labor union and management would interact in the United States. This act guaranteed workers' basic right to organize and created the National Labor Relations Board to oversee union-management relations. It also provided for an election process for unionization efforts in U.S. businesses, and it prohibited five major "unfair labor practices" on the part of U.S. employers.

The Wagner Act was amended and reduced in power in 1947, when Congress enacted the Taft-Hartley Act over President Harry Truman's veto. This act is still in effect. Whereas the Wagner Act was "pro-labor" in its effect, the Taft-Hartley Act was most decidedly "pro-business" in its provisions. Most significantly, Taft-Hartley laid out several "unfair practices" of labor unions and banned them. It also gave the president authority to issue an injunction temporarily stopping a strike, if the strike is deemed to be causing a threat to national security or creates an emergency detrimental to the national interest.

Another important provision banned the union security arrangement known as the closed shop. In a closed shop, individuals must belong to the appropriate union before they can be hired by a company. This arrangement is now

banned in all but a handful of situations. The act also gave the states the right to pass what are called "right-to-work" laws, which create "open shops." An open shop exists when no individual can be compelled to join a union before or after they are hired, even if the employer's workforce is organized. Labor unions typically object to open shops, as they make it difficult for unionization efforts to succeed. Twenty-two states, mostly located in the South, Southwest, and Great Plains regions, are "right-to-work" states.

HEALTH AND SAFETY LAWS

The primary law relating to the health and safety of U.S. workers is the Occupational Safety and Health Act, passed in 1970. This law is controversial because it imposes very complex and detailed safety standards on thousands of U.S. businesses. The Occupational Safety and Health Administration (OSHA) was created to administer and enforce the law.

OSHA has general safety standards for almost all employers and specific standards for certain industries. It has workplace inspectors who have the right to, with a search warrant, inspect the conditions in almost any business in the United States. OSHA has the right to respond to employee complaints of unsafe conditions and in fact, the highest priority for OSHA inspections are those situations that pose an imminent threat to the health and safety of workers.

OSHA has the power to impose penalties on employers who violate its provisions. The severity of the penalties will vary based on the seriousness of the violation, a first or repeat offense, the cooperation of the business, and the size of the business. Although many U.S. companies do not like dealing with OSHA, it does appear that the law and its enforcement has resulted in improvements in the health and safety conditions in U.S. businesses.

OTHER MAJOR LAWS

The Family and Medical Leave Act. The Family and Medical Leave Act (FMLA) of 1993 requires all employers with fifty or more employees to grant workers up to twelve weeks of unpaid leave per year for the care of a newborn child, an ill family member, or their own illness. Employees may take the leave all at once or in increments.

While it helps employees, the FMLA can be quite costly to employers when they must replace workers on leave. Because women are more likely to use these leaves, companies that employ a majority of women are especially hard-hit. Consider the case of Sibley Memorial Hospital of Washington, D.C.: The hospital ran into difficulty when trying to replace an employee on leave. Because she worked in an extremely specialized position, the hospital could not find a replacement locally. In addition to paying the on-leave employee's medical benefits, Sibley had to pay for the replacement worker's round-trip airfare, weekly housing, car rental, and salary. At the end of the original employee's leave, she informed the hospital that she would not be returning to work.

The FMLA protects employers from this type of problem in two ways: (1) it allows employers to exempt workers with highest earnings, and (2) it requires employees to reimburse the employer for insurance premiums paid during the leave if they are able to return to work, yet choose not to do so. While Sibley Memorial Hospital was not able to utilize the first protection (the employee's salary was not among the top 10 percent), it was reimbursed for its insurance payments.

Employee Privacy Laws. Privacy has become one of the most important workplace issues of the twenty-first century. Privacy concerns surface at the workplace when organizations attempt to collect and/or disseminate information about employees in ways that intrude upon their privacy. Privacy issues also surface when employee behavior is constrained by certain workplace rules and policies, denying employees the right to be "let alone," or to do as they please.

Employees may justifiably lodge an invasion of privacy claim if the information collected by an employer is irrelevant to the employer's business needs. A company should have a clear business reason for each piece of information collected and maintained on an individual. For example, a company should not collect information about an employee's spouse unless that information is needed for benefits administration or some other useful purpose.

As a general rule, information pertaining to such personal issues as home ownership, previous marriages, sexual orientation, parents' occupations, and previous arrest records are usually of no concern to employers, and efforts to collect such information could pose legal threats to the company.

Privacy Act. Should employees have access to data kept on them? According to the Privacy Act of 1974, public-sector employees must be given access to any information in their files. Specifically, the act states that employees have the right to:

- Determine what information is being kept on them by their employers.

- Review that information.

- Correct erroneous information.

- Prevent the information from being used for a purpose other than that for which it was collected.

An important limitation to the Privacy Act was enacted in 2007, when President Bush exempted the Department of

Homeland Security and the Arrival and Departure System from the provisions of the act. While the Privacy Act does not cover private-sector employees or non-U.S. citizens, most companies do allow employees to access to their own records as a good employee-relations gesture. Prohibiting employees from seeing their own files may create doubts and suspicions regarding the company's good faith efforts to create business-relevant personnel files.

SEE ALSO *Discrimination; Diversity; Human Resource Management; Quality of Work Life; Safety in the Workplace*

BIBLIOGRAPHY

Bennett-Alexander, Dawn, and Laura Pincus. *Employment Law for Business.* 5th ed. Boston, MA: Irwin McGraw-Hill, 2007.

Kleiman, Lawrence. *Human Resource Management: A Tool for Competitive Advantage.* 4th ed. Cincinnati, OH: South-Western College Publishing, 2006.

Kramer, Ronald J., Camille A. Olson, and William P. Schurgin. *Guide to Employment Law Compliance.* 3rd ed. Washington, DC: Thompson, 2007.

Silverman, Michael G. *Compliance Management for Public, Private, or Non-Profit Organizations.* Boston: McGraw-Hill, 2008.

U.S. Equal Employment Opportunity Commission (EEOC). Available from: http://www.eeoc.gov.

Wolkinson, Benjamin W., and the MSU Employment Law Group. *Employment Law: The Workplace Rights of Employees and Employers.* 2nd ed. Cambridge, MA: Blackwell, 2007.

EMPOWERMENT

The primary goal of employee empowerment is to give workers a greater voice in decisions about work-related matters. Their decision-making authority can range from offering suggestions to exercising veto power over management decisions. Although the range of decisions that employees may be involved in depends on the organization, possible areas include: how jobs are to be performed, working conditions, company policies, work hours, peer review, and how supervisors are evaluated.

Many experts believe that effective use of employee empowerment can allow organizations to increase productivity. This occurs in two ways. First, empowerment can strengthen motivation by providing employees with the opportunity to attain intrinsic rewards from their work, such as a greater sense of accomplishment and a feeling of importance. In some cases, intrinsic rewards such as job satisfaction and a sense of purposeful work can be more powerful than extrinsic rewards such as higher wages or bonuses. Motivated employees clearly tend to put forth more effort than those who are less motivated. Second, employee empowerment can increase productivity through encouraging better decision-making skills. Especially when decisions require task-specific knowledge,

those on the front line can often better identify problems, particularly when they are empowered to do so.

Empowering employees to identify problems, combined with higher-level management involvement in coordinating solutions across departmental boundaries within the firm, can enhance the overall decision-making process and increase organizational learning. For example, Toyota Motor Company empowers some of its employees to identify and help remedy problems occurring during product assembly. An automobile coming off Toyota's assembly line with a paint defect is seen as an opportunity to delve into the root cause of the defect, as opposed to merely fixing the defect and passing it on to distributors for resale. Solutions resulting from employee involvement tend to have more employee buy-in when it comes to implementation. Because such solutions are generated from the front lines, this further enhances the potential for productivity improvements by reducing the attitude that solutions are "passed down from above."

A number of different human resource management programs are available that grant employee empowerment to some extent. A number of these are discussed in the following sections, including informal participative decision-making programs, job enrichment, continuous improvement, and self-managed work teams.

INFORMAL PARTICIPATIVE DECISION-MAKING PROGRAMS

Informal participative decision-making programs involve managers and subordinates making joint decisions on a daily basis. Employees do not enjoy blanket authority to make all work-related decisions; managers decide just how much decision-making authority employees should have in each instance. The amount of authority varies depending on such situational factors as decision complexity and the importance of employee acceptance of the decision. While it may seem obvious, one key to empowerment is choosing under what conditions to empower employees. Employees should be empowered in situations where they can make decisions that are as good as, or better than, those made by their managers.

One possible problem with these types of programs is that the interests of workers may not align with those of the organization. For example, at one university a department head delegated the task of determining job performance standards to the faculty. Because the faculty believed that it was not in their own best interest to develop challenging standards, the standards they eventually developed were easily attainable. The success of empowerment also often hinges on whether employees want to participate in decision making. Some employees, for instance, have no desire to make work-related decisions. Suggestions for increasing employee participation levels include work situations where:

1. All possible solutions are equally effective. For example, consider employee vacation schedules. If one solution is as good as another, employee groups can be empowered to work out the scheduling.

2. Managers do not possess sufficient information or expertise to make a quality decision without employee input. Managers should at least consult their employees before a decision is reached to prevent overlooking solutions that may appear obvious to front-line employees, but which may be more evasive for higher-level managers who are unfamiliar with front-line practices.

3. Managers do not know exactly what information is needed or how to find it. Again, managers should at least consult their employees before a decision is reached to determine whether employees have the information required to make an effective decision.

4. The group's acceptance of, or commitment to, effective implementation is crucial and the group is unlikely to accept a manager's unilateral decision. If employees' acceptance is crucial, participative decision-making should be used. As alluded to previously, employees tend to accept decisions more willingly if they have had a voice in the decision-making process. One caveat is that the participation should be genuine; managers should not ask for employee input simply to give the appearance of participation. Employees can usually recognize this ploy and, if they do, feelings of distrust will likely develop.

5. Employees' goals are aligned with those of management. If employees do not share management's goals, participative decision-making would be inappropriate, because the two parties would be at odds.

Several studies have examined the effects of informal participative decision-making programs. While the results have been mixed and thus cannot be considered definitive, most studies have found that informal participative decision-making programs do, in fact, have a positive impact on productivity.

JOB ENRICHMENT

Sometimes, employees are not motivated because of the way their jobs are designed. For example, consider the job of an assembly-line worker who does nothing but place a screw in a hole as the product passes by on the production line. Such a job provides little opportunity for workers to gain intrinsic rewards. Job enrichment aims to redesign jobs to be more intrinsically rewarding. Certain job characteristics help managers to build enrichment into jobs. These characteristics (summarized in Exhibit 1) include:

Exhibit 1

Job Characteristics That Enhance Intrinsic Motivation

1. Skill Variety: The degree to which a job requires a variety of different activities to carry out the work. A job has high skill variety if it requires a number of different skills and talents.

2. Task Identity: The degree to which a job requires completion of the whole and identifiable piece of work. A job has high task identity if the worker does the job from the beginning to end with a visible outcome.

3. Task Significance: The degree to which the job has a substantial impact on the lives of other people, whether these people are in the immediate organization or in the world at large. A job has a task significance if people benefit greatly from results of the job.

4. Autonomy: The degree to which the job provides the workers with autonomy. A job has high autonomy if workers are given substantial freedom, independence, and discretion in scheduling the work and determining the procedures to be used in carrying it out.

5. Job Feedback: The degree to which the job provides the worker with knowledge of results. A job has high job feedback if carrying out the work activities required by the job provides the individual with direct and clear information about the effectiveness of his or her performance.

- **Skill variety.** The various skills needed to perform a given task, where increased skill requirements are associated with increased motivation.

- **Task identity.** The degree to which employees perceive how their job impacts the overall production of a product or service.

- **Task significance.** Whether the task is meaningful beyond the task itself.

- **Autonomy.** Employee discretion over how to perform a task.

- **Feedback.** Input from peers and supervisors regarding the quality of an employee's work.

When these characteristics are present in a job, employees tend to be more motivated than when these characteristics are not present. However, there is not a "silver bullet" for motivating employees through empowerment; there is considerable variation in the degree to which each of these empowerment factors motivates individuals. On the other hand, it is a mistake to think that because certain individuals do not respond equally to such job designs that overall productivity will not increase as a result of empowerment through proper job design and enrichment. In general, productivity tends to increase despite the inherent variation of specific effects.

Once a job has been identified as needing enrichment, the organization must redesign it to incorporate these characteristics: skill variety, task identity, task significance, autonomy, and feedback. Some specific job enrichment techniques include:

- **Combine tasks.** This involves assigning tasks performed by different workers to a single individual. For example, in a furniture factory, rather than working on just one part of the production process, each person could assemble, sand, and stain an entire table or chair. This change would increase skill variety, as well as task identity, as each worker would be responsible for the job from start to finish.

- **Establish client relationships.** Client relationships could be established by putting the worker in touch with customers. For example, an auto dealership service department could allow its mechanics to discuss service problems directly with customers, rather than going through the service manager. By establishing client relationships, skill variety is increased because workers have a chance to develop interpersonal skills. It also provides them with a chance to do a larger part of the job (task identity), to see how their work impacts customers (task significance), and to have more decision-making authority (autonomy).

- **Reduce direct supervision.** Workers gain autonomy when they are given responsibility for doing things previously done by supervisors. For instance, clerks could be allowed to check for their own errors or be allowed to order supplies directly.

A variation of this type of employee empowerment is illustrated by freight transportation company Con-way Inc. In May 2008, Con-way launched a "driver career choice" program, in which drivers were informed of open positions at sister companies before the jobs were officially advertised to the public. Thus the employee experience was enriched via a reduction of direct supervision, i.e., access to information that would have normally been handled solely by the management. While this program benefited the drivers by giving them greater autonomy to direct their careers, it also benefited the management by automatically creating a pool of experienced job candidates.

Many organizations have successfully enriched otherwise dull jobs, thereby empowering employees to have greater control over their work and the decisions affecting them. In addition to increased productivity, empowerment also may lead to improvements in product or service quality, reduced absenteeism rates, and increased employee retention. In situations where enriched jobs become less automated, however, production may become less efficient. Job enrichment would thus be ill-advised in situations where the loss in efficiency cannot be offset by productivity gains stemming from increased motivation. Moreover, employees preferring highly automated, easy jobs are likely to oppose job enrichment efforts.

CONTINUOUS IMPROVEMENT

Companies adopting continuous improvement attempt to build quality into all phases of product or service design, production, and delivery. Often referred to as total quality management, these programs empower workers to trace product or service problems to their root causes and redesign production processes to eliminate them using various problem-solving and statistical techniques. In these situations, empowerment arises from the need to involve employees at nearly all organizational levels in continuous improvement efforts. The use of continuous improvement programs have grown rapidly, built on the successful experiences of numerous companies. Xerox, for example, was able to decrease the number of customer complaints it received by 38 percent after implementing continuous improvement methods, and Motorola reduced the number of defects in its products by 80 percent. Proponents of self-managed work teams claim they succeed because they are customer-focused and promote sound management practices like teamwork, continuous learning, and continuous improvement.

SELF-MANAGED WORK TEAMS

Self-managed work teams have the authority to manage themselves. Rather than having managers control their work, self-managed work teams incorporate group norms to regulate activities. They plan, organize, coordinate, and take corrective actions. Some can hire, fire, and discipline team members with little intervention from higher levels of management. In short, self-managed work teams are given responsibilities usually held by managers, but control comes from the concerted influence of the team rather than from more formal means. Not surprisingly, managers' jobs are minimized and group norms are maximized when self-managed work teams are used. Self-managed work teams are not for all organizations; characteristics needed for success include:

- **Technical skills.** Cross-training, which allows team members to move from job to job within the team, is essential. Thus, team members should receive training in the specific skills that will broaden their personal contributions to the overall effort.

- **Interpersonal skills.** Team members must communicate effectively, both one-on-one and in groups. Cooperative decision-making within and among teams demands the skills of group problem solving, influencing others, and resolving conflicts. Team members must learn problem-solving skills that assist in zeroing in on problem areas, gathering facts, analyzing causes, generating alternatives, selecting solutions, and other related facets.

- **Administrative skills.** Self-managed work teams must perform tasks formerly handled by supervisors. The team must learn how to keep records, report procedures, budget, schedule, monitor, and appraise the performance of team members.

Research findings concerning self-managing teams have been largely positive. Proponents claim that self-managed work teams are effective because they empower employees to make decisions that affect their day-to-day business lives. Thus, these teams radically change the way that employees value and think about their jobs. Other benefits associated with self-managed teams include greater flexibility to respond to market changes and competitive pressures.

However, there are a number of drawbacks. As noted previously, self-managed teams are not for every organization. Some may be better served by other ways of empowerment, rather than the dramatic empowerment seen with self-managed teams. Drawbacks can include:

- Rivalry within and across teams.

- A shortage of time and skills on the team to deal with conventional management concerns like hiring, training, and resolving interpersonal disputes.

- Difficulty appraising employees in the absence of a traditional management figure.

In addition to these concerns, one of the most difficult issues companies face with self-directed work teams is deciding how to effectively implement them. A number of obstacles must be overcome. Sometimes, managers are reluctant to relinquish control and employees are reluctant to accept new responsibilities. To prepare team members for self-management, the organization must provide a considerable amount of training. Without proper training, teams are likely to become bogged down permanently in mid-process.

As the previous discussion suggests, empowerment is not a single event or process, but rather takes a variety of forms. The degree of empowerment ranges from asking employees for input to allowing total discretion. Informal participative decision-making programs, job enrichment, continuous improvement, and self-managed work teams are some of the ways that organizations empower employees, giving them more control, but at the same time increasing overall organizational productivity.

SEE ALSO *Continuous Improvement; Human Resource Management; Quality and Total Quality Management; Teams and Teamwork*

BIBLIOGRAPHY
Con-way Launches Industry-First Driver Career Choice Program. CNN Money. Available from: http://money.cnn.com/news/newsfeeds/articles/marketwire/0393475.htm.

Druskat, Vanessa Urch, and Jane V. Wheeler. "How to Lead a Self-Managing Team." *MIT Sloan Management Review* 45, no. 4 (2004): 65–72.

Empowering Your Employees. BNET. Available from: http://www.bnet.com/2410-13059_23-95573.html.

Hawley, Casey Fitts. *201 Ways to Turn Any Employee into a Star Performer.* New York: McGraw-Hill, 2004.

Langfred, C.W., and Neta A. Moye. "Effects of Task Autonomy on Performance: An Extended Model Considering Motivational, Informational, and Structural Mechanisms." *Journal of Applied Psychology* 89, no. 6 (2004): 934–946.

Meyer, John P., Thomas E. Becker, and Christian Vandenberghe. "Employee Commitment and Motivation: A Conceptual Analysis and Integrative Model." *Journal of Applied Psychology* 89, no. 6 (2004): 991–998.

Pfeffer, Jeffrey. "How Companies Get Smart." *Business 2.0* 6, no. 1 (2005): 74.

Seibert, Scott E., Seth R. Silver, and W. Alan Randolph. "Taking Empowerment to the Next Level: A Multiple-Level Model of Empowerment, Performance, and Satisfaction." *Academy of Management Journal* 47, no. 3 (2004): 332–350.

Thompson, Neil. *Power and Empowerment.* London: Russel House Publishing Limited, 2007.

ENTERPRISE RESOURCE PLANNING

Enterprise resource planning (ERP) refers to a computer information system that integrates all the business activities and processes throughout an entire organization. ERP systems incorporate many of the features available in other types of manufacturing programs, such as project management, supplier management, product data management, and scheduling. The objective of ERP is to provide seamless, real-time information to all employees throughout the enterprise. Companies commonly use ERP systems to communicate the progress of orders and projects throughout the supply chain, and to track the costs and availability of value-added services.

ERP systems offer companies the potential to streamline operations, eliminate overlap and bottlenecks, and save money and resources. However, ERP systems are very expensive and time-consuming to implement, and surveys have shown that not all companies achieve the desired benefits. According to the online business resource *Darwin Executive Guides*, it is "a tall order, building a single software program that serves the needs of people in finance as well as it does the people in human resources and the warehouse...To do ERP right, the ways you do business will need to change and the ways people do their jobs will need to change too. And that kind of change doesn't come without pain."

EVOLUTION OF ERP

ERP is a part of an evolutionary process that began with material requirements planning (MRP). MRP is a computer-based, time-phased system for planning and controlling the production and inventory function of a firm—from the purchase of materials to the shipment of

finished goods. It begins with the aggregation of demand for finished goods from a number of sources (orders, forecasts, and safety stock). This results in a master production schedule (MPS) for finished goods. Using this MPS and a bill-of-material (a listing for all component parts that make up the finished goods), the MRP logic determines the gross requirements for all component parts and subassemblies. From an inventory status file, the MRP logic deducts the on-hand inventory balance and all open orders to yield the net requirements for all parts. Then all requirements are offset by their lead times to provide a date by which an order must be released in order to avoid delaying the production of finished goods.

From this MRP logic evolved manufacturing resource planning (MRP II). Before MRP II, many firms maintained a separate computer system within each functional department, which led to the overlap in storage of much of the firm's information in several different databases. In some cases, the firm did not even know how many different databases held certain information, making it difficult, if not impossible, to update it. This could also cause confusion throughout the firm if different units (such as engineering, production, sales, and accounting) held different values for the same variables. MRP II expands the role of MRP by linking together such functions as business planning, sales and operations planning, capacity requirements planning, and all related support functions. The output from these MRP II functions can be integrated into financial reports, such as the business plan, purchase-commitment report, shipping budget, and inventory projections. MRP II is capable of addressing operational planning in units or financial planning in dollars, and has a simulation capacity that allows its users to analyze the potential consequences of alternative decisions.

The next step in the evolutionary process was enterprise resource planning (ERP), a term coined by the Gartner Group of Stamford, Connecticut. ERP extends the concept of the shared database to all functions within the firm. Like MRP II systems, ERP systems rely on a common database throughout the company with the additional use of a modular software design that allows new programs to be added to improve the efficiency of specific aspects of the business. By entering information only once at the source and making it available to all employees, ERP enables each function to interact with one centralized database and server. This eliminates not only the need for different departments within the firm to reenter the same information over and over again into separate computer systems, but also the incompatibility that was created by past practice.

FEATURES OF ERP

ERP is a hybrid of many different types of software, incorporating many of the features available in other programs. ERP provides a way to keep track of materials, inventory, human resources, billing, and purchase orders. It is also useful for managing various types of orders, from mass-customized orders where daily or weekly shifts occur within the plant or multiple plants, to products that are made-to-stock, made-to-order, or assembled-to-order.

Higher-level ERPs employ design engineering and engineering change control modules. These modules facilitate the development of new product-engineering information and provide for modification of existing bills of material, allowing engineers to support working models of items and bills of material prior to their production releases.

It is important to understand that ERPs are not cheap to implement and operate, nor can they be implemented overnight. Owens-Corning spent more than $100 million over the course of two years installing one of the most popular ERP systems, SAP AG's R/3 system. Microsoft spent $25 million over 10 months installing R/3. Chevron also spent $100 million on installation. Apparently, however, the benefits of ERP implementation and use can be enormous. Microsoft used its ERP system to replace thirty-three different financial tracking systems used in twenty-six of its subsidiaries, with an expected savings of $18 million annually. In the same respect, Chevron expected to recoup its $100 million investment within two years.

Owens-Corning's aim was to offer buyers one-stop shopping for insulation, pipes, and roofing material. Use of the R/3 facilitated this goal by allowing sales representatives to quickly see what products were available at any plant or warehouse. Analog Devices use the R/3 to consolidate the products stored at its warehouse, thereby creating an international order-processing system that can calculate exchange rates automatically.

ERP AND SUPPLY CHAIN MANAGEMENT

When ERP systems first appeared, they acted as the connection between front-office operations (e.g., sales and forecasting) and the day-to-day functions of manufacturing. As ERP technology has advanced, the systems have increasingly incorporated logistics and warehousing capabilities, further connecting them with the supply chain. Some ERP systems offer Internet functionality, which can provide real-time connectivity from suppliers to the end customer.

The result of ERP use is more than an automation of existing processes—it is a significantly new way of doing business that enables a firm to respond to market changes more rapidly and efficiently. This can apply to service firms as well as manufacturers. Many ERP packages also let the user track and cost service products in the same way they compute the cost of making, storing, and shipping physical products.

RECENT DEVELOPMENTS

The same technological advances that made MRP, MRP II, and ERP more useable and powerful have led to the improvement of other systems with similar purposes, such as lean manufacturing and just-in-time (JIT) production. ERP has been challenged in recent years by improvements in these other areas, with some firms coming to see ERP systems as obsolete. However, research has found that in certain environments with advance demand information, ERP systems yield better performance than their competitors. In 2007, author Phil Robinson noted that "when properly implemented, an ERP package can be the most cost-effective project a company has ever seen."

Others note that MRP and EPR systems are so entrenched in businesses that they no longer provide a source of competitive advantage, necessitating further advances in these systems' use. In 2005, the authors of *Manufacturing Planning and Control for Supply Chain Management* pointed out that sustaining competitive advantage would require that manufacturing planning and control (MPC) systems cross organizational boundaries to coordinate company units that have traditionally worked independently. Calling this the "next frontier" for manufacturing planning and control systems, they recommended that organizations should begin working in pairs or dyads to develop jointly new MPC systems that would allow integrated operations. This approach would allow organizations to learn as much as possible from each dyad and then leverage what they have learned into other dyads.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Management Information Systems; Manufacturing Resources Planning*

BIBLIOGRAPHY

Hanson, J.J. "Successful ERP Implementations Go Far Beyond Software." *San Diego Business Journal* 5 July 2004.

Larson, Melissa. "Meet Customer Demands with New ERP Systems." *Quality* February 1998, 80–81.

Millman, Gregory J. "What Did You Get from ERP and What Can You Get?" *Financial Executive* May 2004.

Monk, Ellen F., Bret Wagner, and Joseph Brady. *Concepts in Enterprise Resource Planning.* 3rd ed. Boston: Thompson Course Technology, 2008.

O'Leary, Daniel F. *ERP: Systems, Life Cycle, E-Commerce, and Risk.* Cambridge University Press, 2000.

Olinger, Charles. "The Issues Behind ERP Acceptance and Implementation." *APICS: The Performance Advantage* June 1998, 44–48.

Robinson, Phil. "ERP (Enterprise Resource Planning) Survival Guide." *The Business Improvement Consultancy* 2007. Available from: http://www.bpic.co.uk/erp.htm.

Vollmann, Thomas E., et al. *Manufacturing Planning and Control for Supply Chain Management.* Boston: McGraw-Hill, 2005.

Wallace, Thomas F., and Michael H. Kremzar. *ERP: Making It Happen-The Implementer's Guide to Success with ERP.* New York: John Wiley, 2001.

ENTREPRENEURSHIP

Entrepreneurship is the process of identifying opportunities, marshalling the resources needed to take advantage of the opportunities, and creating a new venture for the purposes of providing needed products or services to customers and achieving a profit. The word "entrepreneurship" is taken from the French word *entreprendre*, which means "to undertake." A person who engages in entrepreneurship is called an entrepreneur. Entrepreneurship occurs all over the world, but it is a particular characteristic of free-market economies. Countries with the highest rates of entrepreneurship include the United States, Canada, Israel, Italy, and Great Britain.

Entrepreneurship involves considerable risk, as the failure rate for new ventures is very high. Thus, to be successful, an entrepreneur must be able to tolerate and even thrive under conditions of risk and uncertainty. Successful entrepreneurship also requires innovativeness and creativity, as well as self-confidence, high levels of energy, and a strong need for achievement. Interest in entrepreneurship is at an all-time high. Most colleges and universities offer courses or even entire programs of study in entrepreneurship.

The process of entrepreneurship is complex and requires the aspiring entrepreneur to make many decisions. It begins with recognizing an opportunity and applying innovativeness and creativity to exploit the opportunity. The entrepreneur must engage in strategic thinking and identify a competitive advantage that will set the small business apart and provide customers a unique reason to patronize the business.

The outcomes of this strategic thinking should be a business plan, which is a written statement that provides a comprehensive blueprint for the new venture. Although every business plan should reflect the unique characteristics of the entrepreneur and the proposed new business, there are common elements that exist in most business plans. Typically, the business plan includes some or all of the following components:

- Executive Summary
- Description of the Firm's Product/Service
- Business Strategy
- Forecasted Financial Statement
- Loan or Investment Proposal

The executive summary provides a concise one to two page overview of the entire business plan. The description of the product or service should identify the key features and benefits of the product or service. The business strategy is the most detailed part of the business plan. Here, the plan provides the entrepreneur's vision and what he or she sees as the mission of the new venture.

This section must also lay out key strategies in the areas of operations, marketing, and finance. The forecasted financial statements should include monthly and/or quarterly projected cash budgets, income statements, balance sheets, and capital expenditures. The loan or investment proposal should identify the type of financing required and a plan for repayment.

Entrepreneurship is an important, if not the most important, component of a successful market-based economy. Free economies require individuals who are willing to take risks by creating, organizing, and successfully running new businesses. Most entrepreneurs operate in the areas of small business and/or family-owned business. These are the engines of economic growth. If small businesses are defined as those having fewer than 100 employees, 99 percent of businesses in the U.S. are small. Ninety percent of these small businesses employ fewer than twenty employees. Yet, it is estimated that small businesses have created 85 percent of the new jobs in the U.S. since the early 1990s. Further, most of these small businesses are family-owned. Family-owned businesses employ more than 50 million people and generate more than 50 percent of the nation's GDP. Thus, much emphasis is placed on public policies that will encourage entrepreneurial activity and nurture and sustain new ventures, small businesses, and family-owned businesses.

STARTING A BUSINESS

Once the business plan has been formed, the entrepreneur must find investors, form a business structure both legally and economically, and bring together employees with the necessary skills and tenacity to run a successful business around a common goal. These steps, especially those requiring financial backing, can be difficult for entrepreneurs. Professor Scott Shane, author of the 2008 article "Top Ten Myths of Entrepreneurship," writes about some of these difficulties and few of the common misconceptions among those trying to start businesses.

First, it does not take a large amount of money to begin a business. The average amount is about $25,000, and successful entrepreneurs will have the skills necessary to run a company with a low amount of funding. Some of the tricks include paying beginning employees on commission, renting premises for the first couple of years, and offering conditional benefits. There are rarely large investors willing to fund starter businesses, unless they are promising computer or science companies. Most investors are not million dollar venture capitalists, and good entrepreneurs know how to work with limited resources.

Other entrepreneurs are hesitant to begin their businesses with debt, afraid that it will impede success. Actually, most entrepreneurial businesses are financed primarily by debt, with a little less than half their money coming from equity (approximately 47%). Conventional wisdom also insists that entrepreneurs search for loans among their friends, families, interested investors, and government entities, using banks only as a last resort. Banks, however, are the most common provider of loans toward entrepreneurial activities, and they are often willing to consider promising business plans.

The business an entrepreneur picks has an enormous effect on the success of his or her idea. Most entrepreneurs have difficulty spotting and entering industries that have potential. Those who began businesses in the tech industry several years ago had a far better chance of succeeding than those who chose other industries. What will be the industries of the future? What markets will open? A good entrepreneur will be able to choose an industry with potential, which will take a continuing commitment. Professor Shane's article says that only the top 10 percent of entrepreneurs make more money than their employees. The key is to defy the odds with superior innovation and work.

INTERNATIONAL ENTREPRENEURSHIP

International entrepreneurship refers to the practice of using technology and insight to develop an overseas company by highlighting a need in foreign nations that the entrepreneur can fulfill. Foreign markets have particular resources that an entrepreneur can capitalize on, making use of differing cultures, financial regulations, economies, and desires to create a successful global business. Most international entrepreneurship is conducted by well-established companies that have sufficient funds or backers to attempt expanding into foreign markets. Fortunately, more investors are becoming willing to support a global endeavor, especially if a company has clear plans to fill a specific niche in international business. Like local entrepreneurship, international business-building is a matter of opportunities and design.

Once a new element is introduced into a foreign market, there is a period of adaption that takes place in increments. An international market might at first be unwilling to admit a new entrepreneurial business, requiring more time for trial and acceptance of products or services. The number of other businesses trying to sell the same new ideas and the type of international market being entered will also affect the trial period for the entrepreneurial endeavor. Generally, entrepreneurs will encounter three different types of markets globally, as described by Jones and Dimitratos in their 2004 book *Emerging Paradigms in International Entrepreneurship*:

- **Bazaar economies.** Bazaar economies function on a flexible, personal level. Prices are usually negotiated, and competition involves cooperating with others in the same industry to form a reliable network of businesses. Loyalty is often based on personal treatment, customer to customer.

- **Firm-type economies.** In these markets, similar to many of the markets in America, firms have much more control over goods and services. Prices are usually set by the firms or the industry. They are based on customer demand but are not negotiable, and transactions are impersonal, resembling legal contracts more than personal connections. Since relationships are not so important, competition is generally more vigorous and direct. Complex strategy and business plans are commonplace in firm-type economies. Loyalty is generally directed toward a product or a name brand, and not the companies creating or selling the product. Decision-making power, instead of being displaced on a person-to-person basis, is centrally located at a main office.

- **Multi-polar network economies.** These markets are systems that incorporate both personal and transactional styles in their business. Relationship marketing is conducted, where companies form lasting connections with customers. Prices are usually negotiated in these markets, but not always. Relationship networks affect competition and decision-making, but at a wider scale than person-to-person. Power is not held by any main office, but is distributed along the relationship network of the business.

SOCIAL ENTREPRENEURSHIP

Social entrepreneurship, like international entrepreneurship, has risen in popularity over recent years. It involves developing unique ideas, usually from a business standpoint, to solve social problems. Often social entrepreneurs can create practices that revolutionize industries and create very successful companies, but the goal is always social welfare. Social entrepreneurs tend to judge success in terms of "social value" rather than the income generated by a business. They look for ways in which their society needs aid or needs a particular problem solved, then work to solve the problem in the same way a traditional entrepreneur does. A social entrepreneur deals with social potential, and seeks to create lasting change for the better.

Examples of social entrepreneurship abound. Medical practices centering around helping the patient achieve responsibility for their own health and treatment by teaching them about their ailments is a successful form of entrepreneurship begun in World War II by doctors like Byrnes Shouldice. Another good example is strategies for police departments to deal with criminal behavior with new, results-oriented methods. Community programs designed to bring out talents in at-risk youth or help senior citizens become more independent function in the same way.

When considering a social enterprise, an entrepreneur must first decide what sort of business to create—nonprofit or for-profit. Nonprofit businesses find it easier to focus on the social endeavor, attract the right-minded employees, and effectively market their purpose without sounding pretentious. Nonprofit organizations also receive more donations, especially from taxpayers who can write off the donation. For-profit businesses, on the other hand, can often make a better profit, raise more money through investors and stockholders who are willing to keep the business focused on its social goals, and create more opportunity for growth than nonprofit organizations. Which type of business to construct is one of the first questions a social entrepreneur should ask when sitting down to outline the plan.

ELEVATOR PITCH

Many entrepreneurial businesses can hinge on very brief—even chance—proposals to investors, ventures capitalists, and banks. These short proposals have become so useful and widespread that they are referred to as *elevator pitches*, the name drawn from a scenario in which an entrepreneur encounters a high-ranking business executive or capitalist in an elevator, and has only the time both are in the elevator to make the pitch and win the necessary investment.

So, how does an entrepreneur form a perfect elevator speech? Professor Jack Raiton, in his 2007 article, "Mastering the Elevator Pitch," has several good pieces of advice:

- An elevator pitch should not be directed at making a sale. That is a lot to shoot for in a very short amount of time. Instead, the pitch should be designed to pique interest, to give valuable tidbits of information, and to secure some sort of return communication. A successful entrepreneur will win an e-mail, phone call, or interview after an elevator pitch.

- The problem or need the entrepreneur intends to solve should be presented in the elevator pitch. This should be explained in concise, vivid language.

- Since attention spans are not notably long, an elevator pitch should sound interesting—about 30 seconds of spontaneous, memorable conversation. "Spontaneity" can be achieved through extensive practice, rehearsing the speech until it flows naturally and sounds unstilted. A script and a mirror both help prepare for a good elevator pitch.

- The pitch should include the particular advantages the entrepreneur can offer, wrapped up in a nutshell. The title to a book is a good metaphor to apply. The title should be clear, explain the abilities and status of the book, and not run on all over the cover—neither should the elevator speech.

- Nothing complex should be included in an elevator pitch. If it can be simplified, simplify it. Otherwise, do not include it. An idea that is too complex can ruin the entire pitch.

The structure of the elevator speech can be formed using the guidelines above. There are many other tips entrepreneurs may find useful as well. It is a good idea, for instance, to begin by giving a statistic or other arresting fact concerning the pertinent industry, introducing the problem or general situation immediately. Technical or scientific language, in any form, should be avoided in the pitch; even though it may impress, the use of unfamiliar terms ultimately confuses and bores any investor listening. Contacts can also be used in elevator pitches to catch attention, whether it be the dropping of a significant name or previous work experience at a prestigious company. The most important thing is that the entrepreneur feels comfortable and excited giving the pitch under any circumstances.

ANGELS

Business angels are resourceful investors who have a medium amount of capital available to contribute to starting businesses and are known to save or start entrepreneurial endeavors. They are not as difficult to find or win over as the major-investment venture capitalists, and so much of an entrepreneur's selling efforts are directed toward angels. Angels can exist individually and as part of sponsoring networks.

As a way of life, entrepreneurship has several advantages. It offers individuals the chance to be their own boss and to enjoy an independent lifestyle. It provides individuals the opportunity to develop and grow a new business that makes an impact on their community. And, of course, successful new ventures offer the tantalizing prospect of almost unlimited profit potential. However, as a lifestyle, entrepreneurship also has its downside. It requires a tremendous amount of personal commitment and long work hours, particularly in the early stages of new business startup. Uncertainty of income and the potential for financial loss are also potential negatives.

SEE ALSO *Angel Investors and Venture Capitalists; Business Plan; Initial Public Offering; Strategic Planning Tools; Strategy Formulation; Succession Planning; SWOT Analysis*

BIBLIOGRAPHY
Cowan, David. "Practicing the Art of Pitchcraft." *Who Has Time for This?* 2008. Available from: http://whohastimeforthis. blogspot.com/2006/01/practicing-art-of-pitchcraft.html.

Dees, Gregory J. *Strategic Tools for Social Entrepreneurs.* New York: John Wiley and Sons, 2004.

"Global Entrepreneurship Monitor." Available from: http:// www.gemconsortium.org.

Jones, Marian V, and Pavlos Dimitratos. *Emerging Paradigms in International Entrepreneurship.* Edward Elgar Publishing, 2004.

Kawasaki, Guy. "What Is an Angel Investor?" *Inc.com,* 2008. Available from: http://www.inc.com/.

"Nonprofit vs. For-profit Social Ventures." *SmartMoney,* 2008. Available from: http://www.entrepreneur.com/startinga business/smsmallbiz/article195242.html.

Oviatt, Benjamin M. "Defining International Entrepreneurship and Modeling the Speed of Internationalization." *Entrepreneurship: Theory and Practice,* 2005. Available from: http://www.allbusiness.com/management/557273-1.html.

Raitin, Jack. "Mastering the Elevator Pitch: 5 Steps to Entrepreneurial Success." *Professor Raitin's Inside Perspectives,* 2007. Available from: http://mstblog.ohsu.edu/index.php/ 2007/11/13/mastering-the-elevator-pitch-5-tips-to-entrepreneur-success/.

Shane, Scott. "Top Ten Myths of Entrepreneurship." *How To Change the World,* 2008. Available from: http://blog.guy kawasaki.com/2008/01/top-ten-myths-o.html.

Zimmerer, T.W., and N.M. Scarborough. *Essentials of Entrepreneurship ond Small Business Management.* Upper Saddle River, NJ: Prentice-Hall, 2002.

ENVIRONMENTALISM AND SUSTAINABILITY

The importance of the environment and how to preserve it have become as much a priority for corporations as for individual citizens. "Going green" is not only the socially accountable thing to do, it is also one of the most progressive new ways that companies are winning over new clients and saving more money than ever before. Interestingly, doing the right thing for the environment is now, more than ever, a win-win game for stakeholders, business owners, and consumers alike.

Environmentalism on the corporate scale has become a good deal more organized as its importance to the future and sustainability of the planet becomes paramount. Learning how to manage entire corporations and all aspects of their operation in a manner that will be eco-friendly is no longer the exception but the rule. How to manufacture goods and offer services using greener methodologies is the future of business on all fronts and will shape the future of commerce as much as any other crucial marketplace variables.

FINANCIAL BENEFITS OF GOING GREEN

For many corporate entities, the idea of changing practices to become a more environmentally friendly operation isn't enough to commit the resources and time to change practices or completely revamp company policies that are often decades old. But as "greening up" becomes the lasting trend, it shapes the climate of the commercial world; companies that live up to a higher environmental standard will attract a new majority of consumers who

care. Saving money and creating larger profit margins are an added benefit to new, more ecologically sound business and manufacturing practices.

Revenue is increased by simple increase of value. Both consumers and stakeholders see the value of a corporation increase as their practices become more in line with current and future trends and move away from antiquated methods and practices that give a company a reputation for being old-fashioned or behind the times. When consumers and shareholders believe a corporation is moving in a positive direction on a consistent basis, they are more likely to buy more, invest more, and become vigilant about spreading the word—there is no more powerful marketing tool than consumers telling friends and family about the good conduct and quality products or services being provided by a company.

Corporations also increase revenue and lower their cost of production when they act in environmentally friendly ways that save energy. Reducing carbon footprints by making operations more sustainable also bodes well for corporate reputations. Something as simple as reducing the output of greenhouse gases by switching to alternative fuel and energy sources or reducing energy output by reinsulating an old factory can save millions of dollars over a short period of time. Many companies have started to save money by offering customers e-mailed versions of billing statements or access to an online account where bills can be paid, merchandise and services can be purchased, and customers can communicate virtually with company representatives. In this way, metric tons of paper are saved, trees are spared, and dramatically less energy is used. To spread the word, companies incorporate information about new, greener practices in their marketing strategies.

GREEN MANAGEMENT

A joint study by firms Jones Lang Lasalle and CFO Research showed that more than 50 percent of seasoned executives and corporate officers believe that green practices will increase revenue, and more than 45 percent believe that a main environmental concern of corporations should be reducing the impact of manufacturing and other operations on the environment. With these kinds of values intact at the head of large corporations, it is clear that learning and knowing how to manage a company from an environmentally responsible standpoint is crucial to the future of today's successful enterprises.

Because of the rising importance of ecologically sound practices in the corporate sphere, more and more schools of management and business colleges are offering degrees in green management or programs pertaining to green management as part of their curriculums. The Dominican University of California is home to green business degree pioneer Professor John Stayton, and many

other colleges and universities across the United States and the world now offer "green degrees" in several disciplines. Across Asia, especially in Hong Kong, green management practices have become extremely popular— the governments of some Asian countries now offer incentives to corporations that practice green management and manufacturing. These polities also strongly urge companies of all sizes and in many industries to have green committees and managers trained in eco-friendly practices that they can hand down to their subordinates.

The rising importance of proactive and ecologically responsible corporate conduct varies in popularity from one country and region to another. The best way for new and growing enterprises to hedge their bets is to simply practice the highest standards of green management and manufacturing to ensure that their standards are, at the very least, as high as those in use in any region where future business could be headed. Companies that understand this are always researching and putting into practice the newest ways of "greening up" any processes they undertake to create products or offer services. Ensuring that transitions to greener practices go smoothly and that the highest level of efficiency is attained is the job of managers—hence the rising importance of a strong environmentally conscious education from a management school.

An important part of green management has been the ISO 9000 and ISO 14000 standards. These two international standards of quality are motivated to show they want to lessen waste, wish to be greener, and wish to be perceived as a proponent for ecologically friendly business and manufacturing practices. ISO 9000 and ISO 14000 are standards put forth by the International Organization for Standardization that effect both quality and environmental management. The two standards do this by encouraging companies to improve processes that may have harmful effects on the environment, and to improve the quality of products and services for consumers in a manner that lessens the carbon footprint of both the consumer and the purveyor of the product or service.

Green managers are responsible for giving their company the competitive edge against other industry names by constantly creating new ways of saving energy, lessening the company's carbon footprint in any way possible, and saving money through the use of measures that meet those needs. A qualified green manager will make it possible for a corporation to meet its production needs and deadlines using less energy and output a higher quality product that is friendlier to the planet for consumers. A green manager will also keep up with changing laws, regulations, and trends to ensure that his or her enterprise stays ahead of the curve. In addition to these roles, a green manager must also create ways to market the business so that consumers can appreciate the good the company is doing for the

environment. Research indicates that consumers who believe company A is greener than company B will gladly spend the few extra dollars or drive the few extra miles to buy the product or service from company A. A qualified green manager knows this about consumers and creates a way to commercialize and publicize the company's efforts at environmentalism.

GREEN MANUFACTURING

Green manufacturing is the practice of lessening the output of any type of pollution, waste, or byproduct of manufacturing any product. The greater aim of green manufacturing, beyond saving money and increasing corporate profits, is to conserve energy and natural resources and make an effort to leave the environment better—rather than worse—than it was found. Green manufacturing is not always the easiest route for all companies in all industries, but even those firms that won't make up for the cost in terms of overhead will almost always pick up the difference in profit margins and popularity with consumers. Additionally, when companies have to pick up the extra cost of doing business in a more ecologically sound manner, there will often be the impetus for further research and development that uncovers groundbreaking new methods for manufacturing that cut costs for all parties involved, including the consumer.

Recycling and reusing are important aspects of green manufacturing, and consumers are happy to support corporations that actively make use of recycled materials. In addition to making use of materials that have already been processed, reusing when it is a viable option also keeps overall cost down by reducing the need to process new materials, which saves on both raw materials and energy.

Everyday, more advanced methods of green manufacturing become more cost effective and realistic for more companies across more industries. As the popularity of green manufacturing grows, so does the likelihood of more expeditious development of progressively more innovative systems and processes of manufacturing. Of course, there is a cost associated with training existing employees on green manufacturing methods, which may include learning how to operate new machines and other technologies. However, the financial undertaking of training laborers is better spent on ecologically sound methods than on training that would likely be done at some point anyway on equipment that may or may not be so environmentally friendly.

Types of Green Manufacturing. Just in time (JIT) manufacturing is a type of supply chain management that helps reduce the cost and waste output of manufacturing. JIT accomplishes this by more closely following market and consumer trends to know how much of which product to create based on demand. Additionally, components used to create products are not housed by the manufacturing company, thus reducing energy needed to operate, heat, cool, and otherwise maintain warehouse space.

Zero emission manufacturing is a highly green methodology that calls for absolutely no output of hazardous materials that could harm the environment. While this type of green manufacturing is not possible for all entities in all industries, it certainly sets the bar high and creates an atmosphere of high corporate responsibility, one in which companies are competitively urged to hold themselves to a higher standard of production.

EXISTING GREEN COMPANIES

There are many companies, even very large corporations that have been environmentally friendly for many years, some since their conception. Some companies have gone green intentionally while others are green as a natural offshoot of how or where they do business. According to a 2007 article about "green giants" in *Fortune* magazine, Goldman Sachs, Hewlett-Packard, Continental Airlines, Pacific Gas and Electricity (PG&E), and S.C. Johnson are American-based corporations leading the pack. All of these are large corporate entities that are changing the way business is done globally by creating and following a higher standard of green management and manufacturing.

BIBLIOGRAPHY
"10 Green Giants." Available from: http://money.cnn.com/galleries/2007/fortune/0703/gallery.green_giants.fortune/7.html.

Frazier, Scott C. "JIT Manufacturing: Lean Manufacturing and Stockless Production." Indiana: Ball State University, 2004.

"Green Managers Turn Others Green!" Available from: http://www.globalinvesting411.com/articles/00000009.shtml.

"ISO 9000 and ISO 14000." Available from: http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000.htm.

"Jones Lang LaSalle-Sponsored Study Finds CFOs See Financial Benefits in Adopting Environmental Sustainability Practices and Metrics." Available from: http://www.ifma.org/daily_articles/?pg=032808.cfm.

Markham, Jeannette. "Sustainability in Corporations: Wal-Mart and PepsiCo," February 2008. Available from: http://www.icastusa.org/index.php?Itemid=129&id=197& option=com_content&task=view.

ETHICS

Ethics, also commonly referred to as morality, is the broad discipline that deals with determining what is right and what is wrong. There are various approaches to ethics and a wide variety of ethical rules and principles put forward by different ethicists. Making moral decisions is something

that people do on a regular basis. Ethics assists individuals in deciding what to do when faced with various situations.

Ethics is also a crucial component of social life, as individuals' actions usually have an impact on others. Ethical systems are necessary for ordered human existence, but there is and has always been deep disagreement about the proper rules and principles to put in place. Ethics can be grounded in natural law, religious tenets, parental and family influence, educational experiences, life experiences, and cultural and societal expectations.

BUSINESS ETHICS

Ethics in business, or business ethics as it is often called, is the application of the discipline, principles, and theories of ethics to the organizational context. Business ethics have been defined as "principles and standards that guide behavior in the world of business." Business ethics is also a descriptive term for the field of academic study in which many scholars conduct research and in which undergraduate and graduate students are exposed to ethics theory and practice, usually through the case method of analysis.

Ethical behavior in business is critical. When business firms are charged with infractions, and when employees of those firms come under legal investigation, there is a concern raised about moral behavior in business. Hence, the level of mutual trust, which is the foundation of our free-market economy, is threatened.

Although ethics in business has been an issue for academics, practitioners, and governmental regulators for decades, some believe that unethical, immoral, and/or illegal behavior is widespread in the business world. Numerous scandals in the late 1990s and early 2000s seemed to add credence to the criticism of business ethics. Corporate executives of WorldCom, a giant in the telecommunications field, admitted fraud and misrepresentation in financial statements. A similar scandal engulfed Enron at around the same time. Other notable ethical lapses were publicized involving ImClone, a biotechnological firm; Arthur Andersen, one of the largest and oldest public accounting firms; and HealthSouth, a large healthcare firm located in the southeast United States. These companies eventually suffered public humiliation, huge financial losses, and in some cases, bankruptcy or dissolution. The ethical and legal problems resulted in some corporate officials going to prison, many employees losing their jobs, and thousands of stockholders losing some or all of their savings invested in the firms' stock.

Although the examples mentioned involved top management, huge sums of money, and thousands of stakeholders, business ethics is also concerned with the day-to-day ethical dilemmas faced by millions of workers at all levels of business enterprise. It is the awareness of and judgments made in ethical dilemmas by all that determines the overall level of ethics in business. Thus, the field of business ethics is concerned not only with financial and accounting irregularities involving billions of dollars, but all kinds of moral and ethical questions, large and small, faced by those who work in business organizations.

APPROACHES TO ETHICAL DECISION-MAKING

Philosophers have studied and written about ethics for thousands of years, and there continues to be vigorous investigation into and debate about the best ethical principles. Although many different ethical theories have been developed through the ages, there are several broad categories that are commonly used to group different theories by their major traits. These groupings are: teleology, deontology, and virtue. A fourth category, relativism, may be added, although relativism is less an ethical theory than it is a broad claim about the nature of ethics.

Each of the three major types of theories is prescriptive— that is, they purport to determine what conduct is right and wrong, or to prescribe what people *should* (and should not) do. The prescriptions put forward by the theories in each category stem from different fundamental principles. For teleological theories, the fundamental principles focus on the consequences caused by human actions, while deontological theories of ethics focus on (1) the rights of all individuals and (2) the intentions of the person(s) performing an action. Deontological theories differ substantially from teleological views because they do not allow, for instance, harming some individuals in order to help (a greater number of) others. To the deontologist, each person must be treated with the same level of respect, and no one should be treated as a means to an end. Virtue ethics, unlike both teleology and deontology, emphasizes the virtues, or moral character, behind a certain action or set of actions instead of looking at duties or rules, as deontology does, or the outcomes of actions, as teleology does. Thus, an action is evaluated in terms of whether or not a "good person" would perform that action.

Teleological, deontological, and virtue theories are all "universal" theories, in that they purport to advance principles of morality that are permanent and applicable to everyone. In contrast, relativism states that there are no universal principles of ethics and that right and wrong are by different individuals and groups. The relativist does not accept that some ethical standards or values are superior to others and believes that standards of right and wrong change over time and are different across cultures.

CONSEQUENTIALISM

Teleological theories of ethics, often referred to as "consequentialist" theories, focus, as the name indicates, on the consequences or outcomes of ethical decisions. For instance,

when evaluating whether or not it is ethical to use company time to deal with personal business, the relevant question would center on whether any harm came from the action. The consequentialist would look at what happened as a result of that choice. If, say, there were no loss of productivity as a result of conducting a piece of personal business while at work, then consequentialism theories would likely make no adverse ethical judgment about that choice. A commonly heard phrase justifying such choices—"It's not hurting anyone"—is practically the consequentialist motto.

Consequentialist theories are very popular, largely because they are more concrete than deontological or virtue-based ones. It is much easier to determine the consequences of an action—they can be seen—than it is to determine a person's intentions or their moral character. Consequentialism is widely used in the field of business ethics, most likely because businesses are about results, not intentions or character. The most common consequentialist theories are egoism and utilitarianism. These two theories differ in their focus on where the consequences of actions are evaluated. For egoism, the relevant consequences concern one's self; for utilitarianism, the overall impact on society is considered.

Egoism. Egoism is defined by self-interest, and defines right and wrong in terms of the consequences to one's self. An egoist would weigh an ethical dilemma or issue in terms of how different courses of action would affect his or her physical, mental, or emotional well-being. Egoists, when faced with business decisions, will choose the course of action that they believe will best serve their own interests.

Although it seems likely that egoism would potentially lead to unethical and/or illegal behavior, this philosophy of ethics is, to some degree, at the heart of a free-market economy. Since the time of political economist Adam Smith, advocates of a free market unencumbered by governmental regulation have argued that individuals, each pursuing their own self-interest, would actually benefit society at large.

This point of view is notably espoused by the famous economist Milton Friedman, who suggested that the only moral obligation of business is to make a profit and obey the law. However, it should be noted that Smith, Friedman, and most others who advocate unregulated commerce, acknowledge that some restraints on individuals' selfish impulses are required.

Utilitarianism. In the utilitarian approach to ethical reasoning, one emphasizes the utility, or the overall amount of good, that might be produced by an action or a decision. For example, companies decide to move their production facilities from one country to another. How much good is

Table 1
Approaches to Ethics in Business

Teleological	Actions are judged as ethical or unethical based on their results.
Egoism	Actions are judged as ethical or unethical based on the consequences to one's self. Actions that maximize self-interest are preferred.
Utilitarianism	Actions are judged as ethical or unethical based on the consequences to "others." Actions that maximize the "good" (create the greatest good for the greatest number) are preferred.
Deontological	Actions are judged as ethical or unethical based on the inherent rights of the individual and the intentions of the actor. Individuals are to be treated as means and not ends. It is the action itself that must be judged and not its consequences.
Justice	Actions are judged as ethical or unethical based on the fairness shown to those affected. Fairness may be determined by distributive, procedural, and/or interactional means.
Relativism	Actions are judged as ethical or unethical based on subjective factors that may vary from individual to individual, group to group, and culture to culture.

Adapted from: Ferrell, Fraedrich, and Ferrell, 2002, p. 57.

expected from the move? How much harm? If the good appears to outweigh the harm, the decision to move may be deemed an ethical one, by the utilitarian yardstick.

This approach also encompasses what has been referred to as cost-benefit analysis. In this, the costs and benefits of a decision, a policy, or an action are compared. Sometimes these can be measured in economic, social, human, or even emotional terms. When all the costs are added and compared with the results, if the benefits outweigh the costs, then the action may be considered ethical.

One fair criticism of this approach is that it is difficult to accurately measure costs and benefits. Another criticism is that the rights of those in the minority may be overlooked or even intentionally trampled if doing so provides an overall benefit to society as a whole.

Utilitarianism is like egoism in that it advocates judging actions by their consequences, but unlike egoism, utilitarianism focuses on determining the course of action that will produce the greatest good for the greatest number of people. Thus, it is the ends that determine the morality of an action and not the action itself (or the intent of the actor).

Utilitarianism is probably the dominant moral philosophy in business ethics. Utilitarianism is attractive to many business people, since the philosophy acknowledges that many actions result in good consequences for some, but bad consequences for others. This is certainly true of many decisions in business.

INDIVIDUAL ETHICAL DECISION-MAKING

In addition to ethical theories about right and wrong—prescriptive theories, sometimes also called "normative"—the field of business ethics consists of theories about how people make ethical decisions. This area of business ethics is more descriptive than prescriptive. There are many approaches to the individual ethical decision-making process in business. However, one of the more common was developed by James Rest and has been called the four-step or four-stage model of individual ethical decision-making. Numerous scholars have applied this theory in the business context. The four steps include: ethical issue recognition, ethical (moral) judgment, ethical (moral) intent, and ethical (moral) behavior.

Ethical Issue Recognition. Before a person can apply any standards of ethical philosophy to an issue, he or she must first comprehend that the issue has an ethical component. This means that the ethical decision-making process must be "triggered" or set in motion by the awareness of an ethical dilemma. Some individuals are likely to be more sensitive to potential ethical problems than others. Numerous factors can affect whether someone recognizes an ethical issue; some of these factors are discussed in the next section.

Ethical (Moral) Judgment. If an individual is confronted with a situation or issue that he or she recognizes as having an ethical component or posing an ethical dilemma, the individual will probably form some overall impression or judgment about the rightness or wrongness of the issue. The individual may reach this judgment in a variety of ways, following a particular ethical theory or a mixture of theories, as noted in the previous section on approaches to ethical decision-making.

Ethical (Moral) Intent. Once an individual reaches an ethical judgment about a situation or issue, the next stage in the decision-making process is to form a behavioral intent. That is, the individual decides what he or she will do (or not do) with regard to the perceived ethical dilemma.

According to research, ethical judgments are a strong predictor of behavioral intent. However, individuals do not always form intentions to behave that are in accord with their judgments, as various situational factors may act to influence the individual otherwise.

Ethical (Moral) Behavior. The final stage in the four-step model of ethical decision-making is to engage in some behavior with regard to the ethical dilemma. Research shows that behavioral intentions are the strongest predictor of actual behavior in general and ethical behavior in particular. However, individuals do not always behave consistent with either their judgments or intentions with

regard to ethical issues. This is particularly a problem in the business context, as peer group members, supervisors, and organizational culture may influence individuals to act in ways that are inconsistent with their own moral judgments and behavioral intentions.

FACTORS AFFECTING ETHICAL DECISION-MAKING

In general, there are three types of influences on ethical decision-making in business: (1) individual difference factors, (2) situational (organizational) factors, and (3) issue-related factors.

Individual Difference Factors. Individual difference factors are personal factors about an individual that may influence their sensitivity to ethical issues, their judgment about such issues, and their related behavior. Research has identified many personal characteristics that impact ethical decision-making. The individual difference factor that has received the most research support is "cognitive moral development."

This framework, developed by Lawrence Kohlberg in the 1960s and extended by Kohlberg and other researchers in the subsequent years, helps to explain why different people make different evaluations when confronted with the same ethical issue. It posits that an individual's level of "moral development" affects their ethical issue recognition, judgment, behavioral intentions, and behavior.

According to the theory, individuals' level of moral development passes through stages as they mature. Theoretically, there are three major levels of development. The lowest level of moral development is termed the "pre-conventional" level. At the two stages of this level, the individual typically will evaluate ethical issues in light of a desire to avoid punishment and/or seek personal reward. The pre-conventional level of moral development is usually associated with small children or adolescents.

The middle level of development is called the "conventional" level. At the stages of the conventional level, the individual assesses ethical issues on the basis of the fairness to others and a desire to conform to societal rules and expectations. Thus, the individual looks outside him or herself to determine right and wrong. According to Kohlberg, most adults operate at the conventional level of moral reasoning.

The highest stage of moral development is the "principled" level. The principled level, the individual is likely to apply principles (which may be utilitarian, deontological, or justice) to ethical issues in an attempt to resolve them. According to Kohlberg, a principled person looks inside him or herself and is less likely to be influenced by situational (organizational) expectations.

The cognitive moral development framework is relevant to business ethics because it offers a powerful explanation of individual differences in ethical reasoning. Individuals at different levels of moral development are likely to think differently about ethical issues and resolve them differently.

Situational (Organizational) Factors. Individuals' ethical issue recognition, judgment, and behavior are affected by contextual factors. In the business ethics context, the organizational factors that affect ethical decision-making include the work group, the supervisor, organizational policies and procedures, organizational codes of conduct, and the overall organizational culture. Each of these factors, individually and collectively, can cause individuals to reach different conclusions about ethical issues than they would have on their own. This section looks at one of these organizational factors, codes of conduct, in more detail.

Codes of conduct are formal policies, procedures, and enforcement mechanisms that spell out the moral and ethical expectations of the organization. A key part of organizational codes of conduct are written ethics codes. Ethics codes are statements of the norms and beliefs of an organization. These norms and beliefs are generally proposed, discussed, and defined by the senior executives in the firm. Whatever process is used for their determination, the norms and beliefs are then disseminated throughout the firm.

An example of a code item would be, "Employees of this company will not accept personal gifts with a monetary value over $25 in total from any business friend or associate, and they are expected to pay their full share of the costs for meals or other entertainment (concerts, the theater, sporting events, etc.) that have a value above $25 per person." Hosmer points out that the norms in an ethical code are generally expressed as a series of negative statements, for it is easier to list the things a person should not do than to be precise about the things a person should.

Almost all large companies and many small companies have ethics codes. However, in and of themselves ethics codes are unlikely to influence individuals to be more ethical in the conduct of business. To be effective, ethics codes must be part of a value system that permeates the culture of the organization. Executives must display genuine commitment to the ideals expressed in the written code—if their behavior is inconsistent with the formal code, the code's effectiveness will be reduced considerably.

At a minimum, the code of conduct must be specific to the ethical issues confronted in the particular industry or company. It should be the subject of ethics training that focuses on actual dilemmas likely to be faced by employees in the organization. The conduct code must contain communication mechanisms for the dissemination of the organizational ethical standards and for the reporting of perceived wrongdoing within the organization by employees.

Organizations must also ensure that perceived ethical violations are adequately investigated and that wrongdoing is punished. Research suggests that unless ethical behavior is rewarded and unethical behavior punished, that written codes of conduct are unlikely to be effective.

Issue-Related Factors. Conceptual research by Thomas Jones in the 1990s and subsequent empirical studies suggest that ethical issues in business must have a certain level of "moral intensity" before they will trigger ethical decision-making processes. Thus, individual and situational factors are unlikely to influence decision-making for issues considered by the individual to be minor.

Certain characteristics of issues determine their moral intensity. In general, the research suggests that issues with more serious consequences are more likely to reach the threshold level of intensity. Likewise, issues that are deemed by a societal consensus to be ethical or unethical are more likely to trigger ethical decision-making processes.

BUSINESS ETHICS TODAY

Ethics has been an important dimension of business and management practice for several decades, but in recent years, largely due to high-profile scandals, ethics has been placed on the center stage. Since the corporate scandals of the early-2000s, there has been vigorous debate about which ethical principles should prevail in the business world and about the proper role of government in enforcing morality in the marketplace. While there is no universal agreement on ethical principles or underlying theories, there has been wider agreement that the government has to take a more aggressive role in defining and enforcing ethical practice in the business world.

Congress passed the Sarbanes-Oxley Act of 2002 to reform American business practices in response to corporate scandals. This act establishes new or enhanced standards for publicly-traded companies (it does not apply to privately-held companies). Following passage of the Sarbanes-Oxley Act, the Federal Sentencing Guidelines for Organizations were updated in 2005 to strengthen the standards for corporate compliance and ethics programs.

Business ethics is an exceedingly complicated area, one that has contemporary significance for all business practitioners. There are, however, guidelines in place for effective ethical decision making, and there is continued attention paid to developing and maintaining these guidelines. These all have their positive and negative sides, but taken together, they may assist the businessperson to steer toward the most ethical decision possible under a particular set of circumstances.

BIBLIOGRAPHY

Barnett, Tim, and Sean Valentine. "Issue Contingencies and Marketers' Recognition of Ethical Issues, Ethical Judgments, and Behavioral Intentions." *Journal of Business Research* 57 (2004): 338–346.

Beauchamp, Tom L., and Norman E. Bowie. *Ethical Theory and Business.* Englewood Cliffs, NJ: Prentice Hall, 1993.

"Consequentialism." *Stanford Encyclopedia of Philosophy* 9 February 2006. Available from: http://plato.stanford.edu/entries/consequentialism/.

Ferrell, O.C., John Fraedrich, and Linda Ferrell. *Business Ethics.* 7th ed. Boston, MA: Houghton Mifflin Company, 2006.

"A Guide to the Sarbanes-Oxley Act." Available from: http://www.soxlaw.com/.

Hosmer, LaRue Tone. *The Ethics of Management.* 6th ed. Homewood, IL: Irwin, 2007.

Hyatt, James C. "Birth of the Ethics Industry." *Business Ethics* Summer 2005.

Kuhn, James W., and Donald W. Shriver, Jr. *Beyond Success.* New York: Oxford University Press, 1991.

Lawrence, Anne T., James Weber, and James Post. *Business and Society.* 12th ed. New York: McGraw-Hill, 2008.

Paine, Lynn Sharp. "Managing for Organizational Integrity." *Harvard Business Review* March-April 1994.

Trevino, Linda K., and Michael E. Brown. "Managing to Be Ethical: Debunking Five Business Ethics Myths." *Academy of Management Executive* 18 (2004): 69–81.

EUROPEAN UNION

The European Union (EU) is an economic and political federation consisting of twenty-seven member countries that make common policy in several areas. The EU was created in 1993 with the signing of the Treaty on European Union, commonly referred to as the Maastricht Treaty, but it was preceded by various European organizations that contributed to the development of the EU. The EU represents the latest and most successful in a series of efforts to unify Europe, including many attempts to achieve unity through force of arms, such as those seen in the campaigns of Napoleon Bonaparte and World War II.

STEPS TOWARDS THE MAASTRICHT TREATY

In the wake of the Second World War, which devastated the European infrastructure and economies, efforts began to forge political union through increasing economic interdependence. In 1951 the European Coal and Steel Community (ECSC) was formed to coordinate the production and trading of coal and steel within Europe. In 1957 the member states of the ECSC ratified two treaties creating the European Atomic Energy Community (Euratom) for the collaborative development of commercial nuclear power and the European Economic Community (EEC), an international trade body whose role was to gradually eliminate national tariffs and other barriers to international trade involving member countries. Initially the EEC, or, as it was more frequently referred to at the time, the Common Market, called for a twelve- to fifteen-year period for the institution of a common external tariff among its members, but the timetable was accelerated and a common tariff was instituted in 1967.

Despite this initial success, participation in the EEC was limited to Belgium, France, Germany, Italy, Luxembourg, and the Netherlands. Immediately following the creation of the EEC a rival trade confederation known as the European Free Trade Association (EFTA) was created by Austria, Britain, Denmark, Finland, Norway, Portugal, Sweden, and Switzerland. Although its goals were less comprehensive than those of the EEC, the existence of the EFTA delayed European economic and political unity.

By 1961 the United Kingdom indicated its willingness to join the Common Market if allowed to retain certain tariff structures which favored trade between Britain and its Commonwealth. Negotiations between the EEC and the United Kingdom began, but insurmountable differences arose and Britain was denied access to the Common Market in 1963. Following this setback, however, the Common Market countries worked to strengthen the ties between themselves, culminating in the merger of the ECSC, EEC, and Euratom to form the European Community (EC) in 1967. In the interim the importance of the Commonwealth to the British economy waned considerably and by 1973 Britain, Denmark, and the Republic of Ireland had joined the EC. Greece followed suit in 1981, followed by Portugal and Spain in 1986 and Austria, Finland, and Sweden in 1995.

Even as it expanded, the EC worked to strengthen the economic integration of its membership, establishing a European Monetary System (EMS) featuring the European Currency Unit (ECU, later known as the Euro) in 1979. The EC then passed the Single European Act, which strengthened the EC's ability to regulate the economic, social, and foreign policies of its members, in 1987. The EC took its largest step to date toward true economic integration among its members with the 1992 ratification of the Maastricht Treaty, after which the EC changed its name to the European Union (EU). The Maastricht Treaty also created a central banking system for EU members, established the mechanisms and timetable for the adoption of the Euro as the common currency among members, and further strengthened the EU's ability to influence the public and foreign policies of its members.

EXPANSION SINCE 1993

The EU originally had twelve member nations: Belgium, Denmark, France, Germany, Greece, Italy, Luxembourg, the Netherlands, Portugal, the Republic of Ireland, Spain, and the United Kingdom. In 1993, the European Council, meeting in Copenhagen, Denmark, determined the criteria for joining the EU. These requirements, known as the Copenhagen criteria, included: (1) a stable democracy which respects human rights and the rule of law; (2) a functioning market economy capable of competition within the EU; and (3) the acceptance of the obligations of membership, including EU law. The European Council has the responsibility for evaluating a country's fulfillment of these criteria.

The EU has enlarged three times since its creation. In 1995, three new members were added: Austria, Finland, and Sweden. In 2004, ten new members were added, mostly from the former Soviet bloc: Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. In 2007, Romania and Bulgaria, who were not ready to join in 2004, were admitted. As of 2008, there were three official candidates for membership—Croatia, Macedonia, and Turkey—and five nations officially recognized as potential candidates—Albania, Bosnia and Herzegovina, Kosovo, Montenegro, and Serbia.

THE EURO

One of the goals of the EU is economic integration and a common European currency. EU leaders expect great benefits from the adoption of a single currency. International trade within the single currency area will be greatly facilitated by the establishment of what amounts to a single market, complete with uniform pricing and regulation, in place of separate national markets. The creation of a single market is also expected to spur increased competition and the development of more niche products, and ease the acquisition of corporate financing, particularly in what would formerly have been international trade among members of the single currency area. Finally, in the long term, the establishment of the single currency area should simplify European corporate structures, since in time nearly all regulatory statutes within the single currency area should become uniform.

The Maastricht Treaty established conditions that EU member nations would be expected to meet before they would be allowed to participate in the introduction of the single European currency. These conditions were designed to create a "convergence" among the various national economies of Europe to ease the transition to a single currency and ensure that no single country would benefit or be harmed unduly by its introduction. Such a convergence would also create greater uniformity among the various national economies of the EU, making admin-

istration of economic activity within the single-currency area more feasible. The conditions set for participation in the introduction of the Euro and inclusion in the single-currency area included the following:

- Maintaining international currency exchange rates within a specified range (called the Exchange Rate Mechanism or ERM) for at least two years prior to the introduction of the Euro.

- Maintaining long-term interest rates within 2 percent of the national inflation rate and within 1.5 percent of the three best-performing EU member states in terms of price stability.

- Maintaining public debt at no more than 3 percent of the gross domestic product.

- Maintaining total government debt at no more than 60 percent of gross domestic product.

Despite difficulties faced by some members in meeting these conditions, implementation of the Euro went ahead on schedule through the three phases set forth at Maastricht. Phase one began in 1998 with an EU summit in Brussels, Belgium, that determined which of the fifteen member states had achieved sufficient convergence to participate in the introduction of the Euro. The selected participants were Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain (exceptions were Demark, Greece, Sweden and the UK). Phase two, which commenced on 1 January 1999, introduced the Euro as legal tender within the eleven selected countries, referred to as the single-currency area, although the new currency would only exist as a "currency of account," that is, it would exist only on paper or for electronic transactions, as no Euro notes or coins were yet in circulation. Instead, the existing currencies of the participating countries functioned as fixed denominations of the Euro. Phase two also included the subordination of the eleven national banks in the single-currency area to the European Central Bank.

Phase three, which began on 1 January 2002, set the Euro banknotes and coins into circulation and by July 2002, it became the legal tender of the countries, replacing their national currencies. At the time of introduction there were twelve countries in the area using the Euro, known as the Eurozone: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and Greece. Denmark, Sweden and the UK chose not to use the Euro. By the beginning of 2008, the Eurozone had expanded to include fifteen member nations, with Cyprus, Malta, and Slovenia having joined the original members. Nine of the new EU member states were still operating with a currency other than the Euro. The Accession Treaties signed by all of

these countries requires them to join the Euro; some have already joined the ERM and others have set themselves the goal of joining the Euro as follows:

- Slovakia: January 1, 2009

- Lithuania: January 1, 2010

- Estonia: January 1, 2011

- Bulgaria, Czech Republic, Hungary, Latvia, Poland, and Romania: January 1, 2012 or later.

The initial introduction of the Euro as a currency of account began with a resounding success, as the new currency rose immediately to an exchange rate of 1.17 U.S. dollars to the Euro. Uncertainties about the further progress of European Union raised by conflicts in the Balkans in 1999 soon dampened investor interest in the Euro, however, and its value fell to 1.04 U.S. dollars per Euro by the summer of that year. The Euro continued to slip, and by late 2000, it had fallen to a record low of $0.83. Since 2003, however, the Euro has steadily risen against the dollar, gaining strength in 2007 as the U.S. economy began slipping towards recession; by mid 2008, the Euro was holding steady in the mid $1.50s.

STRUCTURE

The EU maintains four administrative bodies dealing with specific areas of economic and political activity.

Council of Ministers. The Council of Ministers comprises representatives, usually the foreign ministers, of member states. The presidency of the council rotates between the members on a semiannual basis. When issues of particular concern arise, members may send their heads of state to sit on the council. At such times the council is known as the European Council, and has final authority on all issues not specifically covered in the various treaties creating the EU and its predecessor organizations. The Council of Ministers also maintains the Committee of Permanent Representatives (COREPER), with permanent headquarters in Brussels, Belgium, to sit during the intervals between the council's meetings; and operates an extensive secretariat monitoring economic and political activities within the EU. The Council of Ministers and European Council decide matters involving relations between member states in areas including administration, agriculture and fisheries, internal market and industrial policy, research, energy, transportation, environmental protection, and economic and social affairs. Members of the Council of Ministers or European Council are expected to represent the particular interests of their home country before the EU as a whole.

European Commission. The European Commission serves as the executive organization of the EU. Currently each country has one commissioner except for the five largest countries that have two. The Commission enlarges as more countries join. The European Commission seeks to serve the interests of Europe as a whole in matters including external relations, economic affairs, finance, industrial affairs, and agricultural policies. The European Commission maintains twenty-three directorates general to oversee specific areas of administration and commerce within the EU. It also retains a large staff to translate all EU documents into each of the EU's twenty official languages. Representatives sitting on the European Commission are expected to remain impartial and view the interests of the EU as a whole rather than the particular interests of their home countries.

European Parliament. The European Parliament comprises representatives of the EU member nations who are selected by direct election in their home countries. Although it serves as a forum for the discussion of issues of interest to the individual member states and the EU as a whole, the European Parliament has no power to create or implement legislation. It does, however, have some control over the EU budget, and can pose questions for the consideration of either the Council of Ministers or the European Commission.

Court of Justice. The Court of Justice comprises thirteen judges and six advocates general appointed by EU member governments. Its function is to interpret EU laws and regulations, and its decisions are binding on the EU, its member governments, and firms and individuals in EU member states.

IMPORTANT PROGRAMS

From its creation the EU has maintained the Economic and Social Committee (ESC), an appointed advisory body representing the interests of employers, labor, and consumers before the EU as a whole. Although many of the ESC's responsibilities are now duplicated by the European Parliament, the committee still serves as an advocacy forum for labor unions, industrial and commercial agricultural organizations, and other interest groups.

One ongoing area of contention among the members of the EU is agricultural policy. Each European nation has in place a series of incentives and subsidies designed to benefit its own farmers and ensure a domestically grown food supply. Often these policies are decidedly not beneficial to the EU as a whole, and lead to conflict between rival national organizations representing agricultural and fisheries industries. The degree of contention on agricultural and fisheries issues within the EU can be seen in the

fact that nearly 70 percent of EU expenditures are made to address agricultural issues, even though agriculture employs less than 8 percent of the EU workforce. In an attempt to reduce conflict between national agricultural industries while still supporting European farmers, the EU adopted a Common Agricultural Policy (CAP) as part of the Treaty on European Union.

The CAP seeks to increase agricultural productivity, ensure livable wages for agricultural workers, stabilize agricultural markets, and assure availability of affordable produce throughout the EU. Although the CAP has reduced conflicts within the EU, it has also led to the overproduction of many commodities, including butter, wine, and sugar, and has led to disagreements involving the EU and agricultural exporting nations including the United States and Australia.

The European Social Fund (ESF) and the European Regional Development Fund (ERDF) were established to facilitate the harmonization of social policies within EU member states. The ESF focuses on training and retraining workers to ensure their employability in a changing economic environment, while the ERDF concentrates on building economic infrastructure in the less-developed countries of the EU.

The European Investment Bank (EIB) receives capital contributions from the EU member states, and borrows from international capital markets to fund approved projects. EIB funding may be granted only to those projects of common interest to EU members that are designed to improve the overall international competitiveness of EU industries. EIB loans are also sometimes given to infrastructure development programs operating in less-developed areas of the EU.

OBSTACLES FACING THE EU

Although the EU has accomplished a great deal in its first two decades, many hurdles must still be crossed before true European unity can be achieved. Many EU nations experienced great difficulty in meeting the provisions required by the EU for joining the EMS, although eleven countries met them by the 1 January 1999 deadline. Meeting these provisions forced several EU members, including Italy and Spain, to adopt politically unpopular domestic economic policies. Others, such as the United Kingdom, chose not to take politically unpopular action and thus failed to qualify for participation. Even though the Euro was introduced according to schedule, economic unity has far outstripped political cooperation among EU members to date and real and potential political disagreements within the EU remain a threat to its further development. Although the Eurozone represents a formidable force in international trade, the EU faces several grave challenges as it strives to form an ever closer linkage of its national constituents.

Despite the fact that the Treaty on European Union created a central bank to supercede the national banks of its members, responsibility for the creation of fiscal policies remains in the hands of each national government. As such, there is great potential for the central authority and national economic policy making agencies to adopt conflicting programs. Furthermore, national political institutions within the EU are likely to be more responsive to the desires of their national constituencies than to the well being of the Eurozone as a whole, especially in times of economic instability. It is difficult to see how voters in the nations of the EU will be able to put the good of Europe ahead of their own particular interests.

This difficulty is particularly troublesome as political integration has progressed much more slowly than economic integration, and further political integration has recently suffered several potentially insurmountable setbacks. In 2004, the Treaty establishing a European Constitution (TCE) was signed by the representatives of all twenty-seven member nations, but the treaty failed to be ratified by all of the members. Most members did in fact ratify the TCE by parliamentary measure or popular referendum, but France and the Netherlands both rejected it in referendums. These failures led other members to postpone or call off their ratification procedures. As a result, the European Council called for a "period of reflection," which subsequently led to negotiations over a new constitutional treaty, known as the Lisbon Treaty. The Treaty of Lisbon, signed on 13 December 2007, was in the process of being ratified by member nations when the Irish electorate rejected the treaty in June 2008, creating uncertainty as to the future ratification of this version of a European constitution.

Another problem also arises out of the composition of the Eurozone. According to the optimal currency theory first posed by American Robert Mundell in 1961, in order for a single currency to succeed in a multinational area several conditions must be met. There should be no barriers to the movement of labor forces across national, cultural, or linguistic borders within the single-currency area; there should be wage stability throughout the single currency area; and an area-wide system should exist to stabilize imbalanced transfers of labor, goods, or capital within the single-currency area. These conditions do not exist in present-day Europe, where labor mobility is small, largely because of language barriers, and wages vary widely among EU member countries, particularly between those in the West and in the East. Furthermore, the present administrative structure of the EU is not powerful enough to redress imbalanced transfers, which are bound to occur periodically. Such imbalances would engage the sort of

political response discussed previously, to the detriment of the EU as a whole.

Optimal currency theory also holds that for a single currency area to be viable it must not be prone to asymmetric shocks, that is, economic events that lead to imbalanced transfers. Ideally, a single-currency area should comprise similar economies that are likely to be on similar cycles, thus minimizing imbalances. Similarly, the need for a freely transferable labor force within the single-currency area is also necessary to minimize imbalances, since each national member of the area must be able to respond flexibly to changes in wage and price structures.

ANALYSIS AND PROSPECTS

The EU has made remarkable progress during its first two decades. Although there are significant obstacles in the way of further strengthening of the EU, especially in political matters, the continued enhancement of economic ties binding members is likely to increase the political unity of EU members over time. That this is feasible is evidenced by the efforts of EU nations to conform to the stipulations of the Maastricht Agreement. Maintaining stable currency exchange rates, reducing public and overall government debt, and controlling long-term interest rates are all areas in which national governments and fiscal agencies had exercised complete autonomy in the past. Before the implementation of the Euro's second phase, many doubted that the EU member states could put aside their own internal interests to meet the Maastricht provisions; however, eleven of the fifteen managed to do so, and currently over half of the EU members belong to the Eurozone. Significantly, many had to experience economic slowdowns and increased unemployment in order to do so. Such resolve bodes well for continued strengthening of European unification in both political and economic areas. In fact, the history of the EU to date has been one of overcoming obstacles similar to those faced during the first two phases of the introduction of the Euro, and a unified Europe is and will remain a fact of international economic life for the foreseeable future.

SEE ALSO *Free Trade Agreements and Trading Blocs; International Business; International Management*

BIBLIOGRAPHY
Alesian, A., and R. Rerotti. "The European Union: A Politically Incorrect View." *Journal of Economic Perspectives* 18, no. 4 (2004): 27–48.

Blair, Alasdair. *The European Union Since 1945.* New York: Longman, 2005.

"Europe Ten Years from Now." *International Economy* 18, no. 3 (2004): 34–39.

"European Union in the U.S." Available from: http://www.eurunion.org.

McCormick, J. *Understanding the European Union: A Concise Introduction.* 3rd ed. New York: Palgrave, 2005.

Phinnemore, D., and L. McGowan. *A Dictionary of the European Union.* 3rd ed. London and Chicago: Europa, 2006.

Pinder, John and Simon Usherwood. *The European Union: A Very Short Introduction.* 2nd ed. New York: Oxford University Press, 2008.

Reid, T.R. *The United States of Europe: The New Superpower and the End of American Supremacy.* New York: Penguin Press, 2004.

Vanthoor, W.F.V. *A Chronological History of the European Union, 1946–2001.* 2nd ed. Northampton, MA: Edward Elgar, 2002.

EXECUTIVE COMPENSATION

Executive employees, such as chief executive officers (CEOs), chief financial officers (CFOs), company presidents, and other upper level managers are often compensated differently than those at lower levels of an organization. Executive compensation consists of base salary, bonuses, long-term incentives, benefits, and perquisites. Total executive compensation has increased dramatically during the past decade, leading to concerns about pay equity and ethics. As the gap between pay at lower and higher levels of corporations widens, CEOs and other executives are increasingly perceived as overcompensated.

TYPES OF EXECUTIVE COMPENSATION

There are several different types of executive compensation that are used to reward corporate executives for their job performance. The underlying purpose of executive compensation is to increase the corporation's profits by motivating executives to make good decisions about the direction of the company; however, compensation packages are determined by a variety of factors, both internal and external.

Base Salary of Executives. Base salary is the regular annual salary of the executive. While job evaluation is typically used to set employee pay in organizations, executive base salary levels are often more influenced by the opinion of the compensation committee (which consists of some or all of the members of the company's board of directors), which is often dependent on information from salary surveys of similar companies. Typically, pay of CEOs and other executives is set to be competitive with other executive salaries in the market and thus may be very high in comparison to the pay of employees in their own company. According to the *Mercer Human Resource Consulting 2006 CEO Compensation Survey*, the median CEO base salary was $995,000 in 2006. However, that same study also

noted that CEO salary is typically only about one-sixth (15% to 16%) of a CEO's total compensation.

Recent data also shows that salaries for executives typically rise more quickly than salaries for other employees. According to the Mercer survey, CEO compensation increased by 7.1 percent in both 2005 and 2006 while exempt employee salaries increased by only 3.6 percent and 3.7 percent respectively; in 2004, CEO compensation increased 14.5 percent while salaries rose only 3.4 percent.

Executive Bonuses. In addition to a base salary, most executives receive variable pay, a compensation that fluctuates according to some level of performance. The use of compensation beyond base salary is intended to motivate executives to reach certain organizational performance goals, for example, specific profit levels, and reward them for reaching these goals. One very popular type of variable pay is the executive bonus, which is a one-time payment tied to some short-term performance goal. The bonus may be based on any number of performance outcomes, ranging from judgments of executive performance by the board of directors, to levels of company profits or market share. Nearly all executives now receive some sort of bonus as a part of their compensation package. The Mercer survey cited above notes that in 2006, CEO bonuses were 26 percent of a CEO's total compensation, an increase from 16 percent in 2002.

Long-term Incentives. In recent decades, long-term incentives (LTIs) have become important for rewarding the performance of executives, and they now make up over half of total executive compensation. Incentives are rewards that are linked to specific long-term goals of the organization. The most common long-term incentive is the stock option, which either gives the executive free company stock or allows him or her to purchase company stock at a reduced price for a period of time. These stocks become more valuable as the company improves financially; therefore, ownership of stock is intended to encourage the executive to make the organization more profitable. Executives can then sell these stocks at a later time when they have appreciated in value, therefore providing compensation beyond the employee's tenure with the organization. However, company failures—in which unethical accounting practices and artificial inflation of stock prices caused lower-level employees to lose investments in company stock—have raised concerns about the ethics of granting large numbers of stock options to executives.

Executive Benefits and Perquisites. Benefits for executive-level employees are also likely to be different than those offered to lower-level employees. Executives will often receive high levels of typical company fringe benefits, like health insurance, life insurance, and pension plans. Addi-

tionally, some executives may also have a contract for large severance packages, paying cash and stock options to a CEO fired from a company. Many executives negotiate generous severance packages at the time of hire, so that even if they are unable to deliver upon promises to the company, they can collect compensation upon exit.

Executive perquisites, or "perks," are special benefits and services for executives and other top employees of companies. Perks may be things such as a car service, an executive dining room, special parking, membership in clubs, and other such amenities. It is customary for many U.S. executives to receive perks as a part of their total compensation. Some of these perks, like car service or a company airplane, may serve to improve an executive's ability to do his or her job. Additionally, some perks bring with them a certain level of status (for example, company-paid membership to an exclusive country club that is appealing to executive employees).

PAY EQUITY

High-profile media reports on executive compensation that followed in the wake of the corporate scandals throughout the 2000s raised consciousness about the issue of pay equity. Both employees and stockholders became increasingly aware of the wide disparity between executive compensation and pay for all other employees, particularly when CEOs of corporations involved in scandals or financial distress were reported to have received millions of dollars in bonuses, stock options, and pensions. (For example, Freddie Mac CEO, Richard Syron, received $14.5 million in 2007; $2.2 million of this amount was a "performance bonus.") Many critics argue that executive pay is far too high, and that these pay rates invite ethical problems.

Pay equity, or the fairness of pay, can be evaluated both internally and externally. These ideas are based on equity theory, a theory of motivation. Equity theory, briefly, indicates that a person examines what he brings to a job (inputs) and what he receives from a job (outcomes) and compares that to a reference person, evaluating the other person's inputs and outcomes. An employee might determine that she brings a certain level of education, experience, and effort to her job and that those inputs result in a certain level of salary and benefits. She would then compare this relationship to the education, experience, and effort, and the subsequent salary and benefits of another person. If these ratios are not equal, then the employee will feel unfairly treated. If this employee determines that her inputs are far greater than her counterpart's inputs, but their pay is the same, this employee will feel unfairly compensated.

External equity is the assessment of the fairness of pay in similar jobs in different organizations. Executives

who compare their pay to executives in other similar firms are making an assessment of external equity. External equity can be determined through market pay surveys, in which companies share information about the pay and benefits in their jobs. Additionally, the pay levels of executives may be public knowledge, either in company publications to shareholders or in trade organizations. If an executive is compensated highly as compared to others in similar companies, he or she is likely to feel positively about this situation; however, executives who are compensated at a lower rate than comparable executives in other companies may attempt to have their salary raised or may look for another position.

Internal equity is an assessment of the fairness of pay in different jobs within the same organization. Executives and employees compare their inputs and their pay to one another's to determine if they are fairly treated. Internal equity is often referred to as pay structure, and there are two types of pay structure: egalitarian and hierarchical. In egalitarian pay structures, the range of pay from the lowest paid employee to the highest paid employee is not very big; there are not large differences in pay. Egalitarian structures tend to be preferred by the lower-paid employees, because they feel that executive pay is not too high. However, executives may become dissatisfied in organizations with egalitarian pay structures, because they feel that their pay may not be commensurate with their skills or job duties. Hierarchical pay structures, conversely, have a fairly wide range of pay between the lowest and highest paid employees. In hierarchical pay structures, upper-level employees are likely to be paid very high salaries, which they are likely to find satisfying. However, in hierarchical structures, employees in low-level jobs may feel unfairly treated because of their relatively lower pay rate.

The pay level of U.S. executives is very high as compared to the pay of executives in other countries, as compared to pay of U.S. executives in the past, and as compared to U.S. employees at lower levels of the organization. Currently, U.S. executives earn about 400 times the pay of the lowest paid workers in their own companies. In Europe and Asia, the pay of executives is about 10 times that of the lowest paid worker. Additionally, many U.S. executives have generous stock option or severance packages that increase the value of their compensation.

EVALUATING PAY EQUITY

With increasing attention focused on the issue of pay equity, corporate boards and stockholders are more concerned than ever about evaluating pay equity. To examine the fairness of executive pay, several factors must be assessed. First, the executive pay package should be responsible to shareholders, which means that it is not so high that it detracts from company profits or that its incentives discourage unethical influence of stock prices. One result of recent attention to issues of pay equity has been an increase in the linkage between long-term incentives and performance. The Mercer Survey cited above indicates that LTIs for CEOs are increasingly performance-based, with performance-shares making up 31 percent of the LTI mix in 2006 (up from 21% in 2005) and stock options dropping from 52 percent to 46 percent of the total. This marks a drastic change from 2002, when stock options made up 76 percent of CEO LTI pay.

Another factor in evaluating pay equity concerns the competitiveness of pay packages with those of other similar organizations so that executives can be recruited, rewarded, and retained successfully. If a pay package is not competitive, there may be motivation problems or turnover. Additionally, executive pay should fit with the company's strategy so that it encourages overall company success. This is particularly relevant in regards to short-term bonuses and long-term incentives which can be used to steer the performance of the executive and the organization. Finally, compensation for executives must be in compliance with regulations. There are a number of laws regarding retirement plans, stock options, and other compensation components that must be followed when designing executive pay plans.

ETHICAL CONCERNS WITH EXECUTIVE COMPENSATION

The base salary, bonuses, incentives, and benefits for executives have raised serious questions about the ethical implications of such pay. One concern about the high pay level for American executives is that they may encourage executives to make business decisions that benefit themselves rather than the organization in order to meet performance goals necessary to receive incentive pay. This is particularly likely if incentives are short-term in nature. For example, an executive may drive up short-term profits that cannot be sustained, only to collect a large bonus and leave the company before long-term financial problems are revealed.

A second concern with the ethics of high executive pay is the use of stock options as an incentive. Recent evidence of illegal practices in some high-profile American companies has prompted the enactment of the Sarbanes-Oxley Act of 2002. This act prevents executives of companies from keeping profits or bonuses acquired from selling company stock if they have misled the public about the financial health of the company to increase stock price.

Finally, some question the ethics of the high level of executive pay when lower-level employee pay has not risen at the same rate. There is a continually widening gap in compensation in different levels of organizations;

for instance, the Mercer study determined that CEOs enjoyed bonuses of 162 percent of salary in 2006, while other studies indicate that typical clerical and technical staff earn approximately 5 percent of salary as an annual bonus. Although some argue that executive level positions deserve high rates of pay due to the nature of the job and the high level of responsibility involved, others argue that the gap in executive versus typical employee pay has widened so dramatically that employees are under-compensated and may even be tempted to engage in unethical behavior, such as stealing from the company.

RESPONSIBLE EXECUTIVE COMPENSATION

The post-Sarbanes-Oxley world has seen an increasing push for responsible executive pay. This trend continues to gain momentum with new rules requiring companies to make disclosures about the nature and value of executive compensation packages. Stockholders have been particularly concerned with ensuring that executive compensation grows only as shareholder returns grow. Recent data indicates that this has in fact been happening. As the Mercer Survey notes, "While the median change in CEO total direct compensation (salary, bonus and long-term incentives) was 8.9 percent, corporate net income increased by 14.4 percent, up from 13 percent in 2005, and total shareholder return was 15.1 percent, more than double the 6.8 percent return in 2005. Companies heard the message that pay has to be linked to performance." It remains to be seen whether there will be sustained attention on this issue.

SEE ALSO *Corporate Governance; Ethics; Human Resource Management*

BIBLIOGRAPHY
Chingos, Peter T., ed. *Responsible Executive Compensation for a New Era of Accountability.* Hoboken, N.J.: John Wiley & Sons, Inc., 2004.
"Executive Pay Trends: Looking Forward and Back." *Journal of Deferred Compensation* 10, no. 1 (2004): 24–35.
Martocchio, Joseph J. *Strategic Compensation: A Human Resource Management Approach* 5th ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2008.
"Mercer issues annual study of CEO compensation at large US firms." *Mercer Consulting* 9 April 2007. Available from: http://www.mercer.com/pressrelease/details.jhtml/dynamic/idContent/1263210.
Milkovich, George T., and Jerry M. Newman. *Compensation.* 9th ed. New York: McGraw-Hill Irwin, 2007.

EXECUTIVE DEVELOPMENT

SEE *Management and Executive Development*

EXIT STRATEGY

An exit strategy in the business world can refer to how a person or entity will leave a firm or part of a firm behind; this can mean selling, liquidating, or in some cases, the complete demolition of an entire corporation (or a branch thereof). An exit strategy is a plan devised by a person or team within the firm—or by a consultant group—that will end the life of a product, service, or sector of a business venture. In some cases, an exit strategy refers to a plan that will enable an entrepreneur to part with a business in a variety of ways for the sake of profit and nothing else.

Ultimately, the goal of an exit strategy is to keep a firm from losing money on a product or branch that is no longer lucrative. When it no longer makes financial sense to keep an item or branch of business going, a clear-cut exit strategy must be established. Creating a good exit strategy is the responsible choice when an item is costing more than it is profiting. Experienced strategic managers will know when this time has come by looking at the numbers and making choices based on fiscal results; stakeholder input can also factor into the decision. In many cases, however, the point of an exit strategy is to sell a business for a profit and simply walk away. This type of exit strategy usually involves liquidation, acquisition, or sale to an employee or other interested, invested party.

ENDING A BRAND OR PRODUCT TYPE

Ending the life of a product or brand within a company can also mean the end of jobs or an entire division of a company. Therefore, as much consideration and planning should be done for the end as was done to begin the operation in question. In this case, providing different jobs or job training to employees who will be displaced by the cancellation of the product or division are important parts of an exit strategy. Other considerations may concern what to do with unnecessary equipment and space, and how to put together a campaign for public notice that a brand or product type will be discontinued.

ENDING OWNERSHIP

Perhaps the most popular reason for calling for an exit strategy is selling a business for profit. Most entrepreneurs sell for a profit or sell at a time when maintaining the business no longer makes financial sense. When the time comes to sell, having a well-thought-out exit strategy is important; unloading a business hastily or without a plan can cost thousands or millions of dollars or can create legal issues. The strategy used should always be approved or even drafted by legal counsel that specializes in business law. Regardless of how the entrepreneur leaves, thinking about the future and what the sale will mean should be on the top of a short list.

A business owner can leave his or her business behind in just a few ways: by sale to an employee or interested party, by liquidation, or by acquisition. Other strategies—like staying on with an extravagant salary or massive stock benefits—are not really exit strategies, as they don't cause an immediate, well-planned or even guaranteed exit. In fact, it's altogether possible to bankrupt the company this way, causing major financial upset for the owner and employees. An exit strategy should include a plan for the best future for everyone, simply bleeding the corporate coffers is not considered a strategy.

Selling Versus Acquisition. Of the exit strategies for the sale of a business, the best option for the life of the business is to sell to an employee, family, or customer. In this way the business will be preserved, for the buyer typically has a vested interest in what is best for its future. Additionally, selling to someone who already knows the business well, and who the buyer knows, will create an atmosphere of trust during the sale and will expedite the process.

Selling the business in an acquisition can mean a good deal more profit for the entrepreneur, which is a good choice if the life of the business is not a concern. Selling to an acquirer is often more lucrative because the acquirer is often a larger company and not an individual. Additionally, when negotiating price with an acquiring company, it may be easier to negotiate upward because as the process moves forward, others interested in acquisition may come along, stirring up an interest and therefore increasing the value of the company for sale. Conversely, selling to an acquiring company can lock the entrepreneur out of a specific industry (noncompete agreement) and the best interest of the company and its history are likely not major concerns for the acquirer. Selling the company becomes a question of what is more important to stakeholders: the legacy or the profit.

Emergency Exit. Sometimes a business must be sold due to a death, divorce, or other event that makes keeping it no longer possible or sensible. In this case, liquidation may be the best bet. While liquidation almost never adds up to the kind of benefit that selling outright does, it offers a fast exit with some profit for the entrepreneur. One way to avoid having to liquidate in the event of a divorce or death is to incorporate. In this way, a business is seen as its own "self," an entity other than the person(s) who own it. A good exit strategy will include plans for what to do and who gets what in the event of a tragedy or emergency. Part of any exit strategy should include a formula for determining the company's worth, a plan for the surviving partner(s), and who will receive what in the event of a divorce.

An exit strategy should be a part of every business plan at the onset. "Begin with the end in mind," says Steven Covey in *The Seven Habits of Successful Living*. Without this kind of forethought, little can be done when the end approaches. An exit strategy should always consider stakeholders, family, and employees first, as protecting them during a transition is always essential to the end goal.

BIBLIOGRAPHY
Dees, Brent. "The Four Ds of a Business Exit Strategy." Available from: http://sbinformation.about.com/od/buyingorselling/a/ucexitplan.htm.

Lyons, Thomas W. *Exit Strategy: Maximizing the Value of Your Business,* 3rd ed. Cape Coral, FL: Sales Gravy Press, 2008.

Robbins, Steve. "Exit Strategies for Your Business." Available from: http://www.entrepreneur.com/management/operations/article78512.html.

EXPATRIATES

An expatriate is an employee sent by his or her employer to work in a foreign country. The firm is normally referred to as the parent company, while the country of employment is known as the host country. If General Motors sent one of its U.S. executives to oversee a new development in Brazil, the executive would be an expatriate, General Motors would be the parent company, and Brazil would be the host country. Equally, if an employee from Brazil was sent to the U.S. or an employee from Canada was sent to the People's Republic of China, they would be expatriates.

Many corporations are sending expatriates to their overseas operations, particularly as more firms face global competition and require internationally competent managers. Organizations need to understand the dynamic relationships between staffing and outcomes, and how these relationships change over time.

Expatriates provide a number of benefits for companies, including greater parent control and particular expertise. International experience is also seen as providing opportunities for personal and professional development and career advancement. Expatriates are very expensive, however, and this can discourage extensive use of expatriates. Many companies have also experienced relatively high failure rates, with failure often being attributed to the family's inability to adapt.

Surprisingly, given the high costs and potential for failure, companies often make these expensive commitments without preparing their employee for a cross-cultural transition. Expatriate success and job performance is closely related to intercultural adjustment and the same is true of families.

Given this, it is critical that companies use a rigorous selection process to identify which employees would likely succeed as expatriates. The selection process should also include consideration of the family.

istrative competencies. Strong relationships with the host country and headquarters' operations also make the expatriate's assignment more productive. Conflict resolution skills are also important to the expatriate. Expatriates must also have a strong belief in the assignment if it is to be a success, and they must believe that the assignment will be advantageous to their careers.

Motivation is likely to be higher if the person has an interest in the specific host country culture as well as in an overseas experience. To be successful the expatriate must be willing to acquire new behavior patterns and attitudes. The most successful expatriates enjoy the challenge of forging their way through new situations and are comfortable networking and initiating new social contacts. These are also critical for the families of expatriates. Training for expatriates and their families is therefore as important as proper selection.

To reduce the likelihood of premature termination of the assignment, companies should choose expatriates who have well-developed relationship skills. Some characteristics are crucial for a successful expatriate: tolerance for ambiguity, behavioral flexibility, strong interpersonal skills, and a nonjudgmental disposition. In addition, an effective expatriate would have high cultural empathy. Ethnocentrism is the belief that one's culture is superior. Ethnocentric expatriates are likely to have problems adjusting to a new culture, and the local people are likely to perceive them negatively. Communication is also key.

The expatriate needs to have some working knowledge of the host language, but it may be more important that the expatriate have outstanding nonverbal communication skills and an understanding that nonverbal communication varies between cultures. He or she should become familiar with common nonverbal protocol in the new culture.

Most expatriates take their families with them to the foreign country, and their family situation is one of the most critical factors in the successful completion of an overseas assignment. Family transition must be taken very seriously. An expatriate must be comfortable on a personal level. Major stress can be caused for the entire family by something as seemingly trivial as the transportation of a family pet. An expatriate's spouse must have a very strong willingness to live abroad. The spouse must be supportive as well as adaptive. Many firms have had expatriates' assignments terminated early because the spouse was unwilling or unable to make the necessary adjustments to the host country.

Predeparture training for the expatriate greatly increases the likelihood of success. The extent of training can depend on a variety of variables: previous overseas experience (if applicable), time until departure, and novelty of the new country. Cross-cultural training must be meaningful for the expatriate and family. Training should, at the minimum,

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Exhibit 1

Types of Allowances Given to Expatriates

Foreign Service Premiums-This is a sum of money that is simply a reward for being willing to move one's family to a new country. The sum is generally a percentage of one's base salary—usually between 10 to 25 percent.

Hardship Allowance-The hardship allowance is actually another foreign service premium added to the original one. It is based on not just having to go overseas, but where you go overseas. Hardship allowances are greatest when the expatriate is sent to places having poor living conditions, a vastly different culture, less access to good health care, etc.

Cost of Living Allowances-Cost of living allowances (COLAs) enable expatriates to maintain their standard of living. COLAs are given when the cost of living in the host country is greater than that in the United States.

Housing Allowances-The cost of housing in various parts of the world is much higher than it is in the United States. Large apartments in Tokyo or Hong Kong, for instance, can go for upwards of $10,000 a month. Housing allowances compensate expatriates for these higher costs.

Utility Allowances-Some companies give expatriates a fixed sum of money above their base salary to pay their utilities bills; other companies try to ascertain the difference in utility bills between the home and the host countries, and give an allowance based on that difference.

Furnishing Allowances-Some companies offer to ship all of the expatriate's furnishings overseas. A second approach is to pay for the lease or purchase of furnishings overseas by expatriates. A third approach is to just give the expatriate a fixed sum of money (usually between $8,000 to $10,000) to buy furnishings.

Education Allowances-Most expatriates send their children to private school overseas. Companies often pay the full cost of tuition, books, and supplies.

Home Leave Allowances-Companies usually provide expatriates and their families with round-trip, business-class airfare to visit the home country at least once a year.

Relocation Allowances-The allowance makes up for any mistakes made in any of the other allowances for unforeseen complications. Expatriates receive about one month's salary.

Medical Allowances-Companies usually pay for all medical expenses. In hardship countries where medical facilities are inadequate, this includes emergency trips to other countries to receive medical care.

Car and Driver Allowances-Most companies offer expatriate managers a car allowance. This enables the expatriate to lease, buy, or rent a car in the host country. In some cases, the expatriate is given funds to hire a chauffeur.

Club Membership Allowances-In some countries the only way an expatriate can gain access to recreational facilities (e.g., tennis courts, swimming pools, country clubs) is by joining clubs. Also, in many cultures these facilities are important places in which to develop contacts and conduct business. This type of allowance is usually made on a case-by-case basis.

Taxes-Many companies reimburse expatriates for taxes they pay in excess of what they would have paid had they remained in the United States.

Several characteristics determine an expatriate's expected level of success: job skills, motivational state, language skills, relationship skills, and family situation. Technical competency is most often used as the selection criteria for expatriates, but that is rarely the best selection technique. An expatriate is likely to make more progress at the overseas location if he or she has effective managerial skills and admin-

inform the expatriate about the new country, and at the best, it would immerse the expatriate into the new culture.

Low-interaction training is focused on information distribution. It generally takes the form of lectures, videos, and readings. The material should include general area studies and a company operational overview. Low-intensity training would be appropriate for someone who has been on an expatriate assignment before or someone familiar with the host country. Unfortunately, this is often the only training received by most expatriates whether they have previous experience or not. This lack of training is usually due to last-minute selection or no training budget.

Medium- to high-intensity training should have a duration of one to two months. This training provides affective learning and cultural immersion. Medium-intensity training takes the intercultural experience workshop approach, offering cultural simulations, role plays, and case studies. Skill development can be culture-general or culture-specific. High-intensity training, most necessary for inexperienced expatriates entering a very different culture, provides sensitivity training and includes communication workshops and field exercises that focus on self awareness, listening skills, open-mindedness, and communication skills.

Prior to 2001, there were relatively few female expatriates (Stroh, Varma, Valy-Durbin, 2000), but a 2006 study by Mercer Human Resource Consulting showed an enormous increase in women being sent out on international assignments. This was particularly true for the Asia-Pacific region, which saw a sixteen-fold increase in female expatriates. The female expatriates in this study were far less likely than their male counterparts to be accompanied by a partner on the assignment. Although the companies surveyed did not have different policies for male and female assignees, it was clear that male and female expatriates were treated differently in certain respects. For example, 15 percent of the companies surveyed said they would not send a female employee to high-risk locations such as the Middle East.

Given that expatriates are very expensive, it is in a firm's interest to make sure the assignment is successful. Proper expatriate selection and training, as well as attention to the needs of the family, can be a productive investment.

SEE ALSO *Human Resource Management; International Business; International Management; Organizational Culture*

BIBLIOGRAPHY
Ali, A., K. Van der Zee, and G. Sanders. "Determinants of Intercultural Adjustment Among Expatriate Spouses." *International Journal of Intercultural Relations* 27, no. 5 (2003): 563–580.

"Big rise in number of female expats." *Management Issues* 12 October 2006. Available from: http://www.management-issues.com/2006/10/12/research/big-rise-in-number-of-female-expats.asp.

Cullen, Lisa Takeuchi. "The New Expatriates." *Time.com* 11 October 2007. Available from: http://www.time.com/time/magazine/article/0,9171,1670516,00.html.

Gong, Y. "Towards a Dynamic Process Model of Staffing Composition and Subsidiary Outcomes in Multinational Enterprises." *Journal of Management* 29, no. 2 (2003): 259–280.

Hess, Melissa Brayer and Patricia Linderman. *The Expert Expat, Revised Edition: Your Guide to Successful Relocation Abroad.* London: Nicholas Brealey Publishing, 2007.

Punnett, B.J. *International Perspectives of Organizational Behavior and Human Resource Management.* Armonk, NY: M.E. Sharpe, 2004.

Schuler, R.S., P.S. Budhwar, and G.W. Florkowski. "International Human Resource Management." In *Handbook for International Management Research* ed. B.J. Punnett and O. Shenkar. Ann Arbor, MI: University of Michigan Press, 2004.

Stahl, G.K., E.L. Miller and R.L. Tung. "Toward the Boundaryless Career: A Closer Look at the Expatriate Career Concept and the Perceived Implications of an International Assignment." *Journal of World Business* 37, no. 3 (2002): 216–227.

Stroh, L.K., A. Varma, and S.J. Valy-Durbin. "Why Are Women Left at Home: Are They Unwilling to Go on International Assignments?" *Journal of World Business* 35, no. 3 (2000): 241–255.

Tucker, M.F., R. Bonial, and K. Lahti. "The Definition, Measurement and Prediction of Intercultural Adjustment and Job Performance Among Corporate Expatriates." *International Journal of Intercultural Relations* 28, no. 3-4 (2004): 221–251.

EXPERIENCE AND LEARNING CURVES

Experience and learning curve models are developed from the basic premise that individuals and organizations acquire knowledge by doing work. By gaining experience through repetition, organizations and individuals develop relatively permanent changes in behavior or learning. As additional transactions occur in a service, or more products are produced by a manufacturer, the per-unit cost often decreases at a decreasing rate. This phenomenon follows an exponential curve. The organization thus gains competitive advantage by converting this cost reduction into productivity gains. This learning competitive advantage is known as the experience curve, the learning curve, or the progress curve.

It is common for the terms *experience curve* and *learning curve* to be used interchangeably. They do, however, have different meanings. According to definitions by Hall and Starr, the experience curve is an analytical tool designed to quantify the rate at which experience of accumulated output, to date, affects total lifetime costs. Melnyk defined the learning curve as an analytical tool designed to quantify the rate at which cumulative experience of labor

hours or cost allows an organization to reduce the amount of resources it must expend to accomplish a task. Experience curve is broader than learning curve with respect to the costs covered, the range of output during which the reductions in costs take place, and the causes of reduction.

Organizational learning is complex in that people learn at many levels simultaneously. In organizations, procedures, norms, rules, and forms store knowledge. March states that managers of competitive organizations often find themselves in situations where relative position with regard to a competitor matters. This possible competitive advantage through enhanced learning is the essence of the study of experience and learning curves.

The analytical use of the concept for business purposes first surfaced in 1936 during airplane construction, when Wright observed that as the quantity of manufactured units doubled, the number of direct labor hours needed to produce each individual unit decreased at a uniform rate. The variation of labor cost with production quantity is illustrated by the following formula:

$$F = \log\ F/\log N$$

where *F* equals a factor of cost variation proportional to the quantity *N*. The reciprocal of *F* represents a direct percent variation of cost versus quantity.

This insight shows that experience-based learning is closely correlated with cumulative output, extending beyond changes in design and tooling. Wright found empirical evidence that as unit volume increases there are predictable corresponding reductions in cost. These data become central concepts for strategic and operational planning. There has been much discussion on the role of learning in business organizations. A seminal work in learning theory is the 1963 *A Behavioral Theory of the Firm* by Cyert and March. These authors viewed firms as adaptively-rational systems. This means that the firm learns from its experience. In its basic form, an adaptive system selects preferred states for use in the future. With experience, management uses decision variables that lead to goals and shuns those that do not lead to goals.

The learning curve model was expanded by Adler and Clark into a learning process model. A key conceptual difference from the prior model is that "a significant part of the effect of experience on productivity (captured in the learning curve model) might be due to the influence of identifiable managerial actions." The authors present two orders of learning. First-order learning refers to the classic learning curve model where productivity is an exponential function of experience. Second-order learning denotes that which is driven by changes in technology or human capital that lead to goal attainment.

FUNDAMENTALS OF EXPERIENCE AND LEARNING CURVES

Following a strategy of increasing market share, the experience curve focuses on cost leadership. Management attempts to increase market share while simultaneously reducing costs. This is a detriment to market entry as the firm can lower its price, which may further increase its market share and place added pressure on potential competitors, as found in a study by Lieberman. Learning through experience becomes an important component of the increased market share strategy.

Quality learning is enhanced through the shared experience at the worker and organizational levels. Quality increases as the firm moves further along the experience curve, thus increasing productivity and efficiency. As the individual employees and organization become more efficient, there should be a corresponding increase in productivity. More output for less input effectively increases capacity; taken together with the increased efficiency and productivity, this should lead to a reduction in unit cost. The business is investing in a cost-leadership posture based on the assumption that price is a basis for competition. If the firm is able to produce quality units and reduce market price, there is the opportunity for increased market share (the business strategy). Increased market share via reduced price may lead to the global goal of improving profits.

Use of a cost-leadership strategy based on the experience curve implies several assumptions, according to Amit:

1. Price is a basis for competition.
2. If per unit cost is reduced, price may be reduced, which may lead to increased market share.
3. As cumulative output increases, the firm's average cost is reduced. Therefore, for any production rate, there is a reduction in the per-unit cost.
4. If market share is increased, profits will increase.

Another critical assumption of the experience curve, noted by Lieberman, is that learning can be kept within the organization. Where industry-wide dissemination of process technology is rapid, the benefits of organizational learning through the experience curve may be short-lived. The cost benefits, therefore, may not lead to increased market share even though industry costs are declining because all participants are learning at approximately the same rate.

LEARNING CURVE FORMULATION

The formula for the learning curve model is commonly shown either as a margin-cost model or as a direct-labor-hours model. The direct-labor-hours formula is more useful, as hourly compensation typically changes over time and there may be inflation considerations as well. However,

both derivations will be presented here for clarity. Also, direct-labor hours may be easily converted into costs if necessary, according to Yelle. By convention, we refer to experience curves by the complement of the improvement rate. For example, a 90 percent learning curve indicates a 10 percent decrease in per-unit (or mean) time or cost, with each doubling of productive output. Experience and learning curves normally apply only to cost of direct labor hours.

Marginal Cost Model. The cumulative-average learning curve formulation is:

$$Y_{cx} = ax^b$$

where Y_{cx} = average cost of the first x units,
   a = the first unit cost,
   x = the cumulative unit number output,
and
   b = the learning elasticity, which defines the slope of the learning curve.

This learning curve model indicates that as the quantity of units produced doubles, the average cost per unit decreases at a uniform rate.

Direct-Labor-Hours Model. The direct-labor-hours model of the learning curve is:

$$Y = KX^n$$

where Y = the number of direct labor hours required to produce the Xth unit,
   K = the number of direct labor hours required to produce the first unit,
   X = the cumulative unit number,
   n = log ϕ/log 2,
   ϕ = the learning rate, and
   $1 - \phi$ = the progress ratio.

These empirical models have been shown to fit many production situations very well. One criticism is that many other undocumented variables may be behind the benefits attributed to the experience curve. There are intermingling variables that also may account for cost reductions. Some of these variables might be economies of scale, product design decisions, tooling and equipment selections, methods analysis and layout, improved organizational and individual skills training, more effective production scheduling and control procedures, and improved motivation of employees. All of these variables play a role in decreasing cost and increasing capacity.

APPLICATIONS AND USES

There are three general areas for the application and use of experience curves: strategic, internal, and external to the organization. Strategic uses include determining volume-cost changes, estimating new product start-up costs, and pricing of new products. Internal applications include developing labor standards, scheduling, budgeting, and make-or-buy decisions. External uses are supplier scheduling, cash flow budgeting, and estimating purchase costs. The usefulness of experience and learning curves depends on a number of factors: the frequency of product innovation, the amount of direct labor versus machine-paced output, and the amount of advanced planning of methods and tooling. All lead to a predictable rate of reduction in throughput time.

Knowledge on the practical application of experience curves and learning curves has increased greatly since 1936. Interest was renewed in the early 1990s with the publication of *The Fifth Discipline* by Peter Senge. Senge melded theories on mental models, the systems approach, and learning curves in a way that made sense for executives.

These curves offer potential competitive advantage to managers who can capitalize on the cost reductions they offer. The experience and learning curves rely, however, on keeping the knowledge gained *within* their organization. Given rapid communication, high manager and engineer turnover, and skills in reverse engineering, this is harder to accomplish with each passing year. However, Hatch and Dyer found that in the case of the semiconductor manufacturing industry, in particular, skills acquired in one firm are not necessarily effectively transferable to another firm since knowledge is specific to the original work environment. Therefore, even if the employee is hired away, there is limited threat to the original firm.

Hatch and Dyer conclude that to truly maintain an advantage over the competition, firms must employ effective human resource selection, training, and deployment processes that facilitate learning by doing. Those firms that meet this challenge may enjoy the only truly sustainable advantage—the ability to learn (and improve) faster than competitors. As manufacturing and service product lives become shorter, management must be keenly on top of experience and learning curves to continue to enjoy the advantages.

SEE ALSO *Knowledge Management; Organizational Learning*

BIBLIOGRAPHY
Abernathy, William J., and Kenneth Wayne. "The Limits of the Learning Curve." *Harvard Business Review* 52, no. 5 (1974): 109–119.
Adler, Paul S., and Kim B. Clark. "Behind the Learning Curve: A Sketch of the Learning Process." *Management Science* 37, no. 3 (1991): 267–281.
Amit, Raphael. "Cost Leadership Strategy and Experience Curves." *Strategic Management Journal* 7, no. 3 (1986): 281–292.

Cyert, Richard M., and James G. March. *A Behavioral Theory of the Firm.* Englewood Cliffs, NJ: Prentice-Hall, Inc., 1963.

Demeester, Lieven L., and Me Fontainebleu Qi. "Managing Learning Resources for Consecutive Product Generations." *International Journal of Production Economics* 95, no. 2 (2005): 265–283.

The Experience Curve. NetMBA Business Knowledge Center. Available from: http://www.netmba.com/strategy/experience-curve/.

Hall, G., and S. Howell. "The Experience Curve from the Economist's Perspective." *Strategic Management Journal* 6, no. 3 (1985): 197–212.

Hatch, Nile W., and Jeffrey H. Dyer. "Human Capital and Learning as a Source of Sustainable Competitive Advantage." *Strategic Management Journal* 25, no. 12 (2004): 1155–1178.

Heizer, Jay, and Barry Render. *Operations Management.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Jaber, M.Y., and A.L. Guiffrida. "Learning Curves for Processes Generating Defects Requiring Reworks." *European Journal of Operational Research* 159, no. 3 (2004): 663–672.

Junginger, M., A. Faaij, and W.C. Turkenburg. "Global Experience Curves for Wind Farms." *Energy Policy* 33, no. 2 (2005): 133–150.

Learning Curve Calculator. National Aeronautics and Space Administration. Available from: http://cost.jsc.nasa.gov/learn.html.

Lieberman, Marvin B. "The Learning Curve, Technology Barriers to Entry, and Competitive Survival in the Chemical Processing Industries." *Strategic Management Journal* 10, no. 5 (1989): 431–447.

Linton, Jonathan D., and Steven T. Walsh. "Integrating Innovation and Learning Curve Theory: An Enabler for Moving Nanotechnologies and Other Emerging Process Technologies into Production." *Research and Development Management* 34, no. 5 (2004): 517–526.

March, James G. "Exploration and Exploitation in Organizational Learning." *Organizational Science* 2, no. 1 (1991): 71–87.

Melnyk, Steven A., and David R. Denzler. *Operations Management: A Value-Driven Approach.* Chicago: Richard D. Irwin, 1996.

Senge, Peter M. *The Fifth Discipline: The Art and Practice of the Learning Organization.* New York: Doubleday Currency, 1990.

Smunt, Timothy L., and Charles A. Watts. "Improving Operations Planning with Learning Curves: Overcoming the Pitfalls of 'Messy' Shop Floor Data." *Journal of Operations Management* 21, no. 1 (2003): 93–107.

Starr, Martin K. *Operations Management: A Systems Approach.* Danvers, MA: Boyd & Fraser, 1996.

Teplitz, Charles J. *The Learning Curve Deskbook: A Reference Guide to Theory, Calculations, and Applications.* New York: Quorum Books, 1991.

Wright, T.P. "Factors Affecting the Cost of Airplanes." *Journal of the Aeronautical Sciences* 3, no. 4 (1936): 122–128.

Yelle, Louis E. "The Learning Curve: Historical Review and Comprehensive Survey." *Decision Sciences* 10, no. 2 (1979): 302–328.

EXPERT SYSTEMS

Expert systems are artificial intelligence (AI) tools that capture the expertise of knowledge workers and provide advice to (usually) non-experts in a given domain. Expert systems use computer programs that contain a knowledge database for a particular area along with an inference mechanism—usually a set of rules of deduction—that enables the program to solve problems that would normally be handled by humans. The outcome of expert system calculations are recommendations of one or more courses of action.

KNOWLEDGE REPRESENTATION SYSTEMS

Expert systems, also known as knowledge representation systems, utilize computerized models that capture the knowledge of one or more subject matter experts (SMEs) and store it in the framework that is most appropriately suited to the reasoning processes that the SMEs use in their problem-solving behavior. Such systems are created by a specialized systems analyst called a knowledge engineer, whose task is to interview the expert and/or observe his problem-solving behavior, then determine the most appropriate form(s) of knowledge representation to model the expert's problem-solving techniques. This process, called knowledge acquisition, is perhaps the most difficult and time-consuming aspect of expert systems development. It requires both technical and people skills on the part of the knowledge engineer, who must establish rapport with the domain expert, maintain a productive relationship during the interviewing process, and recognize the required mapping from the expert's explanations to the appropriate knowledge representation. The knowledge engineer then encodes the expert's knowledge into a knowledge base, which is a repository of the expert's knowledge in a particular representational structure. Some of the most common knowledge representations are described below.

In addition to the knowledge base, an expert system includes an automated reasoning mechanism called an inference engine that performs calculations and/or logical processes to produce the results of a particular problem-solving session. The explanation facility of an expert system provides the user with an explanation of the reasoning process that was used to achieve the conclusion or recommendation. Each knowledge representation has a corresponding inference technique. Three very common knowledge representations are rule-based systems, frame-based systems, and case-based systems.

UNCERTAINTY IN ARTIFICIAL INTELLIGENCE

The types of problems that AI systems try to solve are often fraught with uncertainties. Sometimes SMEs are uncertain

about the conclusions they may draw based on the facts that are presented to them. In addition, the facts themselves may not be clear-cut; they may be in error, incomplete, or ambiguous. Thus, AI systems must have the ability to reason and draw some inference even in the face of such uncertainties. AI systems do this in many ways. Two common approaches are described below.

Rules with Confidence Factors. This approach to uncertainty combines probability with logic. It enhances rule-based systems with probability-like numbers that represent the confidence in either a fact or an inferred conclusion. For example, consider this rule:

If the engine will not start but it will turn over, then the injection system is bad.

In some cases the facts are uncertain. Suppose the user is uncertain whether the engine starts or whether it turns over. If the user is 70 percent sure that the engine does not start and 80 percent sure that the engine turns over, then the conclusion of a bad injection system will be uncertain as well. A typical inference with this uncertainty is to multiply the two probabilities. In this case, 70 percent times 80 percent results in 56 percent confidence that the injection system is bad.

Furthermore, the rule itself may be uncertain. An expert may be only 60 percent sure that an engine that does not start and turns over implies a bad injection system. In this case, even if the user were 100 percent sure that the engine does not start but does turn over, the confidence in the conclusion of a bad injection system would be only 60 percent.

The inference process propagates the uncertainties through to the conclusions, so that the expert system tells the user not only what its recommendation is, but also the level of confidence in the recommendation.

An example of an expert system using rules can be found in the Department of Veterans Affairs within their OneVA initiative, which seeks to improve service by implementing improved information technology. A component of this initiative is the creation of an "expert system for the determination of potential benefits." This expert system utilizes a rule-based approach that analyzes customer data to determine proper eligibility levels.

Fuzzy Logic Systems. One of the most difficult obstacles facing the construction of expert systems is the inherent fuzziness of much human communication. Consider the question "Is this item expensive?" Here, "expensive" implies that the item costs a good deal of money. But how, even with data about prices, does one determine if an item is *expensive*? What is expensive to one person may be quite inexpensive to another. This is a case of linguistic ambiguity, where one word may have different meanings depending on context.

Fuzzy logic deals with linguistic ambiguity by mapping precise values (e.g., price, temperature, age in years) onto imprecise concepts (e.g., expensive, cold, young) via a membership function. The imprecise concept is called a fuzzy set, and the membership function measures the degree to which a precise value belongs in the fuzzy set.

Consider Figure 1, which shows three fuzzy sets related to the price of a product: inexpensive, moderate, and expensive. The membership functions are the solid and dashed lines in the graph. The X-axis shows the crisp value (actual price) and the Y-axis shows the degree of membership of a particular crisp value in each of the fuzzy sets. The price of $10 has 100 percent membership in the inexpensive set and 0 percent membership in each of the others. By contrast, the $100 price has 100 percent membership in the expensive set and 0 percent in the others. The $50 price has some degree of membership in all of the sets; it has 100 percent membership in the moderate set, but also some small degree of membership in both the others.

Figure 1
Artificial Intelligence & Expert Systems
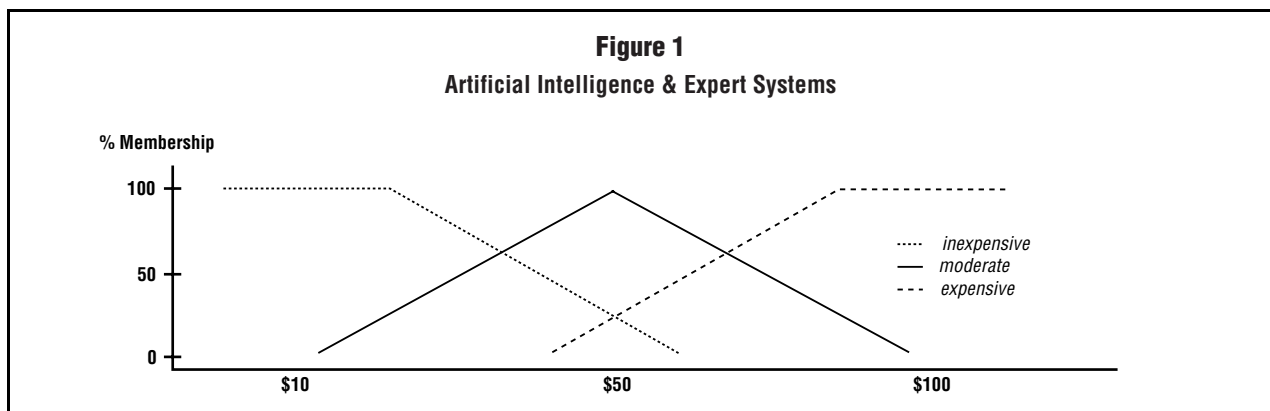
Consider this rule:

**If the price is expensive then do not buy
the product**.

Such a rule will not fire at all if the price is $10. It will fire with 100 percent strength if the price is $100. It will fire with a much lower strength if the price is $50. This is the main idea behind fuzzy logic systems.

Fuzzy logic systems are used in many applications. They are commonly embedded in control systems, such as regulating automatic braking systems in cars and auto focusing in cameras.

COMPUTATIONAL INTELLIGENCE

In theory, expert systems can be applied to any domain of human knowledge. Researchers have focused on improving and expanding the kind of human thinking that can be imitated by computer systems. During the 1990s, developments in expert systems focused on applying computer models to banking and finance, forecasting, security, manufacturing, marketing, and many other business areas and industries. Specifically, areas such as loan applications, fraud detection, inventory management, enterprise resource planning, and supply-chain management found useful applications of expert systems.

With the success of these systems, there was an explosion of work on expert systems during the late 1990s and early 2000s, primarily focused on attempting to refine decision-making algorithms. This research led to the creation of a field known as computational intelligence, which is the current successor to artificial intelligence. Computational intelligence represents an evolution of expert-systems thinking, improving decision-making procedures by incorporating techniques such as neural networks, Swarm intelligence, fractals, and chaos theory. The field of computational intelligence is fairly new, and its techniques, tools, and goals are not as yet fully solidified. Researchers within this field expect exciting breakthroughs in intelligence-modeling and expert-systems developments during the early part of the twenty-first century, but the full power and potential of developing expert systems remains unclear.

SEE ALSO *Artificial Intelligence*

BIBLIOGRAPHY

Andina, Diego, and Duc Truong Pham, eds. *Computational Intelligence.* Dordrecht: Springer, 2007.

Bertino, E., G.P. Zarri, and B. Catania. *Intelligent Database Systems.* Boston: Addison-Wesley, 2001.

Jackson, Peter. *Introduction to Expert Systems.* 3d ed. Boston: Addison-Wesley, 1998.

Leondis, C.T. *Expert Systems: The Technology of Knowledge Management for the 21st Century.* vols. 1–6. Amsterdam: Elsevier Academic Press, 2001.

Liu, Ying, et. al., eds. *Advances of Computational Intelligence in Industrial Systems.* Berlin: Springer, 2008.

Metaxiotis, K., and J. Psarras. "Expert Systems in Business: Applications and Future Directions for the Operations Researcher." *Industrial Management & Data Systems* 103, no. 5/6 (2003): 361–368.

EXPORTING AND IMPORTING

Exporting is the act of producing goods or services in one country and selling or trading them to another country. The term *export* originates from the Latin words *ex* and *portare*, meaning "to carry out." The counterpart to exporting is importing: acquiring goods from one country and selling them in another country. Although it is common to speak of a nation's exports or imports in the aggregate, the company that produces the good or service—as opposed to a nation's government—usually conducts exporting in terms of logistics and sales transactions. However, export and import levels may be highly influenced by government policies, such as offering subsidies that either restrict or encourage the sale of particular goods and services abroad. Certain exports, such as military technology, may be banned entirely, at least for certain recipients, in cases of trade embargoes or other government regulations (e.g., U.S. companies generally cannot export to or import from Cuba). Exporting is just one method that companies use to establish their presence in economies outside their home country. Importing is the method used to acquire products not readily available from within a country or to acquire products at a less expensive cost than if they were produced in that country.

A country may be in a favorable position to export for several reasons. A nation may export if it is the world's sole supplier of a certain good, such as when it has access to natural resources others lack. Some countries are also able to manufacture products at a relatively lower cost than other countries, for example, when labor costs less. Other factors include the ability to produce superior quality goods or the ability to produce the goods in a season of the year when other countries need them (Branch, 1990).

BALANCE OF TRADE

A country's international trade consists of both importing and exporting goods and services. The difference between the amount exported and the amount imported equals the balance of trade. A trade surplus consists of exporting more than importing while a trade deficit consists of importing more than exporting.

Figure 1

U.S. International Trade in Goods and Services (in billions of US dollars)

Source: US Census Bureau: Foreign Trade Statistics. Available from: www.census.gov/indicator/www/ustrade.html.
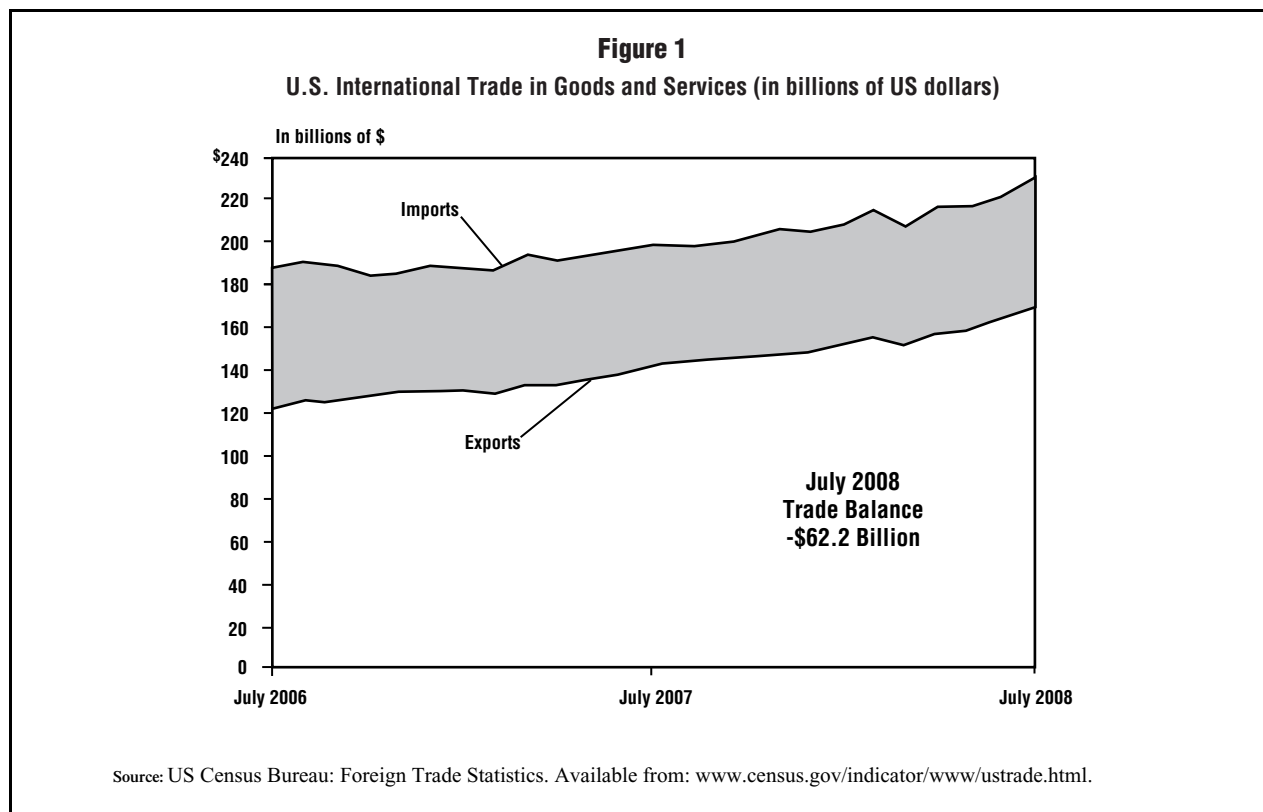
BRIEF HISTORY OF U.S. EXPORTS AND IMPORTS

The United States has been heavily dependent upon exporting throughout its history. It has played an important role in global trade as well. Even before its Declaration of Independence, the United States relied heavily on the exportation of cotton, tobacco, and other agricultural products to Europe for much of its commerce. After the Revolutionary War, the United States endured English duties and restrictions in Europe and the West Indies. This caused the United States to form new trade ties with overseas buyers in Africa, India and East Asia, helping to form a legacy of U.S. trading overseas.

Although the United States thrived in exporting during its first one hundred years, it was not until the Industrial Revolution gained momentum in the late nineteenth century that exporting began to significantly increase. This occurred mainly due to the technological advancements in communications, manufacturing, transportation, and food preservation techniques. It was during this time that the United States made the transition from being a supplier of agricultural products to a manufacturer of industrial goods, such as ships, railroads, clothes, and cars.

However, in the first decades of the twentieth century there was an increase in protective trade barriers and restrictions created by counties to further their own trade interests.

As a result, many laws were created to protect domestic industries and give local firms an advantage in trade. The Sherman Antitrust Act of 1890, the Federal Trade Commission Act of 1914, the Trading with the Enemy Act of 1917, and the Smoot-Hawley Tariff Act of 1930 were some of the laws passed in the United States at this time. While not all of these were intended to reduce trade, and probably none were intended to devastate U.S. exports, the general pattern internationally was to raise protectionist trade barriers and tariffs in kind, creating an unfavorable climate for U.S. exports. This repressive trade environment is considered one of the causes of the Great Depression.

During the mid- and late 1930s, the United States and other nations cooperated to reduce trade barriers and create a smoother world trade climate. The U.S. Reciprocal Trade Agreements Act of 1934 helped to introduce lower tariffs and duties imposed on imports. Additionally, the most-favored-nation (MFN) trading program extended the benefits of any bilateral tariff reductions negotiated by the United States to all MFNs.

World War II helped to increase United States exports, as did reduced trade barriers. At this time, countries turned to the United States for supplies and it was increasingly perceived as an industrial power and a source of high-quality goods. In the postwar years, the United States emerged as the most powerful international trade

leader, while the European and Japanese manufacturing sectors concentrated on rebuilding. From the 1940s through the 1960s, the U.S. trade surplus—the value of exports out of the country less the value of imports into the country—increased at a rate of 20 percent annually. U.S. exports continued to increase throughout the 1970s, growing from about $43 billion in 1970 to nearly $225 billion by 1980.

In the 1970s, however, increased competition from Western Europe and Japan wrested international market share from the United States. In the 1980s U.S. exports were outweighed by imports, as the national trade deficit grew to more than $160 billion annually by the late 1980s. Much of this deficit was due to oil imports; however, Japan's success at manufacturing quality goods for export, particularly autos and electronics, also contributed.

Despite this, increasing globalization of markets and an ongoing effort to lower trade barriers greatly expanded global trading. From 1986 to 1990, U.S. merchandise exports contributed more than 40 percent of the rise in gross national product (GNP). In 1990, almost 84 percent of U.S. GNP growth was due to exports, which totaled a record high of $394 billion. The increase of U.S. exports in the late 1980s and early 1990s led to a significantly lower trade deficit and two million new jobs attributed to exports. The U.S. Department of Commerce estimates that for every $45,000 in export sales, one job is created, more than double the rate of jobs created by domestic sales. By 2004, annual U.S. exports of goods and services were around $1.147 trillion, leaving a $617 billion trade deficit, based on U.S. Census Bureau, Foreign Trade Statistics figures. According to World Trade Organization estimates, in 2004 the United States supplied about 9.6 percent of the world's merchandise exports by value. The United States was the world leader in imports claiming a 16.8 percent share of world total imports.

CHARACTERISTICS OF EXPORTERS

Exports remain an important growth vehicle for U.S. companies, as many domestic product and service markets are saturated and offer only limited growth prospects. Many smaller firms export occasionally and seek to develop permanent, recurring business in foreign countries. Other companies only export to a few countries and want to increase the number of countries in which they do business.

In 2004, 15 percent of U.S. exporters accounted for 84 percent of the value of U.S. manufactured exports. Half of all exporters sell in only one foreign market. Fewer than 20 percent of exporters and fewer than three percent of U.S. companies overall export to more than five markets. From January of 2007 to January of 2008, U.S. exports increased by 16.56 percent, the most growth in one fiscal year since 2004. From 1993 to 2008, the largest single dip

in U.S. exports was in 2001, and this was largely due to the events and aftermath of September 11, 2001.

METHODS OF EXPORTING

Direct Exporting. The typical exporting system is a company-owned export department in which a manufacturer sells directly to companies or consumers in foreign countries. In this arrangement, the company has complete control over the marketing and distribution of its goods and services, distribution, sales, pricing, and other business choices. Most U.S. exporters, however, don't utilize this system. Many companies depend on one or several specialized export channels outside their organizations. Most companies choose direct and indirect routes. Direct exports are sold through foreign-based parties. Indirect exports are sold through home-based proxies or resellers. Both methods can be implemented through either merchants or agents. In these cases, merchants actually assume ownership of the goods, as opposed to agents, who only represent the manufacturer or owner. Bartering is another method that manufacturers may use to sell their goods abroad.

A direct merchant is an organization that buys goods abroad, then sells the goods in their own country. The merchants usually offer complementary services to their buyers such as maintenance, parts sales and technical support. A direct merchant often has a close relationship with the exporter, giving the merchant exclusive rights to sell and service the goods.

There are several different types of direct agents. Some direct agents, for example, are paid by U.S. firms on commission, have a contract, and usually do not sell competing products. The exporter trains a representative on the product and provides them with collateral material. Purchasing agents are similar to commission agents in that they are sent abroad by their company or country to purchase products. Purchasing agents are only in the target country long enough to broker a purchase.

Indirect Exporting. Indirect exporting is using a home-based merchant or agent to find and deliver goods to foreign buyers. This method of exporting poses the least amount of risk and expense because it is relatively easy to start up and has a moderate up-front capital investment. Indirect agents act as intermediaries between the exporter and buyer and facilitate the flow of goods.

There are several different types of indirect agents. One is an export management company (EMC). EMCs usually represent several companies in one or more industries. The agent charges the domestic company a fee or commission and in return provides the manufacturer with access to foreign channels of distribution and knowledge of foreign markets. Another type of indirect agent is a Webb-Pomerene Association. There are about forty such associations in

the United States. These associations are composed of competing manufacturers for the purpose of exporting. The associations are exempt from U.S. antitrust laws relating to price setting, discounting, and customer information. Export trading companies (ETCs) are another type of indirect agent. These were created in 1982 by the U.S. government to help U.S. manufacturers compete with powerful Japanese conglomerates. These companies are similar to but larger than EMCs and Webb-Pomerene Associations. Export commission houses are another indirect agency. In this case, commission agents represent buyers in foreign markets. The foreign buyer places an order and the commission agent solicits bids from domestic manufacturers. The lowest bidder usually receives the order and is compensated by the foreign buyer with a commission. This is an advantage for the exporter because the payment is usually received immediately and it takes little effort to complete the sale. Other indirect trading methods include foreign freight forwarding, which manage overseas shipments for a fee; brokering, which brings buyers and sellers together, but do not handle or distribute the goods; and export agents, who represent the manufacturer, and act under their own name.

EXPORTING GUIDELINES

The international market is more than four times larger than the U.S. market. The growth rates in foreign countries are also much greater than domestic market growth. For the first time in recent history, countries other than the United States are economically stronger due to their importing and exporting savvy. This is largely due to the fact that international exports are no longer just traveling West to serve the United States; much exchange (between even third world countries) now makes up overall global exports.

By exporting, companies can keep ahead of competition. Before starting to export, a company should measure the benefits against the costs and risks associated with it. The following are eleven keys to keep in mind when exporting.

1. Obtain export counseling and create an international marketing plan before beginning to export. The plan should include goals, objectives, and expected challenges.

2. Get a statement of financial commitment from executive management. Take a long-range view of exporting and ensure that management is ready and willing to troubleshoot and work to resolve any issues that may arise.

3. Carefully select foreign distributors. Due to global communication and transportation difficulties, international distributors must act independently.

4. Establish and agree unanimously to a foundation for a profitable operation and growth.

5. Continue dedication to export effort even when the U.S. market is booming. Many companies ignore their exporting plan when the U.S. economy picks up and subsequently lose a good share of the market.

6. Foreign distributors should be treated like domestic counterparts. Many companies implement advertising campaigns, discount offers, sales incentive programs, and so on to the U.S. market but don't make similar offers to their international distributors.

7. Do not assume that a marketing technique that works in one market will automatically work in others. Each market has to be treated separately to ensure success.

8. Research target demographics anywhere a presence is desired; not doing so will result in creating costly campaigns that may not work.

9. Be willing to make modifications to products to meet foreign regulations. Suppliers must take into account cultural preferences in other countries.

10. Messages pertaining to sale and warranties should be printed in local languages. Keep in mind that a foreign distributor may speak English, but it is unlikely that all sales and service personnel have this capability.

11. Readily available servicing for products should be provided. A company can earn a bad reputation when service support is not provided.

IMPORTING

Importing products into countries is often dependent on what product, commodity, or service is being imported. In the United States the Harmonized Tariff Schedule is the directory for determining which tariff is imposed on a given product. Importing will involve communicating with customs agencies to determine the necessary licensing and logistics issues of each nation. Often a customs broker is necessary to facilitate the smooth transfer of goods and services between countries. Inherently, importing involves exporting from one country; thus many of the issues involved in exporting are relevant and necessary for importing goods and services as well.

BARRIERS TO EXPORTS

Barriers to the export and import of goods have been widely established by governments. These barriers serve a number of purposes, including protecting industries, national employment levels, and improving trade balances. The United States and many other nations have made efforts to lower trade barriers, although many countries

still have an intricate network of barriers that greatly impact the world export market.

The two major classes of trade restrictions are tariff and nontariff. Tariffs are duties imposed on goods coming or going into a country. Among other uses, tariffs are used to penalize other countries for trade or political actions. Nontariff barriers include quotas, taxes, and exchange rate controls. These can be broken down into six major categories that include specific trade limitations, customs and administrative entry restrictions, standards, government participation, import charges, and miscellaneous categories. Many governments offer various global export initiatives to encourage free trade. The General Agreement on Tariffs and Trade (GATT), which was signed by the United States and the majority of developed and developing countries, calls for a decrease of both tariff and nontariff barriers worldwide. Other important developments include the North American Free Trade Agreement of 1993 and the European Union's gradual evolution toward economic unity. These agreements significantly reduce trade barriers within the affected regions. In the United States, most governments support specific industries or companies through financial aid, lower tax rates, loans, and grants.

REASONS TO EXPORT

The most important reason a company begins exporting is to maximize profits by exploiting opportunities in foreign markets that are not available in domestic markets. A product may become obsolete in one country, but may perform well abroad. When this happens, a manufacturer can reduce new product development costs and take advantage of learned efficiencies related to the product dealing with production, distribution, and marketing. When markets for products in the United States begin to mature and become saturated, producers can continue to receive continuous sales and profit gains through exporting. International markets are often less saturated

and less competitive, allowing manufacturers to gain faster sales growth and higher profit margins. Foreign markets can provide shelter not only from maturing domestic markets, but also from increased competition in the home market. As manufacturing volume increases, benefits related to economies of scale aid the exporter's competitiveness in both foreign and domestic markets. Market risk diversification is another benefit of exporting. A supplier can usually decrease its exposure to cyclical economic downswings or regional issues by increasing its geographic presence. Exporting also decreases risks associated with seasonality of some products, e.g., warm-weather-related products might be marketed in the Southern Hemisphere when it is winter in the Northern Hemisphere.

As trade barriers continue to dissolve due to the efforts of the World Trade Organization, exporting will become much more lucrative. The significant consumer buying power of industrialized nations, including the United States, is creating an ever expanding market for the exporting and importing of goods and services.

SEE ALSO *International Business; International Management*

BIBLIOGRAPHY

Branch, Alan E. *Elements of Export Marketing and Management.* 2nd ed. London: Chapman and Hall, 1990.

Nelson, C.A. *Exporting: A Manager's Guide to the World Market.* New York: International Thomson Business Press, 1999.

Orton, C.W. "What Makes the U.S. Run Well?" *World Trade* 13, no. 10 (2000): 32–34.

Perry, Mark A. "Strong Export Growth Reduces Recession Odds." Available from: http://mjperry.blogspot.com/2008/03/us-exports-at-record-high-show-strong.html.

Weiss, K.D. *Building an Import/Export Business.* Hoboken, NJ: Wiley, 2002.

Zakaria, Fareed. *The Post-American World.* New York: Norton & Company, 2008.

F

FACILITATOR

A facilitator is a person who helps a group identify and solve problems by structuring the discussion and intervening when necessary to improve the effectiveness of the group's processes and outcomes. Facilitators, sometimes called moderators, maintain a neutral approach to topics and issues and serve the whole group in an unbiased manner.

The word *facilitator* is derived from the French word *faciliter*, which means to make easy or to simplify. Indeed, the goal of the facilitator is to make a group's decision-making process easy, efficient, and effective.

In the mid-1970s, Doyle and Strauss, authors of *How to Make Meetings Work*, argued that facilitators were "neutral servants" responsible for making sure participants were using the most effective approaches to problem solving and decision making while reaching consensus efficiently. The role of facilitators in business has grown dramatically in the past few years, and multiple books on the topic describe the responsibilities of a facilitator as well as approaches for developing facilitation skills. The distinction is often made between facilitators who are external to the organization or the group and facilitators who are internal. Both external and internal facilitators focus primarily on a group's process. In fact, some facilitators have minimal subject matter expertise.

Certain organizations (such as the International Association of Facilitators) offer certification programs for individuals who want to become "professional" facilitators. According to the IAF's Web site, certification as a professional facilitator requires competency in the following areas: creating collaborative client relationships, planning appropriate group processes, creating and sustaining a participatory environment, guiding the group to appropriate and useful outcomes, building and maintaining professional knowledge, and modeling positive professional attitude. Candidates for certification complete an application, pay a fee, and undergo assessment by other members of the organization.

THE ROLE OF THE FACILITATOR

Facilitators set the agenda for a group meeting or discussion, monitor the group's process in discussing agenda items, and help the group reach consensus, make decisions, and set action plans. Effective facilitators bring out a variety of opinions and ideas, at the same time ensuring that all participants feel they are valued contributors to the discussion. Facilitators monitor how the group works together by encouraging participation, protecting individuals from attack, and minimizing dominance by one or two participants.

Facilitators begin by clearly defining the role they will play and the strategies they will use. In addition, facilitators help set ground rules for how group members will interact with each other, how long and when group members will speak, and how the group will make decisions.

Facilitators use a number of strategies to help groups achieve their goals. Focusing on consensus building, facilitators help participants discuss issues so that the end result is an outcome that all participants can support. Voting might be used to assess the depth of agreement or disagreement, but final group decisions are reached by consensus.

Facilitators can be most effective when groups are discussing future-oriented tasks such as developing mission statements, vision and value statements, or conducting strategic planning. Facilitation is also useful when groups

are discussing complex or controversial issues that require an outsider's unbiased attention to structure and process.

Typically, facilitators use flip charts, electronic boards, and web conferencing tools to capture ideas generated by group participants as well as the flow of the discussion. This visual reminder of the group's ideas, decisions, and action plans provide a "recorded" memory for the group during the discussion and the notes following the group meeting.

ADVANTAGES AND DISADVANTAGES OF USING FACILITATORS

Advantages for groups that use facilitators include a well-structured meeting, focus on a common goal and a common process, record of the group's discussion and decisions, and an efficient way to reach consensus and productive outcomes. Facilitators provide strategies to handle conflicts between members as well as other nonproductive participant behaviors that impede the group's process. They also absolve group participants from the responsibility of handling the discussion or staying neutral.

Disadvantages can occur when facilitators are not effective. If a facilitator loses objectivity, the group may feel manipulated by the facilitator's approach. Also, if the facilitator does not manage the group's process effectively, the group will either waste time reaching consensus or in some cases may not meet their goals at all. Finally, groups can become overly dependent on a facilitator and may not learn the skills and strategies necessary to make decisions.

MANAGERS AS FACILITATORS

While facilitators are usually not members of the group since they are required to remain neutral, there is a trend toward managers and team members developing facilitation skills that they can use in meetings and discussions. Managers who assume the role of a facilitator, by definition, are not neutral. Yet, through facilitation managers can lead teams in managing change and achieving work-related outcomes. Specifically, managers as facilitators provide clear expectations of the work to be done, monitor the team's process to increase team productivity, and manage the boundaries that can affect the work of the team. The manager as a facilitator empowers team members to make decisions and resolve problems.

For frequent, regular meetings, groups may rotate responsibility for acting as facilitator among team members or meeting participants. This spares any one person from always bearing the responsibility for focusing discussions, following the agenda, and enforcing time limits.

In a business world marked by rapid change, the role of facilitators will continue to expand as the need for managers and teams to solve complex problems also grows.

BIBLIOGRAPHY

Becoming a Certified Professional Facilitator CPF. International Association of Facilitators. Available from: http://www.iaf-world.org/i4a/pages/index.cfm?pageid=3328.

"GP Business: Resolve Conflict for the Best Team Effort." *General Practitioner* 12 November 2004, p. 30.

Kaner, Sam, et al. *Facilitator's Guide to Participatory Decision-Making*. 2nd ed. San Francisco: Jossey-Bass, 2007.

Kremer, Dennis. "Rules for Improved Meetings. (Viewpoint)" *Fairfield County Business Journal* 20 December 2004, p. 38.

Rees, Fran. *How to Lead Work Teams: Facilitation Skills*. San Diego: Pfeiffer and Company, 1991.

Schwarz, Roger. *The Skilled Facilitator: Practical Wisdom for Developing Effective Groups*. San Francisco: Jossey-Bass, 1994.

Weaver, Richard, and John D. Farrell. *Managers as Facilitators: A Practical Guide to Getting Work Done in a Changing Workplace*. San Francisco: Berrett-Koehler, 1997.

FEEDBACK

Feedback is the return of information about the result of a process, activity, or experience, usually relating to an individual's performance within a company. Feedback can be upward or downward in the organizational structure. Upward feedback is the process by which superiors or management are rated by employees or subordinates, while downward feedback is the flow of information from superiors or management to employees or subordinates.

In the past, feedback has been gathered from sources such as subordinates, peers, and internal or external customers. This is referred to as multi-source feedback when evaluations are collected from more than one source. In recent years, the majority of feedback has been collected for developmental purposes, but it seems that feedback is being used increasingly more in administrative decisions, including compensation and promotion. Such feedback is also being employed as a component of executive appraisals.

The impact of upward feedback is debatable, as is whether managers' responses to feedback are related to performance improvements over time. The major limitation of much research concerning feedback was that no one had examined whether managers' responses to such

Exhibit 1
Types of Feedback

Upward	Downward
Management	Management
↑	↓
Employees	Employees

Exhibit 2

Subordinates → Multi-source Feedback ← External Customers

Internal Customers → Multi-source Feedback ← Peers
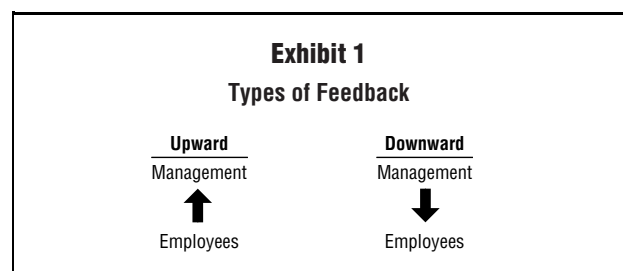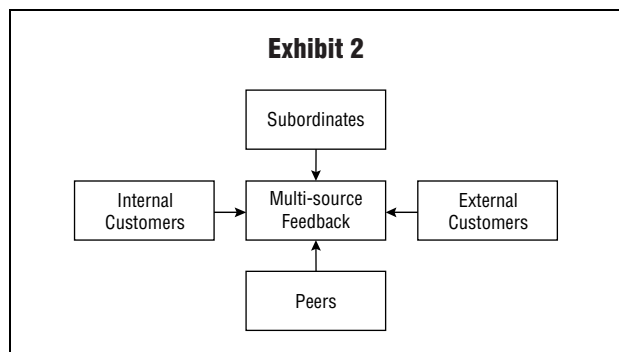
feedback were associated with performance improvement. It had been shown in the past that feedback alone was not the cause of behavior change; instead it was the goals that people set in response to feedback. A recent five-year study of upward feedback was conducted to answer some of these questions. The research covered more than 250 managers who received upward feedback annually over the five years. The results show that managers who were initially rated as being poor or moderate registered significant improvements in upward feedback ratings over the next five-year period. The results also show that managers who participated in discussions about their upward feedback improved more than managers who did not. It further showed that managers improved more in years when they discussed the previous year's feedback than in years when they did not. This study is important because it shows that what managers do with upward feedback is related to its benefits.

One alternative to upward feedback is a process known as "360-degree feedback." In this appraisal process, feedback about a particular employee is collected from that employee's supervisors, subordinates, peers, and sometimes customers, as well as through a self-evaluation. As a result, the employee receives a more comprehensive analysis as to how they are viewed by others, and the company can carefully tailor that employee's development program. A 2006 study showed that this type of feedback results in improved leadership behavior, often as a result of improved employee attitudes.

In the past, it has been assumed that discrepancies between self-ratings and subordinate ratings raise self-awareness, highlight gaps between goals and job performance, and suggest areas of needed improvement. According to the self-consistency theory, when managers receive feedback showing that subordinates ratings are lower than self-ratings, the managers may question whether their behavior is consistent with their self-image. This should, in theory, motivate the managers to improve their performance and reduce discrepancies between how they look at themselves and how subordinates perceive them. However, if the feedback is consistent with self-ratings, man-

agers may be satisfied and may not be motivated to improve their work ethic, even if their current performance level is low. Accordingly, the theory suggests that managers whose subordinate ratings exceed their self-rating have little incentive to improve their performance.

One study investigated whether performance improvement following upward feedback is related to self-other rating discrepancies. It also investigated how self-ratings change after feedback and whether agreement among raters influences performance improvement. The study determined that managers who overrated themselves compared to how others rated them tended to improve their performance from one year to the next, while the underraters tended to decline. These results are consistent with the self-consistency theory. Self-ratings tended to decrease for overraters and increase for underraters, but this was not constant throughout the range of self-ratings. Agreement with subordinate ratings was found to be negatively related to performance improvement.

An issue related to self-ratings of performance is the degree to which employees proactively seek feedback about their own performance from supervisors and/or coworkers. Some studies have linked employees' feedback-seeking to increases in job performance. By asking more often how they are doing, employees tend to know how to perform better. Employees seek feedback in order to reduce their uncertainty, to manage impressions of themselves in the workplace, and to protect their own egos. They are more likely to seek feedback when they have a positive relationship with the manager from whom they seek feedback, when they feel that their manager has expertise, and if they feel that their manager is supportive of them. Additionally, employees may be more likely to seek feedback in private, rather than when others are present.

Beyond its uses in performance appraisal, feedback may also be seen as a more general tool for communication within organizations. Many companies all over the world now use e-mail and toll-free numbers to solicit feedback from their employees. Many of these companies reward employees for their good ideas. In some instances, employees are paid for ideas that turn into new products and technologies, while other companies reward with job opportunities. By implementing a suggestion system, there is a direct link between an employee's suggestion and the rewards that the employee receives for it. The majority of employee ideas focus on improving safety and operations within the company.

BIBLIOGRAPHY

Ashford, S.J., and L.L. Cummings. "Feedback as an Individual Resource: Personal Strategies of Creating Information." *Organizational Behavior and Human Performance* 32, no. 3 (1983): 370–398.

Brett, Joan F. "360-Degree Feedback to Leaders." *Group & Organization Management* 31, no. 5 (2006): 578–600.

Gordon, Jack. "If We Might Make a Suggestion." *Training* July 1999, 20–21.

HBSP. *Giving Feedback: Expert Solutions to Everyday Challenges.* Cambridge: Harvard Business School Press, 2007.

Johnson, Jeff. "The Effects of Interrater and Self-Other Agreement on Performance Improvement Following Upward Feedback." *Personnel Psychology* 52, no. 2 (1999): 271–303.

Performance Appraisal (Negotiated Approach). University of California. Available from: http://www.cnr.berkeley.edu/ucce50/ag-labor/7labor/06.htm.

FINANCIAL ISSUES FOR MANAGERS

One of the most critical aspects of management pertains to the finances of running a firm. Although there are numerous issues facing modern managers with respect to financial management, the following sections will address three of the most ubiquitous: acquisition of outside capital for start-up and growth, management of working capital and cash flow, and the construction and implementation of a capital budgeting process. Accessing the capital markets is fundamental for procuring funds that allow the firm to grow. Working capital involves managing the current assets and liabilities of the firm. Capital budgeting is the process of making long-term fixed asset investments.

ACCESSING THE FINANCIAL MARKETS

In the initial start-up of any firm, management must procure the funds needed to get the business off the ground. These funds may come from a variety of sources, but managers should be aware that all assets are initially financed with either of two sources of capital—equity and debt. The capital markets represent the method by which external funds are made available to firms requiring outside capital infusions.

Equity Markets. The equity markets are the means by which managers may raise capital by selling portions of the firm's ownership. The most common method is selling common stock in the firm. Outside investors provide the firm with new investment capital in exchange for ownership rights in the firm. As owners, stockholders receive voting rights and may participate in the financial success of the firm. In corporations, stockholders are protected by limited liability, meaning they are liable only for losses limited to the amount invested in the firm's stock; personal assets are protected against liability. Other sources of equity capital include contributions by the individual owner or owners from their own resources, and those made by family and friends of originators of the business.

Another method of raising equity capital involves the sale of preferred stock in the firm. Preferred stock promises to pay investors a stated dividend amount, and may also offer the opportunity for eventual conversion into common shares, commonly called convertible preferred stock. Preferred stock is particularly important for larger corporations as a source of funds because current tax law subsidizes the investment by one corporation in another corporation's preferred stock by exempting a portion of dividend income from taxation.

Other methods of equity capital attainment include the selling of warrants and rights. Warrants are securities that grant the holder the right to purchase a fixed number of common shares in the firm at a specified price for a specified period of time. Because warrants are stand-alone securities that may be traded among investors, the firm may raise new capital immediately through the sale of warrants while delaying the dilution of existing stockholders's interests until the warrants are exercised.

Rights are similar to warrants in that firms issue rights as a method of raising new equity capital. In a rights offering, the firm issues additional common stock to raise new capital. Rights are then issued to all outstanding shareholders, giving them the right to purchase shares in the new offering to avoid dilution of their pro-rata ownership in the firm. Through the use of rights, the firm is able to directly access the group of investors who are already interested in the firm's financial success, namely existing shareholders. Because rights have value in that they allow the purchase of new shares at a set subscription price, they are desired by shareholders and may be sold to others if the shareholder decides not to use the rights.

Debt Markets. The other major market for outside capital is the debt market. The debt market is often vital to the financial success of a firm and managers must be familiar with, and have access to, outside sources of debt capital to ensure the survival of the firm. A common method of debt financing is borrowing from financial institutions. Banks, finance companies, and other lenders offer loans of varying terms that are critical for financial management, particularly short-term debt to alleviate temporary cash flow problems. Venture debt firms are also experiencing a resurgence in popularity as managers seek ways to raise capital without further diluting the ownership of the firm. A firm that experiences seasonal sales or uneven production schedules will sometimes utilize an established line of credit to borrow during times of capital needs and repay during times of cash surplus. By arranging credit lines prior to the capital need, managers assure that the firm will not experience sales or production interruptions due to cash shortages. Company infrastructure expenditures like servers or lab equipment are common short-term investments for this type of debt. For longer-term needs,

negotiated notes from lenders serve as an intermediate source of debt financing.

For longer-term capital, the bond markets represent the primary source of debt financing. Bonds are debt securities in which investors become creditors of the firm in exchange for the right to receive payments of interest at regular intervals. For firms desiring to grow beyond local or regional status, access to the bond markets is critical for long-term capital needs, especially when firms do not desire to dilute existing ownership by offering additional equity financing.

SHORT-TERM FINANCIAL ISSUES

Short-term financial issues for managers revolve around two primary areas: the management of current assets and current liabilities. Together, they constitute the overall management of cash flow for the firm. Cash flow management is absolutely critical to the financial survival of a firm, since a shortage of cash may result in a firm that shows a profit on its income statement actually going bankrupt by being unable to meet its financial obligations.

Current Assets. Management of a firm's current assets starts with the management of cash. Cash provides the liquidity needed to meet everyday obligations owed to creditors and suppliers and the flexibility to take advantage of new opportunities that may arise. Managing cash is a tricky issue for many firms; cash is a necessary component of daily operations, yet cash is a non-earning asset. Dollars tied up in cash (checking accounts) could be earning higher rates of return if invested in other areas. Larger corporations spend considerable time and resources in cash management, whereby dollars are transferred back and forth between cash accounts and marketable securities that earn a higher rate of return. As previously mentioned, negotiated credit lines serve to supplement depleted cash during periods of shortage.

Another critical issue is the management of accounts receivable. Receivables are money owed to the firm that has not yet been collected. They represent an important investment for the firm, since dollars not yet received cannot earn a positive return. The management of accounts receivable involves the determination and implementation of the firm's credit policy such as how long customers are allowed to pay for merchandise or services received and cash discounts for immediate rather than deferred payment. These are important financial issues for any manager: to whom does the company extend credit, for how much, and for how long? A tight credit policy may result in missed sales opportunities, since fewer potential customers will qualify for credit sales. Conversely, liberal credit terms may result in longer average collection periods and greater uncollected accounts. There are real costs associated with these issues, and managers must work to find appropriate trade-offs that

result not only in higher sales, but also in the greatest profitability.

A third aspect of current asset management involves the management of inventories. Like receivables, inventory represents an investment of resources by the firm that has yet to pay off. On one hand, adequate inventory levels are necessary to ensure uninterrupted production schedules and to meet unexpected sales demand. However, too much inventory means dollars tied up in non-earning assets that could be devoted to more profitable investments. Managers must decide whether to attempt to coordinate production with sales patterns, or maintain level production regardless of current demand. These decisions spill over into other areas such as employee morale, since uneven or random production scheduling may result in temporary layoffs or overtime requirements. Again, managers utilize negotiated credit lines to access capital to maintain needed inventory materials when production and sales patterns differ.

Current Liabilities. Management of current liabilities involves accounts payable, short-term bank loans, lines of credit, and, for larger corporations, commercial paper. While the importance of short-term credit lines has already been discussed, accounts payable management is a critical issue, particularly for smaller firms. The longer a firm takes to pay its creditors, the longer it maintains access to and has the use of the funds. Thus, managers have every incentive to pay outstanding bills as slowly as possible. However, taking too long to pay may result in suppliers declining to offer future credit. Trade credit offered by suppliers is one of the most important sources of short-term financing for small firms that have limited access to other capital market sources. It is incumbent on managers to seek and negotiate the most favorable trade credit terms possible, since longer payment periods reduce potential cash flow problems and provide greater financial flexibility.

Larger corporations are able to issue commercial paper to provide short-term financial liquidity. Commercial paper is a short-term, unsecured note backed only by the firm's ability to repay. As such, only large, established firms find a market for their commercial paper. Firms such as General Motors use commercial paper as a regular source of short-term debt financing to cover cash flow shortages and provide the firm with ready liquidity.

Cash Budget. Pulling together the management of current assets and liabilities results in the development of a cash budget. A cash budget is a schedule of expected cash inflows and outflows by a period that allows managers the ability to plan for and cover cash shortfalls and surpluses. A successful cash budget prevents the types of surprises or shortages that can result in financial crises such as the inability to pay creditors or purchase additional inventory to meet production needs.

Likewise, managers should work to monitor and manage the firm's cash conversion cycle. The cash conversion cycle consists, primarily, of three elements: the inventory conversion period, the receivable collections period, and the payables deferral period. The goal of effective cash management is to minimize the inventory conversion and receivables collection periods, and to maximize the payables deferral period. Through the successful management of current assets and liabilities, managers can maintain a cash conversion cycle that provides the firm with liquidity and profitability while avoiding the cash flow problems that so often result in financial distress.

CAPITAL BUDGETING ANALYSIS

The third major financial issue for managers involves long-term investments. This area, collectively known as capital budgeting, involves investment in fixed assets such as plant and equipment, new product and business analysis, and expansion and merger analysis. Capital budgeting is extremely important, because the decisions made involve the direction and opportunities for the future growth of the firm. The goal of corporate management is to maximize shareholder wealth; profitable capital projects result in increased firm value.

Discounted Cash Flow. This process is also known as discounted cash flow analysis. The first step in evaluating a long-term investment opportunity is to estimate the net cash flows that would accrue to the firm. Managers should take care to use economically-sound techniques in cash flow analysis. All cash flows should be incremental (i.e., those that would otherwise not accrue to the firm unless this project or investment is undertaken). They should be on an after-tax basis; the only relevant cash flows are those that the firm will actually receive after all expenses and taxes are paid. Finally, sunk costs should not be included in the net cash flows associated with the project or investment. Only those cash flows associated with the future profitability of the investment should be included in the decision analysis. The proper economic decision is whether or not to invest today, and that decision is based on how the future cash flows will affect the present value of the firm. Past expenditures are not part of the analysis.

Once the project's net cash flows are determined, the timing of the cash flows should be considered. This is the discounted portion of discounted cash flow analysis. The decision of whether or not to invest is made in the present, so all dollars associated with the investment should be converted into present-value dollars. Managers must determine the proper interest rate at which to discount future cash flows. The discount rate should represent the opportunity cost of capital (also referred to as the Weighted Average Cost of Capital, or WACC), the rate of return that could be earned on alternative investment projects of similar risk. Many firms set an internal "hurdle rate" for capital budgeting analysis, in effect saying no long-term investments will be undertaken that offer an expected rate of return lower than the hurdle rate. Normally, this rate is the weighted average cost of capital, which incorporates the firm's capital structure in determining the required rate of return on investment.

Net Present Value Analysis. Once the net cash flows are determined and the discount rate has been established, managers should utilize a discounted cash flow method to evaluate and rank investment alternatives. The most economically-sound technique is net present value analysis (NPV), which involves discounting all future project cash flows back to the present using the firm's discount rate, then subtracting the net cost of the investment project. If the present value of the future cash-flow stream exceeds the present cost, then undertaking the project would add value to the firm today. The NPV method is congruent with the idea of management's goal to maximize the present value, which represents shareholder wealth, of the firm.

Internal Rate of Return. Another popular technique is the internal rate of return (IRR) method. The IRR is actually a special case of the NPV method. The internal rate of return is the unique discount rate that equates the present value of the future cash flow stream to the net cost of the project. If the IRR of the project is greater than the firm's hurdle rate, then the project offers a chance to earn a profitable return on investment and should be undertaken.

Payback Method. Finally, a third technique often used is the payback method. The payback method attempts to determine how long it will take for the project to recoup the total investment costs. Unlike the NPV and the IRR methods, the payback method is not a measure of profitability. Instead, it is a measure of time. Firms and managers often set a (subjective) hurdle period, such as no projects will be undertaken which do not recoup their initial costs in less than five years. The analysis then involves comparing the payback of the proposed investment to the firm's hurdle period. The payback method is popular because it provides an answer to a frequently asked question: "how long before this investment pays for itself?" However, it is a flawed method because it does not consider all of the project's cash flows and does not consider the time value of money. Managers should employ the payback technique only in tandem with at least one of either the NPV or IRR discounted cash-flow methods.

Financial management is an integral aspect of managing a company. Accessing the capital markets to provide investment dollars, managing the working capital of the firm to ensure liquidity and flexibility, and making long-

term investment decisions are all important issues that managers should address to allow the firm to grow and prosper.

BIBLIOGRAPHY

Ante, Spencer E. "Facebook: Friends with Money." *BusinessWeek* 9 May 2008. Available from: http://www.businessweek.com/technology/content/may2008/tc2008059_855064.htm

Block, Stanley B., and Geoffrey A. Hirt. *Foundations of Financial Management.* 11th ed. New York: McGraw-Hill, 2005.

Leach, J.C., and Ronald W. Melicher. *Entrepreneurial Finance.* 2nd ed. Mason, OH: Thomson South-Western, 2006.

Shapiro, Alan C. *Capital Budgeting and Investment Analysis.* Upper Saddle River, NJ: Prentice Hall, 2005.

Tuller, Lawrence. *Finance for Non-Financial Managers.* 2nd edition. Cincinatti, OH: Adams Media, 2007.

FINANCIAL RATIOS

Financial ratios are one of the most common tools of managerial decision making. A ratio is the comparison of one number to another—mathematically, a simple division problem. Financial ratios involve the comparison of various figures from financial statements in order to gain information about a company's performance. It is the interpretation, rather than the calculation, that makes financial ratios a useful tool for business managers. Ratios may serve as indicators, clues, or red flags regarding noteworthy relationships between variables used to measure the firm's performance in terms of profitability, asset utilization, liquidity, leverage, or market valuation.

USE AND USERS OF RATIO ANALYSIS

There are basically two uses of financial ratio analysis: to track individual firm performance over time, and to make comparative judgments regarding firm performance. Firm performance is evaluated using trend analysis—calculating individual ratios on a per-period basis, and tracking their values over time. This analysis can be used to spot trends that may be cause for concern, such as an increasing average collection period for outstanding receivables or a decline in the firm's liquidity status. In this role, ratios serve as red flags for troublesome issues, or as benchmarks for performance measurement.

Another common usage of ratios is to make relative performance comparisons. For example, comparing a firm's profitability to that of a major competitor or observing how the firm stacks up versus industry averages enables the user to form judgments concerning key areas such as profitability or management effectiveness. Financial ratios are used by parties both internal and external to the firm. External users include security analysts, current and potential investors, creditors, competitors, and other industry observers. Internally, managers use ratio analysis to monitor performance and pinpoint strengths and weaknesses from which specific goals, objectives, and policy initiatives may be formed.

PROFITABILITY RATIOS

Perhaps the type of ratios most often used and considered by those outside a firm are profitability ratios. Profitability ratios provide measures of profit performance that serve to evaluate the periodic financial success of a firm. One of the most widely-used financial ratios is net profit margin, also known as return on sales.

$$\text{Net profit margin } = \frac{\text{net income}}{\text{net sales}}$$

Return on sales provides a measure of bottom-line profitability. For example, a net profit margin of 6 percent means that for every dollar in sales, the firm generated six cents in net income.

Two other margin measures are gross profit margin and operating margin.

$$\text{Gross profit margin } = \frac{\text{gross profit}}{\text{net sales}}$$

Gross margin measures the direct production costs of the firm. A gross profit margin of 30 percent would indicate that for each dollar in sales, the firm spent seventy cents in direct costs to produce the good or service that the firm sold.

$$\text{Operating margin } = \frac{\text{operating profit}}{\text{net sales}}$$

Operating margin goes one step further, incorporating nonproduction costs such as selling, general, and administrative expenses of the firm. Operating profit is also commonly referred to as earnings before interest and taxes, or EBIT. An operating margin of 15 percent would indicate that the firm spent an additional fifteen cents out of every dollar in sales on nonproduction expenses, such as sales commissions paid to the firm's sales force or administrative labor expenses.

Two very important measures of the firm's profitability are return on assets and return on equity.

$$\text{Return on assets } = \frac{\text{net income}}{\text{total assets}}$$

Return on assets (ROA) measures how effectively the firm's assets are used to generate profits net of expenses. An ROA of 7 percent would mean that for each dollar in assets, the firm generated seven cents in profits. This is an extremely useful measurement for any firm's management

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Table 1

Profitability Ratios

Gross profit margin	Return on assets
Operating margin	Return on equity
Net profit margin	

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performance as it is the job of managers to utilize the assets of the firm to produce profits.

$$\text{Return on equity } = \frac{\text{net income}}{\text{common shareholders equity}}$$

Return on equity (ROE) measures the net return per dollar invested in the firm by the owners, the common shareholders. An ROE of 11 percent means the firm is generating an eleven-cent return per dollar of net worth.

In each of the profitability ratios mentioned above, the numerator in the ratio comes from the firm's income statement. Hence, these are measures of periodic performance, covering the specific period reported in the firm's income statement. Therefore, the proper interpretation for a profitability ratio such as an ROA of 11 percent would be that, over the specific period (such as fiscal year 2004), the firm returned eleven cents on each dollar of asset investment.

ASSET UTILIZATION RATIOS

Asset utilization ratios provide measures of management effectiveness. These ratios serve as a guide to critical factors concerning the use of the firm's assets, inventory, and accounts receivable collections in day-to-day operations. Asset utilization ratios are especially important for internal monitoring concerning performance over multiple periods, serving as warning signals or benchmarks from which meaningful conclusions may be reached on operational issues. An example is the total asset turnover (TAT) ratio.

$$\text{Total asset turnover } = \frac{\text{net sales}}{\text{total assets}}$$

This ratio offers managers a measure of how well the firm is utilizing its assets in order to generate sales revenue. An increasing TAT would be an indication that the firm is using its assets more productively. For example, if the TAT for 2003 was 2.2×, and for 2004 it was 3×, the interpretation would follow that in 2004, the firm generated three dollars in sales for each dollar of assets, and an additional eighty cents in sales per dollar of asset investment over the previous year. Such change may be an indication of increased managerial effectiveness.

A similar measure is the fixed asset turnover (FAT) ratio.

$$\text{Fixed asset turnover } = \frac{\text{net sales}}{\text{net fixed assets}}$$

Fixed assets (such as plant and equipment) are often more closely associated with direct production than are current assets (such as cash and accounts receivable), so many analysts prefer this measure of effectiveness. A FAT of 1.6× would be interpreted as the firm generating $1.60 in sales for every $1.00 it had in fixed assets.

Two other asset utilization ratios concern the effectiveness of a firm's asset management. Inventory is an important economic variable for management to monitor since dollars invested in inventory have not yet resulted in any return. Inventory is an investment, and it is important for the firm to maximize its inventory turnover. The inventory turnover ratio is used to measure this aspect of performance.

$$\text{Inventory turnover ratio} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

Cost of goods sold (COGS) derives from the income statement and indicates the expense dollars attributed to the actual production of goods sold during a specified period. Inventory is an asset on the balance sheet. Because the balance sheet represents the firm's assets and liabilities at one point in time, an average figure is often used from two successive balance sheets. Managers attempt to increase this ratio, since a higher turnover ratio indicates that the firm is going through its inventory more often due to higher sales. A turnover ratio of 4.75×, or 475 percent, means the firm sold and replaced its inventory stock more than four and one-half times during the period measured on the income statement.

One of the most critical ratios that management must monitor is days sales outstanding (DSO), also known as average collection period.

$$\text{DSO } = \frac{\text{accounts receivable}}{\text{net sales}} \times 360 \text{ days}$$

This represents a prime example of the use of a ratio as an internal monitoring tool. Managers strive to minimize the firm's average collection period, since dollars received from customers become immediately available for reinvestment. Periodic measurement of the DSO will "red flag" a lengthening of the firm's time to collect outstanding accounts before customers get used to taking longer to pay. A DSO of 36 means that, on average, it takes 36 days to collect on the firm's outstanding

Table 2
Asset Utilization Ratios

Total asset turnover	Days sales outstanding
Inventory turnover	Fixed asset turnover

accounts. This is an especially critical measure for firms in industries where extensive trade credit is offered, but any company that extends credit on sales should be aware of the DSO on a regular basis.

LEVERAGE RATIOS

Leverage ratios, also known as capitalization ratios, measure the firm's use of debt financing. These are extremely important for potential creditors who are concerned with the firm's ability to generate the cash flow necessary to make interest payments on outstanding debt. Thus, these ratios are used extensively by analysts outside the firm to make decisions concerning the provision of new credit or the extension of existing credit. It is also important for management to monitor the firm's use of debt financing. The commitment to service outstanding debt is a fixed cost to a firm, resulting in decreased flexibility and higher break-even production rates. Therefore, the use of debt financing increases the risk associated with the firm. Managers and creditors must constantly monitor the trade-off between the additional risk that comes with borrowing money and the increased opportunities that new capital provides. Leverage ratios provide a means of such monitoring.

Perhaps the most straightforward measure of a firm's use of debt financing is the total-debt ratio.

$$\text{Total debt ratio} = \frac{\text{total debt}}{\text{total assets}}$$

There are only two ways to finance the acquisition of any asset: debt (using borrowed funds) and equity (using funds from internal operations or selling stock in the company); total debt ratio covers both. A debt ratio of 35 percent means that, for every dollar of assets the firm has, thirty-five cents were financed with borrowed money. The natural corollary is that the other sixty-five cents came from equity financing. This is known as the firm's capital structure—35 percent debt and 65 percent equity. Greater debt means greater leverage, and more leverage means more risk. How much debt is too much is highly subjective, and opinions vary from one manager to another. To a large extent, the nature of the business will determine debt risk. Large manufacturers, who require heavy investment in fixed plant and equipment, will require higher levels of debt financing than will service firms such as insurance or advertising agencies.

The total debt of a firm consists of both long- and short-term liabilities. Short-term (or current) liabilities are often a necessary part of daily operations and may fluctuate regularly depending on factors such as seasonal sales. Many creditors prefer to focus their attention on the firm's use of long-term debt. Thus, a common variation on the total debt ratio is the long-term debt ratio, which does not incorporate current liabilities in the numerator.

$$\text{Long-term debt ratio} = \frac{\text{long-term debt}}{\text{total assets}}$$

Similarly, many analysts prefer a direct comparison of the firm's capital structure. Such a measure is provided by the debt-to-equity ratio.

$$\text{Debt-to-equity ratio} = \frac{\text{total debt}}{\text{total equity}}$$

This is perhaps one of the most misunderstood financial ratios, as many confuse it with the total debt ratio. A debt-to-equity ratio of 45 percent would mean that for each dollar of equity financing, the firm has 45 cents in debt financing. This does not mean that the firm has 45 percent of its total financing as debt; debt and equity percentages, together, must sum to one (100 percent of the firm's total financing). A little algebra will illustrate this point. Let x = the percent of equity financing (in decimal form), so $0.45x$ is the percent of debt financing. Then $x + 0.45\ x = 1$, and $x = 0.69$. So, a debt to equity ratio of 45 percent indicates that each dollar of the firm's assets is financed with sixty-nine cents of equity and thirty-one cents of debt. The point here is to caution against confusing the interpretation of the debt-to-equity ratio with that of the total debt ratio.

Two other leverage ratios that are particularly important to the firm's creditors are the times-interest-earned and the fixed-charge coverage ratios. These measure the firm's ability to meet its on-going commitment to service debt previously borrowed. The times-interest-earned (TIE) ratio, also known as the EBIT (earnings before interest and tax) coverage ratio, provides a measure of the firm's ability to meet its interest expenses with operating profits.

$$\text{Times interest earned} = \frac{\text{EBIT}}{\text{interest charges}}$$

For example, a TIE of 3.6× indicates that the firm's operating profits from a recent period exceeded the total interest expenses it was required to pay by 360 percent. The higher this ratio, the more financially stable the firm and the greater the safety margin in the case of fluctuations

Table 3
Leverage Ratios

Total debt ratio	Times interest earned
Long-term debt ratio	Fixed charge coverage
Debt-to-equity ratio	

in sales and operating expenses. This ratio is particularly important for lenders of short-term debt to the firm, since short-term debt is usually paid out of current operating revenue.

Similarly, the fixed charge coverage ratio, also known as the debt service coverage ratio, takes into account all regular periodic obligations of the firm.

$$\text{Fixed charge coverage} = \frac{\text{EBIT}}{(\text{Interest expense} + \frac{\text{Principal repayment}}{1 - \text{tax rate}})}$$

The adjustment to the principal repayment reflects the fact that this portion of the debt repayment is not tax deductible. By including the payment of both principal and interest, the fixed charge coverage ratio provides a more conservative measure of the firm's ability to meet fixed obligations.

LIQUIDITY RATIOS

Managers and creditors must closely monitor the firm's ability to meet short-term obligations. The liquidity ratios are measures that indicate a firm's ability to repay short-term debt. Current liabilities represent obligations that are typically due in one year or less. The current and quick ratios are used to gauge a firm's liquidity.

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

A current ratio of $1.5\times$ indicates that for every dollar in current liabilities, the firm has \$1.50 in current assets. Such assets could, theoretically, be sold and the proceeds used to satisfy the liabilities if the firm ran short of cash. However, some current assets are more liquid than others. Obviously, the most liquid current asset is cash. Accounts receivable are usually collected within

Table 4
Liquidity Ratios

Current ratio	Quick ratio

one to three months, but this varies by firm and industry. The least liquid of current assets is often inventory. Depending on the type of industry or product, some inventory has no ready market. Since the economic definition of liquidity is the ability to turn an asset into cash at or near fair market value, inventory that is not easily sold will not be helpful in meeting short-term obligations. The quick (or acid test) ratio incorporates this concern.

$$\text{Quick ratio} = \frac{\text{current assets} - \text{inventories}}{\text{current liabilities}}$$

By excluding inventories, the quick ratio is a more strident liquidity measure than the current ratio. It is a more appropriate measure for industries that involve long product production cycles, such as manufacturing.

MARKET VALUE RATIOS

Managers and investors are interested in market ratios, which are used in valuing the firm's stock. The price-earnings ratio and the market-to-book value ratio are often used in the valuation analysis. The price/earnings ratio, universally known as the PE ratio, is one of the most heavily-quoted statistics concerning a firm's common stock. It is reported in the financial pages of newspapers, along with the current value of the firm's stock price.

$$\text{Price/earnings ratio} = \frac{\text{market price per share}}{\text{earnings per share}}$$

Caution is warranted in the calculation of PE ratios. Analysts use two different components in the denominator: trailing earnings and forecast earnings. Trailing earnings refer to the firm's reported earnings, per share, over the last twelve months of operation. Forecast earnings are based on security analyst forecasts of what they expect the firm to earn in the coming twelve-month period. Neither definition is more correct than the other; one should simply pay attention to which measure is used when consulting published PE ratios. A PE ratio of 16 means investors are willing to pay \$16 for \$1 worth of earnings. PE ratios are used extensively, on a comparative basis, to analyze investment alternatives. In investment lingo, the PE ratio is often referred to as the firm's "multiple." A high PE is often indicative of investors' belief that the firm has very promising growth prospects, while firms in more mature industries often trade at lower multiples.

A related measure used for valuation purposes is the market-to-book value ratio. The book value of a firm is defined as:

Table 5
Market Value Ratios

Price/earnings ratio	Market-to-book ratio

$$\text{Book value per share} = \frac{\text{total shareholders equity}}{\text{common shares outstanding}}$$

Technically, the book value represents the value of the firm if all the assets were sold off, and the proceeds used to retire all outstanding debt. The remainder would represent the equity that would be divided, proportionally, among the firm's shareholders. Many investors like to compare the current price of the firm's common stock with its book, or break-up, value.

$$\text{Market-to-book ratio} = \frac{\text{market price per share}}{\text{book value per share}}$$

This is also known as the price/book ratio. If the ratio is greater than one, which is often the case, then the firm is trading at a premium to book value. Many investors regard a market-to-book ratio of less than one an indication of an undervalued firm. Interpretation of market ratios—high PEs versus low PEs—is highly subjective. Nonetheless, these measures provide information that is valued both by managers and investors regarding the market price of a firm's stock.

COMMON SIZE RATIOS

Common size ratios are used to contrast and compare the financial statements of large and small enterprises. Using the common size ratio, an analyst can determine which variables and which trends are affecting businesses of all sizes, and which of these is affecting small business more than larger business (and vice versa). Common size ratios are used to compare data about inventory, total assets, cost of goods sold, gross profit, overhead and production costs, and overall yearly revenue from one firm to another, usually one significantly larger than the other.

The comparison of one company to another company using common size ratios is sometimes called a *cross-sectional analysis*, and will include industry averages to draw a comparison for both entities. Often the common size ratio will use comparative data about an industry's leader by which to compare another smaller, more modest operation to see how it might be progressing.

CAUTIONS ON THE USE AND INTERPRETATION OF FINANCIAL RATIOS

Financial ratios represent tools for insight into the performance, efficiency, and profitability of a firm. Ratio calculation and interpretation can be confusing. For example, if someone refers to a firm's profit margin, are they referring to gross profit margin, operating margin, or net profit margin? Is debt ratio a reference to total debt ratio, long-term debt ratio, or debt-to-equity ratio? Confusing these can make the use of ratio analysis a frustrating experience.

Financial ratios should be interpreted with care. A net profit margin of 12 percent may be outstanding for one type of industry and mediocre to poor for another. This highlights the fact that individual ratios should not be interpreted in isolation. Trend analyses should include a series of identical calculations, such as following the current ratio on a quarterly basis for two consecutive years. Ratios used for performance evaluation should always be compared to some benchmark, either an industry average or the identical ratio for the industry leader.

Another factor in ratio interpretation is identifying whether individual components, such as net income or current assets, originate from the firm's income statement or balance sheet. The income statement reports performance over a specified time period, while the balance sheet gives static measurement at a single point in time. These issues should be recognized when interpreting the results of ratio calculations.

Despite these issues, financial ratios are useful for internal and external evaluations of a firm's performance. A working knowledge and ability to use and interpret ratios remains a fundamental aspect of effective financial management. Financial ratios were widely used and highly valued during the stock market decline of 2000, when the bottom dropped out of the soaring "dot.com" economy. Throughout the long run-up, some financial analysts warned that the stock prices of many technology companies—particularly Internet start-up businesses—were overvalued based on the traditional rules of ratio analysis. Yet investors largely ignored such warnings and continued to flock to these companies in hopes of making a quick return.

Conversely, the 2008 crossroads in energy and fuel management—and China's growing need for oil and other raw materials—has been largely forecasted and interpreted using financial ratios. Investors and analysts alike have weathered rough parts of this supply and demand crisis by evaluating market circumstances with ratios and facing the truth rather than ignoring it.

In the end, it becomes clear that the old rules still apply, and that financial ratios remain an important means of measuring, comparing, and predicting a firm's performance.

SEE ALSO *Balance Sheets; Cash Flow Analysis and Statement; Financial Issues for Managers; Income Statements*

BIBLIOGRAPHY

Fridson, Martin, and Fernando Alvarez. *Financial Statement Analysis: A Practitioner's Guide.* New York: John Wiley, 2002.

Harrington, Diana R. *Corporate Financial Analysis: Decisions in a Global Environment.* 4th ed. Chicago: Richard D. Irwin, Inc., 1993.

Helfert, Erich A. *Techniques of Financial Analysis: A Modern Approach.* 9th ed. Chicago: Richard D. Irwin, Inc., 1997.

NetMBA.com. "Financial Ratios." Available from: http://www.netmba.com/finance/financial/ratios.

NetMBA.com. "Common Size Financial Statements." Available from: http://www.netmba.com/finance/statements/common-size/.

Soros, George. *The New Paradigm for Financial Markets: The Credit Crash of 2008 and What It Means.* New York: PublicAffairs, Perseus Books, 2008.

FIRST-MOVER ADVANTAGE

The idea of first-mover advantage is similar to the old adage, "the early bird gets the worm." In business, being the first company to sell a new product may provide long-lasting benefits or competitive advantages. Most researchers use the term "first-mover" to refer to the first company to enter a market, not the first company to develop a product (the inventor). First movers are also called market pioneers. The benefits of pioneering may result in market dominance and higher-than-average profitability over time. There are several reasons why these benefits may develop, but research has shown that being the first mover does not always provide advantages. Sometimes there are even first-mover disadvantages, where companies that enter a market later can achieve superior results to those attained by the first-mover firm.

For example, Amazon.com was the first major online bookstore, seizing a head start on later entrants. Established book retailers Barnes & Noble and Borders were quick to develop their own Web sites. Amazon maintained their first-mover advantage in two ways: by partnering with Borders and by extending their product offerings into apparel, electronics, toys, and housewares. This negated any customer preference for purchasing from Barnes & Noble because Amazon became a much larger and more versatile one-stop-shopping destination. Company strategists need to decide if they are likely to benefit from being first, or whether it would be better to wait and follow the leader.

There are two stages to developing first-mover advantages. First, a company must have an opportunity to be first at something, either through skill or luck. Second, the firm must be able to capture the benefits of being first.

In their award-winning article, professors Marvin Lieberman and David Montgomery of Stanford University described three benefits of being first: technology leadership, control of resources, and buyer-switching costs.

TECHNOLOGY LEADERSHIP

First, early entrants can lead other companies in their understanding and use of technology in ways that are hard for later entrants to copy. One way this can happen is that the early entrant learns how to reduce the costs of producing a product through accumulated experience in producing it. This is called a "learning" or "experience" curve effect. Unless later entrants can learn how to produce at these lower costs faster than the first entrant did, the first entrant will have a cost advantage. Harvard University Professor Michael Porter discusses how Procter & Gamble developed an advantage in disposable diapers in the United States. However, researchers have found that in most industries it is relatively easy for later entrants to learn new technology quickly and overcome the lead held by the first-mover firm.

Another way that a first mover may benefit from technology leadership is by applying for patents for their technology to try to prevent other companies from copying it. Patents appear to protect first-mover advantages in some industries, such as pharmaceuticals. In many industries, though, later entrants can invent their own technology quickly enough so that the first-mover's patent protection does not matter. A stronger advantage from technology leadership arises when the first mover can establish their product as the industry standard, making it more difficult for followers to gain customer acceptance. An example of this is the RIM BlackBerry. While there are other mobile devices that offer as much or more in terms of Internet and communications technology, BlackBerry—the first mover in this category—is the industry standard, making BlackBerry the "it" handheld device by which all others are compared.

CONTROL OF RESOURCES

The second type of first-mover benefit is the ability to control a resource necessary for the business that is better than resources later entrants must use. For example, the first company to open a new type of restaurant in town may obtain the best location. This is considered to be one of the advantages exploited by Wal-Mart (and later by Starbucks) when they were the first to scout and secure store locations in small towns. Other resources that a first entrant may be able to control include a supply of raw materials needed to make the product, or access to shelf space at the supermarket. First-mover firms also have the opportunity to build resources that may discourage entry by other companies. For example, the first mover may

increase production capacity or broaden their product line, signaling that there is not enough room for followers to enter and profit.

BUYER-SWITCHING COSTS

The final benefit that first movers may enjoy comes from buyer-switching costs. If it is costly or inconvenient for a customer to switch to a new brand, the first company to gain the customer will have an advantage. Switching costs includes adapting to a new product (e.g., employee training), and penalties associated with breaking a long-term contract. Especially for consumer products, the first mover has the opportunity to shape consumer preferences. The first company to offer a product of acceptable quality may earn brand loyalty. Satisfied consumers tend not to spend time seeking information about other products, and tend to avoid the risk of being dissatisfied if they switch. The pioneering brands in many product categories, such as Coca-Cola soft drinks and Kleenex facial tissues, often dominate their markets for a long time. These brand preferences appear to be more important for products purchased by consumers than for products purchased by businesses. Businesses buy products in larger volume and have more incentive to search for information about lower-cost options.

UNCERTAINTY OF FIRST-MOVER ADVANTAGE

Three types of benefits—technology leadership, control of resources, and buyer-switching costs—can provide long-lasting first-mover advantages. However, researchers believe that in many industries, companies entering later can overcome these advantages. Sometimes there are even first-mover disadvantages, or advantages enjoyed by companies who enter later. For example, the first entrant may invest heavily in enticing customers to try a new type of product. Later entrants would benefit from informed buyers without having to spend as much on educational marketing. Later entrants may be able to avoid mistakes made by the first movers. If first movers become complacent, later entrants may take advantage of changing customer needs. As the Internet continues to develop, technology companies find themselves especially susceptible to second- or later-mover success. Follower companies are reverse-engineering many new products to develop competing products either faster or cheaper—negating much of the first-mover advantage.

Given the uncertainty about when first-mover advantages occur, companies need to carefully consider their strategy. Does the firm want to invest in seeking opportunities to be first? If opportunities arise, what is the best approach to market timing? Which of the three types of benefits are likely to be available to the first entrant in this market and to what degree? Does the firm have the resour-

ces to sustain any initial benefits they gain from being first? If someone else enters first, how difficult will it be to follow? What advantages might a later entry provide in better or lower-cost technology, or better adaptation to customer needs? Although first-mover advantages may be attractive, there are also advantages to being a follower. Company strategists need to decide which approach has the highest potential for long-term profits given their resources and viable market characteristics.

SEE ALSO *New Product Development; Product Life Cycle and Industry Life Cycle*

BIBLIOGRAPHY

Boulding, William, and Markus Christen. "Sustainable Pioneering Advantage? Profit Implications of Market Entry Order." *Marketing Science* 22, no. 3 (2003): 371–392.

———. "First-Mover (Dis)advantages: Retrospective and Link with the Resource-Based View." *Strategic Management Journal* 19, no. 12 (1998): 1111–1125.

Kerin, Roger, P.R. Varadarajan, and Robert Peterson. "First-Mover Advantage: A Synthesis, Conceptual Framework, and Research Propositions." *Journal of Marketing* 56, no. 4 (1996): 33–52.

Lieberman, Marvin B., and David B. Montgomery. "First-Mover Advantages." *Strategic Management Journal* 9 (1998): 41–58.

Mittal, Sharad, and Sanjeev Swami. "What Factors Influence Pioneering Advantage of Companies?" *Vikalpa: The Journal for Decision Makers* 29, no. 3 (2004): 15–33.

Mueller, Dennis C. "First-Mover Advantage and Path Dependence." *International Journal of Industrial Organization* 15, no. 6 (1997): 827–850.

Nakata, Cheryl, and Kolachalam Sivakumar. "Emerging Market Conditions and Their Impact on First-Mover Advantages: An Integrative Review." *International Marketing Review* 14, no. 6 (1997): 461–485.

Rahman, Zillur, and Sanjay K. Bhattacharyya. "First-mover Advantages in Emerging Economies: A Discussion." *Management Decision* 41, no. 2 (2003): 141–147.

Robinson, William T., and Sungwook Min. "Is the First to Market the First to Fail? Empirical Evidence for Industrial Goods Businesses." *Journal of Marketing Research (JMR)* 39, no. 1 (2002): 120–129.

Sandberg, K. D. "Rethinking the First-Mover Advantage." *Harvard Management Update* 6, no. 5 (2001): 1–5.

Trump, Donald J. "Trump University Wealth Building 101: Your First 90 Days on the Path to Prosperity." *New York: Wiley & Sons, 2007.*

FIVE S FRAMEWORK

The 5S framework was originally developed by just-in-time expert and international consultant Hiroyuki Hirano. The 5S framework is an extension of Hirano's earlier works on just-in-time production systems. The 5Ss represent a simple "good housekeeping" approach to improving the work environment consistent with the tenets of lean manufacturing systems. The focus on the concept is how the visual

workplace can be utilized to drive inefficiencies out of the manufacturing process.

This framework also improves workplace safety, which makes it attractive to businesses. According to Hirano, without the organization and discipline provided by successfully implementing the 5Ss, other lean manufacturing tools and methods are likely to fail. The 5Ss stand for the Japanese words *seiri, seiton, seiso, seiketsu,* and *shitsuke.* These Japanese "S" words roughly translate into the English words organization, orderliness, cleanliness, standardized cleanup, and discipline. Alternative corresponding "Ss" have also been developed for the English language: sort, set in order, shine, standardize, and sustain.

Seiri, or sort, focuses upon reducing the amount of rarely used material or tools that tend to create clutter. Only those things required for immediate production should be retained in the work area. *Seiton,* or orderliness, facilitates the reduction of clutter and efficient access to material or tools by following the old adage "a place for everything and everything in its place." Workers readily know when a tool is missing because of visual signals (e.g., empty space on a signboard).

Seiso, or cleanliness, focuses upon keeping the workplace, machinery, and tools clean. This includes keeping tools and machinery calibrated, performing preventive maintenance, and the use of visual cues to signal when maintenance is needed. *Seiketsu,* or standardized cleanup, is essentially the condition that occurs when the first three pillars—the first 3Ss—are implemented well. However, it also includes institutionalizing the first three pillars. This includes developing rules, processes, and procedures to ensure that the continuity and uniformity of achievements accrued by the first three pillars do not erode over time.

Finally, *shitsuke,* or discipline, focuses upon putting procedures into place that sustain the psychological meaningfulness of the payoffs achieved by the overall framework. This may include periodic rewards for workers who excel in some facet of the framework or other visual signals that communicate the commitment of management to the continued implementation of 5S.

Use of color is a primary tool of the visual workplace. Examples include color-coded connections to mistake-proof and speed connections of all sorts of parts, and colored boundary markers on shop floors. Information sharing is also an important aspect of the visual workplace. For example, processes can be designed to provide visual signals indicating that certain activities need to occur (e.g., empty inventory space on the floor) or to communicate productivity standards and output.

5S framework guidelines can be tailored by managers to suit the routine workplace environment of their particular organizations. Moreover, training of new employees (to ensure that they understand the organization-specific workplace environment guidelines) is a very important formality in the orientation process. This is primarily because different organizations observe different procedures for implementing the 5S framework model. For example, training of new employees at McDonald's begins with an immediate one-hour orientation program on the general structures and operation procedures of the company.

Many companies have utilized the simple guidelines provided by the 5S framework. However, implementing the framework is not always a simple task. It may require redesigning processes or buying new, more reliable machinery. This difficulty has given rise to a burgeoning consulting business designed to help firms implement the 5S system, including process design as well as employee training. Interestingly, while there appears to be a wide variety of firms utilizing the 5S framework, there is no published empirical research supporting its utility. There does, however, appear to be some anecdotal evidence supporting the efficacy of the 5S framework.

SEE ALSO *Japanese Management; Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management*

BIBLIOGRAPHY

Alukal, George, and Anthony Manos. "How Lean Manufacturing Can Help Your Mold Shop." *Gardner Publications, Inc.*, 2008. Available from: http://www.moldmakingtechnology.com/articles/100204.html.

"5S Lean Manufacturing." *Systems2Win.com.* Available from: http://systems2win.com/solutions/5S.

Doehrman, Marylou. "The Fives in 5S Apply to Every Industry." *Colorado Springs Business Journal,* February 2005.

Fabrizio, Thomas, and Don Tapping. *5S for the Office: Organizing the Workplace to Eliminate Waste.* New York: Productivity Press, 2006.

Gerard, Alexis, and Bob Goldstein. *Going Visual: Using Images to Enhance Productivity, Decision Making, and Profits.* Hoboken, NJ: John Wiley & Sons, 2005.

Hirano, Hiroyuki. *5 Pillars of the Visual Workplace: The Source Book for 5S Implementation.* New York: Productivity Press, 1996.

Sarkar, Debashis. *5S for Service Organizations and Offices: A Lean Look at Improvements.* Milwaukee, WI: ASQ Quality Press, 2006.

Jusko, Jill. "Seeing Is Believing: The Collins-Aikman Athens, Tennessee Operations Relies on Visual Signals, Good Housekeeping and Teamwork to Drive Its Lean Manufacturing Imperative." *Industry Week,* October 2002.

FLEXIBLE BENEFITS

SEE *Cafeteria Plan—Flexible Benefits*

FLEXIBLE MANUFACTURING

Business firms generally choose to compete within one or two areas of strength. These areas of strength are often referred to as distinctive competencies, core competencies, or competitive priorities. Among the options for competition are price (cost), quality, delivery, service, and flexibility. An ever-increasing number of firms are choosing to compete in the area of flexibility. Generally, this has meant that the firm's major strength is flexibility of product (able to easily make changes in the product) or flexibility of volume (able to easily absorb large shifts in demand). Firms that are able to do this are said to have flexible capacity—the ability to operate manufacturing equipment at different production rates by varying staffing levels and operating hours, or starting and stopping at will. Specifically, manufacturing flexibility consists of three components: (1) the flexibility to produce a variety of products using the same machines and produce the same products on different machines; (2) the flexibility to produce new products on existing machines; and (3) the flexibility of machines to accommodate changes in the design of products.

FLEXIBLE MANUFACTURING SYSTEMS

A flexible manufacturing system (FMS) is a group of numerically-controlled machine tools, interconnected by a central control system. The various machining cells are interconnected, via loading and unloading stations, by an automated transport system. Operational flexibility is enhanced by the ability to execute all manufacturing tasks on numerous product designs in small quantities and with faster delivery. It has been described as an automated job shop and as a miniature automated factory. Simply stated, it is an automated production system that produces one or more families of parts in a flexible manner. Today, this prospect of automation and flexibility presents the possibility of producing nonstandard parts to create a competitive advantage.

The concept of flexible manufacturing systems evolved during the 1960s when robots, programmable controllers, and computerized numerical controls brought a controlled environment to the factory floor in the form of numerically-controlled and direct-numerically-controlled machines.

FMS is generally limited to firms involved in batch production or job shop environments. Normally, batch producers have two kinds of equipment from which to choose: dedicated machinery or non-automated, general-purpose tools. Dedicated machines save cost but lack flexibility. More flexible general purpose machines such as lathes, milling machines, or drill presses are all costly, and may not reach full capacity. Flexible manufacturing systems provide the batch manufacturer with another option—one that can make batch manufacturing just as efficient and productive as mass production.

OBJECTIVES OF FMS

The general objectives of an FMS are to approach the efficiencies and economies of scale normally associated with mass production, and to maintain the flexibility required for small- and medium-lot-size production of a variety of parts. Two kinds of manufacturing systems fall within the FMS spectrum. These are assembly systems, which assemble components into final products, and forming systems, which actually form components or final products. A generic FMS is said to consist of the following components:

1. A set of work stations containing machine tools that do not require significant set-up time or change-over between successive jobs. Typically, these machines perform milling, boring, drilling, tapping, reaming, turning, and grooving operations.

2. A material-handling system that is automated and flexible in that it permits jobs to move between any pair of machines so that any job routing can be followed.

3. A network of supervisory computers and microprocessors that perform some or all of the following tasks: (1) directs the routing of jobs through the system; (2) tracks the status of all jobs in progress so it is known where each job is to go next; (3) passes the instructions for the processing of each operation to each station and ensures that the right tools are available for the job; and (4) provides essential monitoring of the correct performance of operations and signals problems requiring attention.

4. Storage, locally at the work stations, and/or centrally at the system level.

5. The jobs to be processed by the system. In operating an FMS, the worker enters the job to be run at the supervisory computer, which then downloads the part programs to the cell control or NC controller.

BENEFITS OF FMS

The potential benefits from the implementation and utilization of a flexible manufacturing system have been detailed by numerous researchers on the subject. A review of the literature reveals many tangible and intangible benefits that FMS users extol. These benefits include:

- Less waste
- Fewer workstations
- Quicker changes of tools, dies, and stamping machinery

- Reduced downtime

- Better control over quality

- Reduced labor

- More efficient use of machinery

- Work-in-process inventory reduced

- Increased capacity

- Increased production flexibility

LIMITATIONS OF FMS

Despite these benefits, FMS does have certain limitations. In particular, this type of system can only handle a relatively-narrow range of part varieties, so it must be used for similar parts (family of parts) that require similar processing. Due to increased complexity and cost, an FMS also requires a longer planning and development period than traditional manufacturing equipment.

Equipment utilization for the FMS is not always as high as one would expect. Japanese firms tend to have a much higher equipment utilization rate than U.S. manufacturers utilizing FMS. This is probably a result of U.S. users' attempt to utilize FMS for high-volume production of a few parts rather than for a high-variety production of many parts at a low cost per unit. U.S. firms average ten types of parts per machine, compared to ninety-three types of parts per machine in Japan.

Other problems can result from a lack of technical literacy, management incompetence, and poor implementation of the FMS process. If the firm misidentifies its objectives and manufacturing mission, and does not maintain a manufacturing strategy that is consistent with the firm's overall strategy, problems are inevitable. It is crucial that a firm's technology acquisition decisions be consistent with its manufacturing strategy.

If a firm chooses to compete on the basis of flexibility rather than cost or quality, it may be a candidate for flexible manufacturing, especially if it is suited for low- to mid-volume production. This is particularly true if the firm is in an industry where products change rapidly, and the ability to introduce new products may be more important than minimizing cost. In this scenario, scale is no longer the main concern and size is no longer a barrier to entry.

However, an FMS may not be appropriate for some firms. Since new technology is costly and requires several years to install and become productive, it requires a supportive infrastructure and the allocation of scarce resources for implementation. Frankly, many firms do not possess the necessary resources. Economically justifying an FMS can be a difficult task, especially since cost accounting tends to be designed for mass production of a mature product, with known characteristics, and a stable technology. Therefore, it is difficult to give an accurate indication of whether flexible manufacturing is justified in many cases.

Rapidly-changing technology and shortened product life cycles can cause capital equipment to quickly become obsolete. Conversely, however, it is important to understand that when it is financially possible, flexible manufacturing is an option that creates synergy among existing machines, making it possible to create massive batches of products in a span of time previously thought impossible. With today's fast moving trends and constant inventory turnover on all marketplaces, flexibility is truly the key in manufacturing almost anything.

For other firms, their products may not require processes at the technological level of an FMS. IBM found that a redesigned printer was simple enough for high-quality manual assembly and that the manual assembly could be achieved at a lower cost than automated assembly. Potential FMS users should also consider that some of the costs traditionally incurred in manufacturing may actually be higher in a flexible automated system than in conventional manufacturing. Although the system is continually self-monitoring, maintenance costs are expected to be higher and energy costs are likely to be higher despite more efficient use of energy. Increased machine utilization can result in faster deterioration of equipment, providing a shorter than average economic life. Finally, personnel training costs may prove to be relatively high in comparison.

For some firms, worker resistance is a problem. Workers tend to perceive automation as an effort to replace them with a tireless piece of metal that does not eat, take breaks, or require benefits. To combat this perception, many firms stress that workers are upgraded as a result of FMS installation, and that no loss of jobs ensues.

Despite any problems, use of flexible manufacturing systems should continue to grow as more firms are forced to compete on a flexibility basis and as technology advances. It has shown many advantages in low- to mid-volume, high-mix production applications. Future systems will probably see lower and lower quantities per batch. FMS can somewhat shift emphasis in manufacturing from large-scale, repetitive production of standard products to highly-automated job shops featuring the manufacture of items in small batches for specific customers. The increased availability of flexible manufacturing technology will also give multi-product firms more choices of how to design production facilities, how to assign products to facilities, and how to share capacity among products.

BEYOND FLEXIBLE MANUFACTURING: AGILE MANUFACTURING

Fliedner and Vokurka, in their *Production and Inventory Management Journal* article on agile manufacturing, define

agile manufacturing as the ability to successfully market low-cost, high-quality products with short lead times (and in varying volumes) that provide enhanced customer value through customization. An agile firm manages change as a matter of routine. The difference between agility and flexibility is whether or not the change in market demand has been predicted. Flexibility refers to the capability of rapidly changing from one task to another when changing conditions are defined ahead of time. Agility refers to the ability to respond quickly to unanticipated marketplace changes. Fliedner and Vokurka present four key dimensions of agile competition:

1. **Enriching the customer:** This requires a quick understanding of the unique requirements of individual customers and rapidly meeting those requirements.

2. **Cooperating to enhance competitiveness:** This includes better intra-organizational cooperation and may extend to inter-organizational cooperation, such as supplier partnerships and virtual relationships.

3. **Organizing to master change and uncertainty:** This involves utilizing new organizational structures provided by such techniques as concurrent engineering and cross-functional teams.

4. **Leveraging the impact of people and information:** This places great emphasis on the development of employees through education, training, and empowerment.

IMPLEMENTING AGILE MANUFACTURING

Finally, the two authors prescribe a series of internal and external initiatives for successful implementation of agile manufacturing. The internal initiatives include the following:

1. **Business process reengineering:** This is the rethinking and radical redesign of business processes so that dramatic improvements in critical areas can be achieved.

2. **Management planning and execution tools:** This involves the use of such techniques as manufacturing resource planning, real-time manufacturing execution systems, production planning configurators, and real-time threaded scheduling.

3. **Design for manufacturability/assembly:** The results include modular products that allow for future upgrades, fewer parts for enhanced reliability, and recycling.

4. **Reorganization processes:** Process reorganization could include the use of flexible manufacturing systems or cellular manufacturing.

5. **Intraorganizational cooperation.** This form of cooperation calls for the use of employee empowerment/involvement techniques and employee education and training.

External initiatives include:

1. **Interorganizational cooperation:** This means early supplier involvement in product and process designs, training suppliers in such activities as vendor-managed inventories, and joint research efforts.

2. **Supply chain practices:** The use of outsourcing, schedule sharing, and postponement of product design are included.

3. **Information technology:** Some companies are using technology to improve supply chain efficiency. For example, the move from centralized mainframe computing to decentralized client and server computing.

4. **Point-of-sale data collection:** Reductions in order entry time are being achieved with electronic data interchange (EDI), radio frequency communications tools, bar coding, and electronic commerce.

The authors propose that flexibility provided by agility may emerge as the most important competitive priority of the early twenty-first century, as competition is expected to ensure that manufacturers will increasingly need to adapt readily to market shifts.

SEE ALSO *Cellular Manufacturing; Economies of Scale and Economies of Scope; Lean Manufacturing and Just-in-Time Production*

BIBLIOGRAPHY

Anderson, Dr. David. "Design for Manufacturability & Concurrent Engineering; How to: Design for Low Cost, Design for High Quality, Design for Lean Production, and Design Quickly for Fast Production." California: CIM Press, 2008.

Chandra, Charu, Mark Everson, and Janis Grabis. "Evaluation of Enterprise-Level Benefits of Manufacturing Flexibility." *Omega* 33, no. 1 (2005): 17–31.

Fliedner, Gene, and Robert J. Vokurka. "Agility: Competitive Weapon of the 1990s and Beyond." *Production and Inventory Management Journal* 38, no. 3 (1997): 19–24.

"Ford Furthers Flexible Manufacturing Effort." *Manufacturing Engineering* 133, no. 1 (2004): 27.

Popely, Rick. "Ford Upgrades Chicago Plant to Meet Need for 'Flexible Manufacturing.'" *Knight Ridder Tribune Business News* 9 June 2004.

Schonfeld, Erick. "The Customized, Digitized, Have-It-Your-Way Economy." *Fortune* 28 September 1998, 114–124.

Truett, Richard. "Ford's Flexibility Reaps Rich Reward." *Automotive News* 78, no. 6106 (2004): 17.

Tseng, Mei-Chiun. "Strategic Choice of Flexible Manufacturing Technologies." *International Journal of Production Economics* 91, no. 3 (2004): 223–227.

FLEXIBLE SPENDING ACCOUNTS

Flexible spending accounts (FSAs), sometimes called reimbursement accounts, are accounts set up by employers. These accounts allow employees to make annual, pre-tax contributions that can be used to pay for certain health care and dependent care expenses that are not paid for by insurance companies. FSAs are offered under the umbrella of cafeteria benefit plans and are sometimes called cafeteria plans. FSAs must comply with all applicable rules and regulations governing benefits under cafeteria plans. FSAs are commonly associated with health savings accounts, or HSAs. Health savings accounts are a specific type of account made available to employees, usually a type of FSA. They are permanent and tax exempt, and are used specifically for medical insurance purposes.

Employers must establish flexible spending accounts so that they comply with all applicable federal legislation. Once an FSA is established, employees have the opportunity to sign up for the plan during the annual "open enrollment" period. During the sign-up period that precedes the plan year, employees must estimate the relevant costs they are likely to incur during the year and indicate the amount of money they want set aside in the FSA for the year. Usually, the money is set aside using regular payroll deductions from the employee's paychecks. The deductions from employees' wages are pre-tax, thus reducing the employee's tax liability. Employees must carefully consider the amount they elect to contribute to the FSA, because amounts unused at the end of the plan year cannot be carried over to the next year and are forfeited by the employee if a balance remains at the end of the year. There is no legal limit to the annual amount that can be set aside, but employers can set their own limit if they wish.

As employees incur eligible expenses throughout the plan year, they must obtain and retain all receipts and documentation. Employees then provide required documentation that they have incurred eligible expenses (usually by providing receipts for the expenditures) and are reimbursed from the accumulated money in their account. Employees can turn in requests for reimbursement throughout the plan year or save all their documentation and turn in their request at the end of the plan year. Recent innovations in FSAs include the introduction of debit cards by some employers. These debit cards allow employees to obtain immediate reimbursement for eligible expenses rather than compiling receipts and documentation, submitting the paperwork, and waiting for the employer to cut them a check.

EXPENSES ELIGIBLE FOR COVERAGE UNDER FSAS

Flexible spending accounts can be used to pay for eligible costs related to health care and dependent care for children

or elderly parents. FSAs cover insurance premiums, deductibles, co-payments, prescription drugs, and many health-related expenses not covered by an employee's health insurance. For example, employees can pay for procedures and items such as laser eye surgery, orthodontia, hearing aids, and contact lenses with their FSAs. Flexible spending accounts can also be used to pay for certain expenses related to child and elder care. In 2003, the government expanded the drug coverage under FSAs to include certain types of over-the-counter drugs, such as pain relievers, cold medicines, nicotine patches, and allergy medications.

HEALTH CARE AND DEPENDENT DAY CARE ACCOUNTS

FSAs are commonly divided into two different categories, the health care account and the dependent day care account. The health care account is an FSA used for various health expenses, especially those not covered by a normal health care plan.

Dependent day-care accounts are used to set aside pre-tax funds for medical aid to any eligible dependents the employee may have, such as children.

ORIGINATION OF FLEXIBLE SPENDING ACCOUNTS

Although flexible spending accounts have been available since the enactment of Section 125 in the late 1970s, for many years employers didn't offer them and only a small percentage of eligible employees utilized them. There were various reasons for their lack of popularity. Employers were initially put off by what they perceived as the complexity and administrative costs associated with cafeteria plans in general, and flexible spending accounts in particular. Employees were reluctant to participate because of the forfeiture rule, which requires a participating employee to "use or lose" the funds set aside in the FSA each year. The advent and spread of managed care plans, such as health maintenance organizations (HMOs) and preferred provider organizations (PPOs) in the 1980s and 1990s also hampered the growth of flexible spending accounts. Managed care plans often included a low (or no) deductible, low co-payments, and coverage for preventive care. Employees' "out-of-pocket" health care expenses were often reduced; thus there was less incentive for employees to set aside money to cover non-reimbursed medical or dependent care expenses.

However, rising health care costs and dissatisfaction with managed care plans in the 1990s and early 2000s caused many organizations to look for ways to cut health care costs. Many found it necessary to raise the premiums employees pay for health insurance, the deductible employees pay before health expenditures are covered, and the copayments that employees pay once deductibles are met.

Thus, employees' out-of-pocket expenses rose. The flexible spending account offers a way for employees to cover some of these extra expenses with pre-tax dollars, which lowers their out-of-pocket expenses.

A 2004 survey by the Society for Human Resource Management found that over 70 percent of member organizations offer flexible spending accounts as part of a cafeteria benefits plan. Small employers, however, are much less likely to offer such plans. For example, one Bureau of Labor Statistics report estimated that only 4 percent of employers with fewer than 100 employees offer flexible spending accounts.

HEALTH REIMBURSEMENT ARRANGEMENT

An HRA, or health reimbursement arrangement, is an extra account that can be used with nearly any health plan, and it is most commonly established with high-deductible health plans. HRAs are employer-funded accounts that reimburse employees for certain medical expenses. Where some flexible spending accounts, such as HSAs, do not need employer contribution or can be made with a combination of employer and employee dollars, HRAs are made only of employer contributions, and cannot be taken by employees when they leave their company. However, HRAs tend to be more flexible than HSAs, since many employers allow employees to rollover unused funds in HRAs for the next year or move them to a different account.

HIGH-DEDUCTIBLE HEALTH PLANS

Some companies have also begun to use high-deductible health plans, or HDHPs. These plans have a minimum deductible of $1,000 dollars for individuals and $2,000 for families. They are used in conjunction with the other plans discussed and are intended to create more awareness of health insurance choices. Employees, forced to pay higher deductibles, become more conscious of the form of health care they use, and make better choices in what kind of accounts they want, which benefits the company overall.

SEE ALSO *Employee Benefits; Health Savings Accounts*

BIBLIOGRAPHY

"Consumer Driven Health Products." *Associated Builders and Contractors, Inc,* 2008. Available from: http://www.abc.org/Insurance/Products/Medical_Options/HSA_HRA_FSA.aspx.

"Flexible Spending Accounts." *University of Minnesota.* 2008. Available from: http://www1.umn.edu/ohr/benefits/fsa/index.html.

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources.* 4th ed. Upper Saddle River, NJ: Prentice-Hall, 2004.

Gordon, Pat H., and Helen Box-Farnen. "Health Care Flexible Spending Accounts: An Old Benefit with New Appeal." *Compensation & Benefits Review* 36, no. 3 (2004): 38–44.

Henderson, Richard L. *Compensation Management in a Knowledge-Based World.* 9th ed. Upper Saddle River, NJ: Prentice-Hall, 2003.

Roberts, Sally. "Employers Seek Optimal Approach to Stacking Health Care Accounts." *Business Insurance* 39, no. 6 (2005): 1–4.

Saleem, Haneefa T. "Health Spending Accounts." *US Department of Labor.* 2003. Available from: http://www.bls.gov/opub/cwc/cm20031022ar01p1.htm.

Zinkewicz, Phil. "Tax-Favored Flexible Savings Accounts (FSAs)...A Lid on Employer Health Costs." *Insurance Advocate* 114, no. 39 (2003): 2.

FORECASTING

Forecasting involves the generation of a number, set of numbers, or scenario that corresponds to a future occurrence. It is absolutely essential to short-range and long-range planning. By definition, a forecast is based on past data, as opposed to a prediction, which is more subjective and based on instinct, gut feel, or guess. For example, the evening news gives the weather "forecast," not the weather "prediction." Therefore, forecasts should not be mistaken for predictions because forecasting is based on traceable and observable data and trends as opposed to mere assumptions. Properly prepared forecasts should be able to address blips that arise from one-off spread factors as well as other major seasonal factors. Spreadsheets can be used for analyzing past trends and determining forecasts.

Forecasting is based on a number of assumptions:

1. The past will repeat itself. In other words, what has happened in the past will happen again in the future.

2. As the forecast horizon shortens, forecast accuracy increases. For instance, a forecast for tomorrow will be more accurate than a forecast for next month; a forecast for next month will be more accurate than a forecast for next year; and a forecast for next year will be more accurate than a forecast for ten years in the future.

3. Forecasting in the aggregate is more accurate than forecasting individual items. This means that a company will be able to forecast total demand over its entire spectrum of products more accurately than it will be able to forecast individual stock-keeping units. For example, General Motors can more accurately forecast the total number of cars needed for next year than the total number of white Chevrolet Impalas with a certain option package.

4. Forecasts are seldom accurate and almost never totally accurate, although some are very close. Therefore, it is wise to offer a forecast "range." If one were to forecast a demand of 100,000 units for the next month, it is extremely unlikely that demand would equal exactly 100,000. However, a forecast of 90,000

to 110,000 would provide a much larger target for planning.

William J. Stevenson lists a number of characteristics that are common to a good forecast:

- Accurate—some degree of accuracy should be determined and stated so that comparison can be made to alternative forecasts.

- Reliable—the forecast method should consistently provide a good forecast if the user is to establish some degree of confidence.

- Timely—a certain amount of time is needed to respond to the forecast so the forecasting horizon must allow for the time necessary to make changes.

- Easy to use and understand—users of the forecast must be confident and comfortable working with it.

- Cost-effective—the cost of making the forecast should not outweigh the benefits obtained from the forecast.

Forecasting techniques range from the simple to the extremely complex. These techniques are usually classified as being qualitative or quantitative.

QUALITATIVE TECHNIQUES

Qualitative forecasting techniques are generally more subjective than quantitative forecasting techniques. Qualitative techniques are more useful in the earlier stages of the product life cycle, when less past data exists for use in quantitative methods. Qualitative methods include the Delphi technique, Nominal Group Technique (NGT), sales force opinions, executive opinions, and market research.

The Delphi Technique. The Delphi technique uses a panel of experts to produce a forecast. Each expert is asked to provide a forecast specific to the need at hand. After the initial forecasts are made, each expert reads what every other expert wrote and is influenced by their views. A subsequent forecast is then made by each expert. Each expert then reads again what every other expert wrote and is again influenced by the perceptions of the others. This process repeats itself until each expert nears agreement on the needed scenario or numbers.

Nominal Group Technique. The Nominal Group technique is similar to the Delphi technique in that it utilizes a group of participants, usually experts. After the participants respond to forecast-related questions, they rank their responses in order of perceived relative importance. Then the rankings are collected and aggregated. Eventually, the group should reach a consensus regarding the priorities of the ranked issues.

Sales Force Opinions. The sales staff is often a good source of information regarding future demand. The sales manager may ask for input from each salesperson and aggregate their responses into a sales force composite forecast. Caution should be exercised when using this technique as the members of the sales force may not be able to distinguish between what customers say and what they actually do. Also, if the forecasts will be used to establish sales quotas, the sales force may be tempted to provide lower estimates.

Executive Opinions. Sometimes upper-level managers meet and develop forecasts based on their knowledge of their areas of responsibility. This is sometimes referred to as a jury of executive opinion.

Market Research. In market research, consumer surveys are used to establish potential demand. Such market research usually involves constructing a questionnaire that solicits personal, demographic, economic, and marketing information. On occasion, market researchers collect such information in person at retail outlets and malls, where the consumer can experience—taste, feel, smell, and see—a particular product. The researcher must be careful that the sample of people surveyed is representative of the desired consumer target.

QUANTITATIVE TECHNIQUES

Quantitative forecasting techniques are generally more objective than qualitative forecasting methods. Quantitative forecasts can be time-series forecasts (i.e., a projection of the past into the future) or forecasts based on associative models (i.e., based on one or more explanatory variables). Time-series data may have underlying behaviors that need to be identified by the forecaster. In addition, the forecast may need to identify the causes of the behavior. Some of these behaviors may be patterns or simply random variations. Among the patterns are:

- Trends, which are long-term movements (up or down) in the data.

- Seasonality, which produces short-term variations that are usually related to the time of year, month, or even a particular day, as witnessed by retail sales at Christmas or the spikes in banking activity on the first of the month and on Fridays.

- Cycles, which are wavelike variations lasting more than a year that are usually tied to economic or political conditions.

- Irregular variations that do not reflect typical behavior, such as a period of extreme weather or a union strike.

- Random variations, which encompass all non-typical behaviors not accounted for by the other classifications.

Table 1

Naïve Forecasting

Period	Actual Demand (000's)	Forecast (000's)
January	45	
February	60	45
March	72	60
April	58	72
May	40	58
June		40

Among the time-series models, the simplest is the naïve forecast. A naïve forecast simply uses the actual demand for the past period as the forecasted demand for the next period. This makes the assumption that the past will repeat. It also assumes that any trends, seasonality, or cycles are either reflected in the previous period's demand or do not exist. An example of naïve forecasting is presented in Table 1.

Another simple technique is the use of averaging. To make a forecast using averaging, one simply takes the average of some number of periods of past data by summing each period and dividing the result by the number of periods. This technique has been found to be very effective for short-range forecasting.

Variations of averaging include the moving average, the weighted average, and the weighted moving average. A moving average takes a predetermined number of periods, sums their actual demand, and divides by the number of periods to reach a forecast. For each subsequent period, the oldest period of data drops off and the latest period is added. Assuming a three-month moving average and using the data from Table 1, add 45 (January), 60 (February), and 72 (March) and divide by three to arrive at a forecast for April:

$$45 + 60 + 72 = 177 \div 3 = 59$$

To arrive at a forecast for May, drop January's demand from the equation and add the demand from April. Table 2

Table 2

Three Month Moving Average Forecast

Period	Actual Demand (000's)	Forecast (000's)
January	45	
February	60	
March	72	
April	58	59
May	40	63
June		57

presents an example of a three-month moving average forecast.

A weighted average applies a predetermined weight to each month of past data, sums the past data from each period, and divides by the total of the weights. If the forecaster adjusts the weights so that their sum is equal to 1, then the weights are multiplied by the actual demand of each applicable period. The results are then summed to achieve a weighted forecast. Generally, the more recent the data is, the higher the weight, and the older the data the smaller the weight. Using the demand example, a weighted average using weights of .4, .3, .2, and .1 would yield the forecast for June as:

$$60(.1) + 72(.2) + 58(.3) + 40(.4) = 53.8$$

Forecasters may also use a combination of the weighted average and moving average forecasts. A weighted moving average forecast assigns weights to a predetermined number of periods of actual data and computes the forecast the same way as described above. As with all moving forecasts, as each new period is added, the data from the oldest period is discarded. Table 3 shows a three-month weighted moving average forecast utilizing the weights .5, .3, and .2.

A more complex form of weighted moving average is exponential smoothing, so named because the weight falls off exponentially as the data ages. Exponential smoothing takes the previous period's forecast and adjusts it by a predetermined smoothing constant, α (called alpha; the value for alpha is less than one) multiplied by the difference in the previous forecast and the demand that actually occurred during the previously forecasted period (called forecast error). Exponential smoothing is expressed formulaically as such:

New forecast = previous forecast +
alpha (actual demand – previous forecast)

$$F = F + \acute{\alpha}(A–F)$$

Exponential smoothing requires the forecaster to begin the forecast in a past period and work forward to the period for which a current forecast is needed. A substantial amount of past data and a beginning or initial forecast are also necessary. The initial forecast can be an actual forecast from a previous period, the actual demand from a previous period, or it can be estimated by averaging all or part of the past data. Some heuristics exist for computing an initial forecast. For example, the heuristic $N = (2 \div \alpha) - 1$ and an alpha of .5 would yield an N of 3, indicating the user would average the first three periods of data to get an initial forecast. However, the accuracy of the initial forecast is not critical if one is using large amounts of data, since exponential smoothing is "self-correcting."

Table 3
Three–Month Weighted Moving Average Forecast

Period	Actual Demand (000's)	Forecast (000's)
January	45	
February	60	
March	72	
April	58	55
May	40	63
June		61

Given enough periods of past data, exponential smoothing will eventually make enough corrections to compensate for a reasonably inaccurate initial forecast. Using the data used in other examples, an initial forecast of 50, and an alpha of .7, a forecast for February is computed as such:

New forecast (February) = 50 + .7(45 –50) = 41.5

Next, the forecast for March:

New forecast (March) = 41.5 + .7(60 – 41.5) = 54.45

This process continues until the forecaster reaches the desired period. In Table 4 this would be for the month of June, since the actual demand for June is not known.

An extension of exponential smoothing can be used when time-series data exhibits a linear trend. This method is known by several names: double smoothing; trend-adjusted exponential smoothing; forecast including trend; and Holt's Model. Without adjustment, simple exponential smoothing results will lag the trend; that is, the forecast will always be low if the trend is increasing, or high if the trend is decreasing. With this model there are two smoothing constants, α and β with β representing the trend component.

An extension of Holt's Model, called Holt-Winter's Method, takes into account both trend and seasonality.

Table 4

Period	Actual Demand (000's)	Forecast (000's)
January	45	50
February	60	41.5
March	72	54.45
April	58	66.74
May	40	60.62
June		46.19

There are two versions, multiplicative and additive, with the multiplicative being the most widely used. In the additive model, seasonality is expressed as a quantity to be added to or subtracted from the series average. The multiplicative model expresses seasonality as a percentage—known as seasonal relatives or seasonal indexes—of the average (or trend). These are then multiplied times values in order to incorporate seasonality. A relative of 0.8 would indicate demand that is 80 percent of the average, while 1.10 would indicate demand that is 10 percent above the average. Detailed information regarding this method can be found in most operations management textbooks or one of a number of books on forecasting.

Associative or causal techniques involve the identification of variables that can be used to predict another variable of interest. For example, interest rates may be used to forecast the demand for home refinancing. Typically, this involves the use of linear regression, where the objective is to develop an equation that summarizes the effects of the predictor (independent) variables upon the forecasted (dependent) variable. If the predictor variable were plotted, the object would be to obtain an equation of a straight line that minimizes the sum of the squared deviations from the line (with deviation being the distance from each point to the line). The equation would appear as: $y = a + bx$, where y is the predicted (dependent) variable, x is the predictor (independent) variable, b is the slope of the line, and a is equal to the height of the line at the y-intercept. Once the equation is determined, the user can insert current values for the predictor (independent) variable to arrive at a forecast (dependent variable).

If there is more than one predictor variable or if the relationship between predictor and forecast is not linear, simple linear regression will be inadequate. For situations with multiple predictors, multiple regression should be employed, while non-linear relationships call for the use of curvilinear regression.

ECONOMETRIC FORECASTING

Econometric methods, such as autoregressive integrated moving-average model (ARIMA), use complex mathematical equations to show past relationships between demand and variables that influence the demand. An equation is derived and then tested and fine-tuned to ensure that it is as reliable a representation of the past relationship as possible. Once this is done, projected values of the influencing variables (income, prices, etc.) are inserted into the equation to make a forecast.

EVALUATING FORECASTS

Forecast accuracy can be determined by computing the bias, mean absolute deviation (MAD), mean square error

(MSE), or mean absolute percent error (MAPE) for the forecast using different values for alpha. Bias is the sum of the forecast errors [$\sum$(FE)]. For the exponential smoothing example above, the computed bias would be:

$$(60 - 41.5) + (72 - 54.45) + (58 - 66.74) +$$
$$(40 - 60.62) = 6.69$$

If one assumes that a low bias indicates an overall low forecast error, one could compute the bias for a number of potential values of alpha and assume that the one with the lowest bias would be the most accurate. However, caution must be observed in that wildly inaccurate forecasts may yield a low bias if they tend to be both over forecast and under forecast (negative and positive). For example, over three periods a firm may use a particular value of alpha to over forecast by 75,000 units (-75,000), under forecast by 100,000 units (+100,000), and then over forecast by 25,000 units (-25,000), yielding a bias of zero (-75,000 + 100,000 − 25,000 = 0). By comparison, another alpha yielding over forecasts of 2,000 units, 1,000 units, and 3,000 units would result in a bias of 5,000 units. If normal demand was 100,000 units per period, the first alpha would yield forecasts that were off by as much as 100 percent while the second alpha would be off by a maximum of only 3 percent, even though the bias in the first forecast was zero.

A safer measure of forecast accuracy is the mean absolute deviation (MAD). To compute the MAD, the forecaster sums the absolute value of the forecast errors and then divides by the number of forecasts ($\sum$ |FE| ÷ N). By taking the absolute value of the forecast errors, the offsetting of positive and negative values are avoided. This means that both an over forecast of 50 and an under forecast of 50 are off by 50. Using the data from the exponential smoothing example, MAD can be computed as follows:

$$(|60 - 41.5| + |72 - 54.45| + |58 - 66.74| +$$
$$|40 - 60.62|) \div 4 = 16.35$$

Therefore, the forecaster is off an average of 16.35 units per forecast. When compared to the result of other alphas, the forecaster will know that the alpha with the lowest MAD is yielding the most accurate forecast.

Mean square error (MSE) can also be utilized in the same fashion. MSE is the sum of the forecast errors squared divided by N-1 [($\sum$(FE)) ÷ (N-1)]. Squaring the forecast errors eliminates the possibility of offsetting negative numbers, since none of the results can be negative. Utilizing the same data as above, the MSE would be:

$$[(18.5) + (17.55) + (-8.74) + (-20.62)] \div 3$$
$$= 383.94$$

As with MAD, the forecaster may compare the MSE of forecasts derived using various values of alpha and assume the alpha with the lowest MSE is yielding the most accurate forecast.

The mean absolute percent error (MAPE) is the average absolute percent error. To arrive at the MAPE one must take the sum of the ratios between forecast error and actual demand times 100 (to get the percentage) and divide by N [($\sum$ | Actual demand − forecast | ÷ Actual demand) × 100 ÷ N]. Using the data from the exponential smoothing example, MAPE can be computed as follows:

$$[(18.5/60) + 17.55/72 + 8.74/58 + 20.62/48) \times$$
$$100] \div 4 = 28.33\%$$

As with MAD and MSE, the lower the relative error the more accurate the forecast.

It should be noted that in some cases the ability of the forecast to change quickly to respond to changes in data patterns is considered to be more important than accuracy. Therefore, one's choice of forecasting method should reflect the relative balance of importance between accuracy and responsiveness, as determined by the forecaster.

MAKING A FORECAST

William J. Stevenson lists the following as the basic steps in the forecasting process:

- Determine the forecast's purpose. Factors such as how and when the forecast will be used, the degree of accuracy needed, and the level of detail desired determine the cost (time, money, employees) that can be dedicated to the forecast and the type of forecasting method to be utilized.

- Establish a time horizon. This occurs after one has determined the purpose of the forecast. Longer-term forecasts require longer time horizons and vice versa. Accuracy is again a consideration.

- Select a forecasting technique. The technique selected depends upon the purpose of the forecast, the time horizon desired, and the allowed cost.

- Gather and analyze data. The amount and type of data needed is governed by the forecast's purpose, the forecasting technique selected, and any cost considerations.

- Make the forecast.

- Monitor the forecast. Evaluate the performance of the forecast and modify, if necessary.

- Establish cause and effect relationships that add validation to a forecast.

SEE ALSO *Futuring; Manufacturing Resources Planning; Planning; Sales Management*

BIBLIOGRAPHY

Finch, Byron J. *Operations Now: Profitability, Processes, Performance.* 2nd ed. Boston: McGraw-Hill Irwin, 2006.

"Forecasting Principles." *forecastingprinciples.com.* Available from: http://www.forecastingprinciples.com.

Green, William H. *Econometric Analysis.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 2003.

Hanke, John E. and Dean Wichern. *Business Forecasting.* 9th ed. Upper Saddle River, NJ: Prentice Hall, 2008.

Joppe, Dr. Marion. "The Nominal Group Technique." *The Research Process.* Available from: http://www.ryerson.ca/mjoppe/ResearchProcess/841TheNominalGroupTechnique.htm.

Stevenson, William J. *Operations Management.* 8th ed. Boston: McGraw-Hill Irwin, 2005.

Stutely, R. *Definitive Guide to Business Finance: What Smart Managers Do with the Numbers.* Prentice Hall: Upper Saddle River, New Jersey, 2007.

FRANCHISING

When an individual has the desire and drive to be an entrepreneur but lacks a strong idea for a company, franchising a proven business can be extremely rewarding. Franchising is an agreement or alliance between two organizations—the franchisor and the franchisee. The franchisor has the business model, training materials, and other materials for the business. The franchisee is the entrepreneur who agrees to operate a branch of the business while paying the franchisor various fees and royalties for the use of the business idea or model.

TYPES OF FRANCHISING

Business-format franchising exists when a franchisor allows someone to market products or services, using the business name or trademark, in return for fess and royalties. When franchising is mentioned, most people think of business-format franchising, like McDonald's, AAMCO Transmission, or Molly Maid. There is also product or trademark franchising. This is a limited franchise where a manufacturer may grant another party a license to sell goods produced by the manufacturer. This might include sale of cars through dealerships (e.g., Ford dealerships), sale of gasoline through service stations (e.g., Shell stations), and sale of soft drinks through local franchising (e.g., Coca Cola bottlers). A final type of franchising is conversion franchising. This franchising model is designed to bring formerly-independently-operating businesses together under the collective power of a national name and advertising. An example of conversion franchising is Century 21 Realtors, an affiliation of previously-established real estate agents.

FRANCHISE START-UP

Franchise fees typically include a lump-sum entrance fee and other charges for regular services, including royalties on sales, advertising fees, and marketing. In exchange for these licensing fees, the franchisor retains control over the delivery of the products and services, as well as marketing and the operational and quality standards of the franchise. The franchising company's revenue is generated through the franchisee that pays these on-going sales royalties, typically averaging 5 percent of sales. The contract, or franchise agreement, is signed by both parties and establishes the relationship between the franchisee and the franchisor. The contract also details the responsibilities and privileges of both parties.

Franchises include such popular names as H&R Block, McDonald's, 7-Eleven, Body Shop, Pizza Hut, and Jiffy Lube. These franchise operations have well-established names, brands, and reputations. The best franchises provide a strong brand or trademark of the concept, a proven business system, extensive training and product development, along with a number of initial and on-going managerial support services. Some help the franchisee secure funding and offer benefits, including discounted supplies. Typically, the franchised business is less risky than other forms of new venture creation because the business idea has been tested and there are mutual advantages to both parties. The Service Corps of Retired Executives (SCORE), a volunteer group involved in counseling would-be entrepreneurs, reports that franchises are safer than other business formats. Franchises experience less than a 5 percent failure rate compared to an 80 percent five-year failure rate for independent businesses and a 90 percent failure rate for independent restaurants. Banks are also supportive of the franchising business model and many will offer up to 70 percent of the initial capital costs.

WHY FRANCHISE?

Franchising allows a business to rapidly expand beyond its original owners. Franchisees pursue a new business, experience the advantages of running their own business and being their own boss, and gain wealth through a proven business idea. They provide the management skills to run the business, and contribute the capital to fund the opening and on-going operations. The franchisor also benefits from the partnership and gains economy of scope advantages as more franchises are established. National or international advertising becomes possible and the franchisor can more easily expand business locations with help and capital from the franchisee. The franchisee helps to build brand awareness through market proliferation. The franchisee has a unique opportunity to run a business with a greater chance of success. There is experience from the franchisor for starting the business and many of the initial

mistakes have already been made, learned from, and corrected.

Franchisees create their own jobs and often create a number of new jobs in operation areas as they hire employees. As the franchise becomes successful, the franchisee may choose to open other stores to create even more wealth. Franchising is popular in the United States and abroad. Franchising is at a mature level in the United States, Europe, and Australia, while Asia, South America, Mexico, and Central America report rapid growth. China, too, is experiencing franchise business growth.

RESEARCHING FRANCHISES

It is important to carefully perform initial due diligence and to thoroughly examine any franchise offering. A Federal Trade Commission (FTC) rule was created and adopted in the mid-1970s that requires franchisors to disclose to franchisees very specific information, including information about themselves, the business, and the terms of the relationship. This document is the Uniform Franchise Offering Circular (UFOC) and provides important legal information about the franchisor and its franchising program.

When deciding on a franchise, it is important to first ascertain personal goals for business ownership and to examine the franchise offering to find a compatible opportunity. While there are no guarantees in franchising, a well-developed operating plan is often an advantage. An entrepreneur should consider a number of issues regarding a possible franchise. For example, is the franchise in only one local market, or does it have a regional, national, or international presence? Lower-risk franchises have a national or global presence and benefit from the size advantage. The franchisee will also want to consider if most of the existing outlets are profitable, and whether the franchise is the market leader with the largest market share among competitors. The entrepreneur should evaluate the presence of a national marketing and purchasing program. The lower-risk franchises also have documented training, manuals, field support, marketing and promotion, standardized operating procedures, and on-going feedback channels between the franchisor and the franchisees. The terms of the license agreement vary from less than ten years to more than twenty years and some have automatic renewal. Capital requirements for obtaining the franchise also vary. Other factors to consider include territory limitations, failure rates, and any relevant litigation history against the franchise. Investment requirements should also be clearly disclosed.

It is often a good idea to interview existing franchise owners to determine if start-up costs and processes are realistic. Legal counsel may be required to negotiate and interpret the franchise agreement contract. SCORE also recommends that potential franchising clients plan and analyze their options. This planning and analysis should include researching Chamber of Commerce and Better Business Bureau records for a given franchise. SCORE agrees that the most important step for choosing a franchise is also considering the entrepreneur's interests, skill set, and experience. It is easier to evaluate an established franchise than a new franchise. There may be few, if any, owners with whom to speak about the franchise. It is important that the new franchise have strong franchisee support and a proven business system. The business strategy should also be examined carefully.

FRANCHISING AND THE ECONOMY

In 2005 more than 11 million people were employed by franchised businesses. This group of approximately 3,000 franchised names—ranging from automobile dealers to food operations—generates nearly 5 percent of gross income in the United States. Giving nearly 8 percent of able-bodied workers a job, curbing unemployment during tough economic times, and creating wealth where there previously was none, these businesses are clearly important to the economy. The IFA reports that for franchising the start-up costs can range from less than $5,000 to more than $1,000,000. Growth in the franchise sector is on an upward trend even during otherwise questionable economic times. For this reason, PricewaterhouseCoopers suggests the outward growth of franchises may not necessarily have an end in sight. IFA offers information on franchising, including newsletters about events and discussion forums and educational materials. It also includes information on government regulations for franchising.

In a 2004 study conducted by PricewaterhouseCoopers (for the International Franchise Association Educational Foundation) on the economic impact of franchised businesses, more than 760,000 franchised businesses exist in the United States and generate some $1.53 trillion yearly. This represented 9.5 percent of the private sector economic output in the United States. These franchises generate one out of every seven jobs in America.

The IFA established a Franchise Index to track the market performance of the top fifty U.S. public franchisors. The index has increased steadily since January 2000, compared to a drop of 20.1 percent in the Standard and Poors (S&P) 500 Index over the same period. Interestingly, the franchise index has grown during tough economic times. Thus, franchising is a major economic force with a significant impact on the nation's economy.

The franchising business model attracts a number of qualified individuals, particularly in times of recession or slow business growth. Individuals are attracted to franchising and the opportunity to create their own jobs. While franchising is not a get-rich-quick proposition, many do have attractive returns on investment. Most analysts agree a three- to five-year period of hard work and dedication is

needed before the franchised business is profitable. Over the years, more individuals are touting the advantages and value of franchising. These franchises pick up on key business trends that affect—and are affected by—social and demographic changes and changing lifestyles. Healthy fast food, at-home care for the elderly, pet care, Internet education, personal services, automotive services, green living, and travel services are all industries that have grown because of changing attitudes. Many of these industries offer exclusive territories in a given market.

Additional advice on finding and comparing franchising opportunities is available on the franchise-broker Web sites (e.g., www.FranNet.com, www.FranChoice.com, and www. francorpconnect.com). FranNet.com is a franchise-broker Web site representing franchise consultants. Some potential franchisees prefer using a broker to find a franchise.

While there are many advantages to franchising, there are some disadvantages. Once a business grows beyond a certain size, it could make more money if it were wholly owned, since a percentage of the profit goes to the franchisor. Even if a franchise is capable of making large profits, the franchise manager must deal with the franchisor as well as business operations. The franchisee must be committed to the idea and business model. The franchisee must also be supportive of the franchisor's system, as the key to a successful franchise operation is consistency. Customers expect a similar product or service from all branches of a franchise. Entrepreneurs who do not want to follow the predetermined structure and operating procedures of a franchise may not be successful.

The franchising arrangement is a balance of entrepreneurial spirit, standard business procedures, and following instructions. The venture, like other start-ups, will require a serious time and energy commitment. It can be difficult for a franchisor to find a franchisee with drive, energy, and the experience necessary to run a business according to franchise guidelines. A franchise also needs an appropriate location. Aside from who runs the franchise, where it is located is of the highest importance. A franchise location must be researched thoroughly to determine its growth potential.

The combination of franchisor guidance, franchisee know-how and determination, reasonable capital investment, and well-researched location will almost always result in successful franchise operation regardless of economic climate, season, or trends. A strong business model coupled with a determined business owner are the keys to success in franchising.

SEE ALSO *Business Plan; Due Diligence; Entrepreneurship; Strategy Formulation*

BIBLIOGRAPHY
Caplin, J. "How Do I Find the Right Franchise?" *Money* 33, no. 5 (2004): 55.

Doehrman, Marylou. "Pros and Cons of a Franchised Business." *Daily Record and the Kansas City Daily News–Press,* 3 January 2005: 1.

Inma, Chutarat. "Purposeful Franchising: Re-Thinking of the Franchising Rationale." *Singapore Management Review* 27, no. 1 (2005): 27–48.

Lymbersky, Christoph. "Market Entry Strategies." Hamburg, Germany: Management Laboratory, 2008.

Ng, L. "Unfolding Franchising." *Malaysian Business,* 1 September 2004, 50.

Timmons, Jeffry A., and Stephen Spinelli. *New Venture Creation: Entrepreneurship for the 21st Century.* Boston: McGraw-Hill Irwin, 2004.

Zaragoza, S. "Due Aims to Take Pain Out of Franchising." *Dallas Business Journal* 28, no. 17 (2004): 12.

FREE TRADE AGREEMENTS AND TRADING BLOCS

Sovereign nations join together, usually on a regional scale, to create free trade agreements. Free trade agreements are created to lower trade barriers and to stimulate trade between member countries. Member countries belonging to the free-trade area trade freely with each other while maintaining trade barriers and tariffs for non-member countries. Free trade agreements are generally seen as having a positive impact on economic growth, especially for smaller countries in the agreement. Trading blocs are groups of countries that have reached a common agreement to lower trade barriers throughout the group (e.g., NAFTA, ASEAN, and the European Union).

HISTORY

According to the Congressional Budget Office, since the end of World War II there has been significant support, especially from the United States, to eliminate artificial trade barriers and to support a greater liberalization of international trade. The General Agreement on Tariffs and Trade (GATT) was created shortly after World War II, between twenty-three countries, to facilitate and coordinate trade between the nations. In addition to creating a more liberal trade environment, it also had provisions and charters creating rules for employment, commodity agreements, restrictive business practices, international investments, and services. The process of creating a free trade agreement followed a pattern of discussion, negotiation, and eventual ratification. The complete process is called "rounds." There were eight rounds in the GATT treaty. Despite numerous difficulties and differences between the involved countries, much was accomplished by GATT; although portions were never fully ratified by all of the countries.

In 1995, during the Uruguay round of GATT negotiations, the World Trade Organization (WTO) was created. The WTO became the official successor to the GATT. The WTO is the only international organization dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably, and freely as possible. At the center of the WTO is its multilateral trading system that functions by seeking consensus between all member nations (over 150). The notion of consensus facilitates cooperation and, potentially, an agreement that is most beneficial to all involved countries.

MOST FAVORED NATION

An important component of free trade agreements is the most favored nation status. The most favored nation status within a free trade agreement creates a situation where all countries are treated equally. Benefits, reduction of tariffs, and other trading privileges applied to one country will be applied to all countries with the most favored nation status.

TRADING BLOCS

Trading blocs are relationships between countries, generally in the same region, to facilitate free trade agreements. Trading blocs include: North American Free Trade Agreement (NAFTA), Central American Free Trade Agreement (CAFTA), Association of Southeast Asian Nations (ASEAN), European Union (EU), Mercado Comun del Sur (Mercosur), and Southern African Development Community (SADC). Southeast Asia has enjoyed unparalleled and astonishing economic growth in the past three decades since the establishment of ASEAN. In 1967, ASEAN's overall trade was worth $10 billion. In 2006, total trade reached a staggering $1.4 trillion.

NAFTA. NAFTA, along with its two supplements, the North American Agreement on Environmental Cooperation (NAAEC) and the North American Agreement on Labor Cooperation (NAALC), is the largest trade agreement on Earth today. The combined effects on trade, labor, and environmental bylaws has created a colossal force in trade that determines when and how all Canadian, American, and Mexican goods and services will be dispersed amongst its most powerful consumers—each other.

NAFTA does have its controversies and opponents, but overall it is widely considered to be the most impressive free trade agreement to date. Opponents suggest that energy taxes, especially those that caused billions in losses in 2006, are caused directly by NAFTA regulations that do not guard private citizen interest between nations well enough. Additionally, some say that government-issued subsidies given to those protected by NAFTA are an unfair

monetary advantage against those who are not listed under NAFTA, especially those in the agricultural industries. A 2008 poll of U.S. voters suggests that roughly 53 percent of Democrats do not approve of NAFTA, while in Canada, NAFTA has an approval rating of more than 62 percent.

DR-CAFTA. DR-CAFTA, previously known as CAFTA, is the free trade agreement between Costa Rica, Guatemala, Honduras, El Salvador, Nicaragua, the United States and, most recently, the Dominican Republic, which put the agreement into effect in March of 2007. Very similar in its common goals to NAFTA, DR-CAFTA is seen by many as just another step in creating a completely globalized free trade agreement. DR-CAFTA represents the future of free trade and the evolution from smaller free trade areas to larger areas, with the end goal being to include nearly every nation.

DR-CAFTA is probably most important to the creation of new highways that will traverse the terrain from Panama to Mexico and even Texas. In order for these roads to become a reality between these separate nations, a trade agreement such as DR-CAFTA will need to lower or totally eliminate tariffs to bring materials and labor in and out of construction areas. Opponents of DR-CAFTA suggest that this trade agreement, like NAFTA, is just another way to globalize and monetize the interests of massive corporations, not the interests of small business or citizens of a given nation. Supporters of DR-CAFTA see it as a natural progression for the area as well as a thoughtful way to compete against global mass-producers such as China.

Mercosur. Established in 1991 and updated in 1994, Mercosur—the free trade agreement between Uruguay, Paraguay, Brazil, and Argentina—has welcomed other nations, including Peru, Bolivia, Chile, Columbia, Ecuador, and in 2006, Venezuela. The latter nations have only partial membership in the trade agreement. Mercosur has lowered tariffs for all member nations, but most notably in 2005 for Columbia, which is now able to bring products and services to more than 200 million people who would not have had access previous to Mercosur.

Like all trade agreements, Mercosur has its issues. Some feel that it has been set up in such a way that it solidifies the status quo of both underdeveloped and wealthy nations, making it difficult for the poor to rise up and truly take advantage of any of the agreement's offerings. Others say that the extreme class separations in the geographic area effected by Mercosur can only stand to gain wealth, even if it is through a trickle-down system.

Free trade areas, the logical progression of free trade agreements, will most likely be implemented until all separate agreements make up one larger, almost completely universal agreement.

CRITICISM OF FREE TRADE

The expansion of free trade and the creation of trading blocs cause concern for some people. As reported by the Congressional Budget Office, the pursuit of free trade could "divert the world from multilateral negotiations and lead to the development of rival trading blocs." Other concerns include: the exploitation of developing countries by industrialized countries; environmental concerns as the production of goods overseas is not consistently regulated from country to country; and labor concerns over fair wages and the loss of jobs from industrialized countries to the developing countries, as well as political concerns that may influence the negotiations between trading partners.

BENEFITS OF FREE TRADE

Multilateral and free trade agreements create benefits by increasing imports and exports of goods. Countries are not the same in their production capabilities. Access to raw materials, necessary levels of technological development, and education of the workforce all have an impact on developing a product or service. Free trade agreements create the opportunity for countries to focus on what they do best, while being able to acquire goods and services at, potentially, the lowest price possible. Free trade makes it possible for countries rich in certain natural resources (such as oil) to trade them with the world for a fair price while also importing traded goods from other nations that are scarce in their own, such as produce. By opening doors for other countries to compete fairly, without burdensome tariffs or trade policies, there is a belief that increased free trade is a deterrent to monopolistic activities.

FUTURE OF FREE TRADE AGREEMENTS

The most recent round of negotiations for multilateral trade in the World Trade Organization continues to drag on due to the increasing number of participants with their own opinions on what each country, including their own, should be entitled to. The attractiveness of free trade agreements will remain high as the benefits evolve with a changing, globalizing marketplace—with the advent of the Internet and other technologies and English-speaking workforces abroad, it's not just tangible goods that are traded between countries anymore. Countries interested in increasing trade will circumvent the delays in the WTO by making their own agreements. The expansion of current trade agreements is also taking place—as with the expansion of NAFTA into the Free Trade Agreement for the Americas (FTAA). The U.S. market is extremely desirable and lucrative for smaller countries' exports, while also providing access to a wider variety of goods and services from the United States and other potential trading partners.

BIBLIOGRAPHY

"Canadians' Views On Trade Agreements." *Ipsos-Reid Polling* 2008. Available from: http://www.ipsos-na.com/news/pressrelease.cfm?id=2224.

"Economic and Budget Issue Brief: The Pros and Cons of Pursuing Free-Trade Agreements." *Congressional Budget Office* 2003. Avaliable from: http://www.cbo.gov.

Duina, Francesco. "The Social Construction of Free Trade: The European Union, NAFTA, and Mercosur." Princeton, New Jersey: Princeton University Press, 2007.

Hufbauer, Sjamsu R. "Toward a US-Indonesia Free Trade Agreement: Issues and Opportunities (Policy Analyses in International Economics)." Washington, D.C.: Peter G. Peterson Institute, 2007.

Magnusson, Paul. "States's Rights vs. Free Trade." *Business Week* 7 March 2005, 102–103.

Mahmood, Amir. "WTO and Market Access in Non-Agricultural Products: Issues and Options for Developing Countries." *Journal of American Academy of Business, Cambridge* 6, no. 1 (2005): 1–11.

Poole, William. "Why are Economists and Noneconomists So Far Apart?" *Review (Federal Reserve Bank of Saint Louis)* 86, no. 5 (2004): 1–6.

Wirtz, Ronald A. "A Fork in the Free-Trade Road." *Region (Federal Reserve Bank of Minneapolis)* 18, no. 3 (2004): 6–9, 48–53.

FULFILLMENT

Fulfillment in business generally refers to the steps a firm takes to fulfill orders that have been placed via the phone, Internet, or in person. Fulfillment can also refer to a specialized firm known as a specialty fulfillment center that does nothing but fulfill orders; these companies do so by handling all the steps of fulfillment for other firms or for other branches of the same firm.

Regardless of who is handling order fulfillment, the steps are fundamentally the same. How a given enterprise takes care of the orders its customers place at its point of sale is the basic definition of fulfillment. Some firms have to custom-build an item to each different customer's specifications to fulfill orders, while other firms simply pick products off of shelves, pack them, and ship them off to ordering clientele. What makes fulfillment important is how it shapes the future of a given business—the numbers of customers buying (or not buying) and the amount of product selling (or not selling) can be used to forecast the future of the business and how much inventory will be needed the same time next week, month, or year. What sales are forecast to be and what they actually turn out to be are always two different things, but sales forecasts will always determine how much product is warehoused by the fulfilling entity.

THE STAGES OF FULFILLMENT

The stages of fulfillment include the sale of a product or service; the confirmation of that order; the production, assembly, or custom-building of the ordered good; the billing and charging of the client for the good; the packing, shipping, and delivery of the product; and lastly, any returns or exchanges associated with the original order placed.

The Sale. A product can be sold in any number of locations: from a sales floor, over the Internet, through television and radio offers, or from a catalog order form that came in the mail. For many smaller retailers, the use of a specialty fulfillment center begins here. An entity like Amazon.com or eBay will allow anyone from a sole proprietor to a medium-sized retailer to place their items on sale through their Internet portals. From here, the customer can browse and pick the product they want to buy, and Amazon.com or similar online retail centers will handle the rest of the fulfillment process.

Order Confirmation. Orders can be confirmed in multiple ways, but a growing method for many companies is the e-mail confirmation. Easier and faster than a follow-up phone call and also less wasteful of resources like time and paper, the e-mail confirmation is a convenient way for both firm and client to keep confirmations for record-keeping purposes. E-mail confirmations usually come with an order tracking number, company contact information, and even links where the order's status can be checked. Also, if an order needs to have any information edited, a client can usually respond to the e-mail confirmation or find the information needed within the confirmation that leads them through the process of changing the order or any address or payment information.

Readying the Order. Once the order has been confirmed, the next step is to ready the order's contents for delivery to the client. In some instances, assembly or special creation may be required. For example, a custom-order T-shirt company may have to silk screen T-shirts with a specific image for an order. In other instances, an order will be "picked and packed" from existing inventory by warehouse workers and then simply double-checked for accuracy before shipping.

Billing and Charging the Customer. A customer can be billed and charged immediately when they order online. Usually this requires the customer to input credit card information or checking account and bank routing numbers into fields on a Web site's point-of-sale page. In other sales settings, the customer will be charged immediately by a sales staff member; in some cases, a customer can be charged upon delivery of the item.

Shipping the Product. Often times, an order will not be shipped until payment has cleared. Payment will also usually include the cost of shipment, which is determined by the customer's choice of regular or some method of expedited shipping. Each fulfillment house will use a different method for shipping goods, but popular choices include UPS, DHL, the United States Postal Service, and Federal Express.

Returns and Exchanges. If a customer is shipped the wrong item or if upon receipt the customer is unhappy, the firm in charge of fulfillment will be asked to remedy the situation by use of its return or exchange policy. In some cases, no refunds are granted but exchanges for other products are allowed. In other cases, a firm will allow exchange for credit or simply exchange the product with the same product of the correct size, shape, or color.

OUTSOURCING FULFILLMENT

There are pros and cons to outsourcing fulfillment. One of the major advantages is not having to worry about the cost or space needed to warehouse goods. Additionally, contracting a fulfillment house frees up employees from packing orders, dealing with returns and exchanges, and keeping tabs on warehouse inventory. In this way employees can be hired to focus on other aspects of maintaining and accelerating the growth of a firm. Choosing a fulfillment house is not always an easy choice; final decisions should be based on price, proximity, and range of services offered.

While outsourcing fulfillment has its advantages, by doing so a business eliminates a critical avenue of contact between itself and the consumer. If order processing goes smoothly, all is well, but businesses run the risk of losing customers if the customer has trouble dealing with the outsourced fulfillment agency. If there is a problem of some kind (such as a delay or a lost order), many customers will wonder why they are dealing with a third party (the outsourced firm), and not speaking directly to someone at the business itself. In other words, having satisfied customers by using a more expensive, in-house fulfillment center might leave a company better off than if it switched to a less-expensive outsourced fulfillment agency that somewhat alienates its customer base. With this and other potential problems in mind, businesses should take extreme caution to insure that the advantages to outsourcing fulfillment are not outweighed by a decrease in customer service.

BIBLIOGRAPHY
Anderson, David M. *Built-to-Order & Mass Customization; The Ultimate Supply Chain Management and Lean Manufacturing Strategy for Low-Cost On-Demand Production without Forecasts or Inventory* Cambria, CA: CIM Press, 2008.

Henderson, Danna. "Outsourcing E-commerce Order Fulfillment." Available from: http://entrepreneurs.about.com/od/beyondstartup/a/orderfulfill.htm.

Mulcahy, David E. *Eaches or Pieces Order Fulfillment, Design, and Operations Handbook.* Boca Raton, FL: Auerbach Publications, 2007.

FUTURING

Futuring is the field of using a systematic process for thinking about, picturing possible outcomes, and planning for the future. Futurists are people who actively view the present world as a window on possible future outcomes. They watch trends and try to envision what might happen. Futuring has its roots in the post during the World War II era. Scientists, politicians, and academics began to consider ways of anticipating the future. This initial consideration led to a more cohesive and developed field of futuring in the mid-1960s. An association, the World Future Society, exists to provide a forum for further discussion and analysis.

Explorers often found themselves in situations where they had no idea what the future held for them. What was around the next bend, over the next mountain range, or across the next river was a complete unknown. They were forced to make decisions that were literally life and death. Futurists can look to these explorers for guidance. Edward Cornish, former president of the World Future Society, highlights seven lessons that can be learned: (1) prepare for what you will face in the future; (2) anticipate future needs; (3) use poor information when necessary; (4) expect the unexpected; (5) think long term as well as short term; (6) dream productively; and (7) learn from your predecessors.

A major instigator of forecasting the future is the incredible rate of change that is taking place. Technologically, culturally, and environmentally change is all around and moving at a very fast rate. Mankind has lived through the Agricultural, Industrial, and Cybernetic Revolutions. There will undoubtedly be another, if not several more, revolutions that will affect the planet. Futuring delves into this process of revolutions to attempt to forecast what might be the next one. Cornish discusses six current "super trends" that are dramatically affecting the present and the future.

- **Technological Progress.** Improvements in computers, medicine, transportation, communications, and other industries are all affected by technology.

- **Economic Growth.** Impacted by technological progress the improvement of people's economic well-being continues to steadily improve over time.

- **Improving Health.** Impacted by the aforementioned super trends—technological progress and economic growth—the average lifespan and overall health of the average person continues to improve over time.

- **Increased Mobility.** Technological progress, economic growth, and improving health combine to improve mobility of people and products, creating both advantages and disadvantages as the world shrinks.

- **Environmental Decline.** The scope of this progress and mobility and increasing population is impacting the earth with severe environmental issues that do not have a short-term solution.

- **Increasing Deculturation.** Mankind has had a wide variety of cultures and races; due to some of the above trends, these cultures are being erased by poverty, migration, and tourism.

FORCES THAT AFFECT THE FUTURE

Futurists must account for several powerful forces that impact future events and trends. These forces are systems, chance, and chaos.

Systems. Systems exist in most every setting. Relationships between people, the human body, and cities sewage and transportation services are all examples of systems. Actions that impact one part of the system can inevitably affect other parts of the system.

Chance. Chance events occur continuously. These events can shape future outcomes. Small actions or details can have a profound effect that can cause major worldwide events.

Chaos. Chaos is the idea that minor differences in something can have a profound effect on other things and then inevitably on the future. This means that there is always a wide array of possible outcomes; only extremely minor differences separate these possible outcomes from actually happening.

These three forces: systems, chance, and chaos, must all be considered at some level if a person is to try and forecast the future.

FUTURING METHODS

Futuring is accomplished by rather normal means of forecasting. There are four methods used in futuring to determine possible outcomes. These methods are: polling, gaming, modeling and simulation, and visioning.

Polling. Polling is a method that involves consulting with others, preferably experts, who are knowledgeable on the topic in question. It consists of a series of questions to elicit responses that are then collated to determine what

the overall perception of the group is. This is best performed when the participants cannot interact with each other and bias their answers.

Gaming. Another method of forecasting that is used by researchers, and especially by the government, is gaming. Gaming is a method of possible events where participants are placed in mock situations and are expected to make actual decisions based on the information and actions that are happening around them. Gaming possible events and situations with computer simulations is becoming more popular. Gaming assists with understanding how people will react in their roles and what possible outcomes of a given situation might be.

Modeling and Simulation. Modeling is a method used in forecasting future outcomes. Modeling generally involves computer processing of data to provide possible outcomes. Data for the relevant variables is entered into the computer with the model then run repetitively with minor variations to observe potential outcomes.

Visioning. Many futurists use the visioning method to not only forecast, but to encourage potential futures. Visioning involves discussing and creating preferred futures. The result of visioning is a plan of action for following through with the ideas that are generated.

The different methods of forecasting the future can be used in a variety of settings depending on the people and information available. Other methods that are also used in futuring are:

- *Scanning*—systematic survey of information sources focusing on trends

- *Trend Analysis*—in-depth look at a specific trend and all of its related issues and elements

- *Trend Monitoring*—continuous monitoring of important trends

- *Trend Projection*—using numerical data to project where a trend should eventually end up

- *Brainstorming*—generating new ideas by small group interaction

- *Historical Analysis*—using historical events to anticipate current developments

- *Deja Viewing*—reviewing the past to determine if anything similar has happened

- *Bringing the Future to the Present*—looking ahead to the future and painting a picture of what you want to happen

- *Experience Hitchhiking*—gaining experience by "hitchhiking" with people who have gone through similar experiences already

SCENARIOS

Scenarios are recognized as an effective method for forecasting the future. Scenarios are beneficial in forecasting because they deal with the uncertainty of a situation. Scenario creation focuses on identifying what might happen. This allows for analyzing the problem and determining what the consequences might be in light of the information available and in light of our own reactions to possible events. Futurists often use five different variations of scenario building: (1) *Continuation*—things will continue much as they are now; (2) *Optimistic*—things will get considerably better; (3) *Pessimistic*—things will get considerably worse; (4) *Disaster*—things will go terribly wrong; and (5) *Miracle*—things will go stunningly well.

Each scenario is then given a percentage of probability on the likelihood that it will happen. Cost for each scenario in effort or outcome is important to consider. Scenarios assist in clarifying thinking about issues so that better decisions can be made.

WORLD FUTURE SOCIETY PREDICTIONS

The World Future Society brings together experts from around the world to report on future directions in their areas of expertise. The November 2007 issue of *The Futurist* contained the WFS's top predictions for the future. A sampling of the trends is provided here:

- **The world will have 1 billion millionaires by 2025.** Technology and globalization will drive this prosperity, but the world's newfound wealth will also cause problems like water shortages.

- **Commerce will become cashless.** As technology becomes more accessible, there will be more frequent counterfeiting attempts, pushing society toward cash-free commerce. All transactions will be processed instantaneously and "grace periods" will no longer exist.

- **The U.S. federal deficit will worsen.** America's fiscal imbalance will become even worse if federal spending continues along its current trend. In twenty years, the deficit will become unsustainable and reach more than 10 percent of the economy.

- **The world population will reach 9.2 billion people by 2050.** Previous estimates of population growth have been adjusted due to increased longevity in richer countries and slower than expected decreases in fertility in developing countries. At the same time,

infant mortality rates may rise due to HIV/AIDS and other issues.

- **Water shortages will be a continuing problem for much of the world.** Implications of this include: (1) the growth of famine and desertification in developing areas of the world; (2) water wars are possible in certain areas of the world; and (3) water impurities will become a growing problem.

- **A major species will become extinct.** As a result of overpopulation, increased resource consumption, and environmental destruction, the earth will experience a species extinction event 100 to 1,000 times greater than any experienced since the dawn of humanity.

- **The United States will experience an osteoporosis epidemic.** Currently 34 million Americans have a condition that is considered a precursor to osteoporosis, a number that is projected to grow to 47 million by 2020.

- **Generation X and Y will be far more likely to choose the wrong career path than their predecessors.** This effect will be caused by unrealistic expectations about a particular career.

- **Privacy as we know it will disappear.** As a result of the increase in cyber-exhibitionism as well as new surveillance technology, privacy will become a thing of the past.

Futurists are aware that random events can happen that can change the best forecasting; therefore, these techniques of trend-watching, reviewing past events, gaming, scenarios, and others all must allow for a certain amount of flexibility. Forces acting on any possible future include systems, chance, and chaos, as well as individual choice.

Developing the skills and techniques to see into the future is neither magic nor unattainable. Futurists are leading the way to envisioning possible futures. They believe that developing effective foresight can lead to better decision-making, greater discoveries, and an improved future. Futurists challenge the concept of fatalism—that the future is coming and there is nothing we can do about it. Using these forecasting methods, individuals can change and guide their future. They are in a position to positively influence their future, which can potentially make things better for others and possibly change the world.

SEE ALSO *Brainstorming; Forecasting; Gap Analysis; Strategic Planning Tools; Strategy Implementation; Strategy in the Global Environment; Technology Management; Technology Transfer*

BIBLIOGRAPHY
"The Art of Foresight." *Futurist* 38, no. 3 (2004): 31–37.
Cetron, M.J. "Trends Now Shaping the Future." *Futurist* 39, no. 2 (2005): 27–42.

———. "Trends Now Shaping the Future." *Futurist* 39, no. 3 (2005): 37–50.
Cornish, E. *Futuring: The Exploration of the Future.* Bethesda, MD: World Future Society, 2004.
May, T.A. "Tricks of the Futuring Trade." *Computerworld* 38, no. 12 (2004): 23.
Orell, David. *The Future of Everything: The Science of Prediction.* New York: Basic Books, 2008.
"Outlook 2008: recent forecasts from World Future Society for 2008 and beyond." *The Futurist.* Available from: http://www.allbusiness.com/government/public-finance-government-budgets/5523416-1.html
Taylor, C. "Looking Ahead in a Dangerous World." *Time* 11 October 2004, 60–61.

FUZZY LOGIC

Most analytical and computational processes use strict (crisp) logic parameters to control their functions. They define objects simply in aspects of positive or negative, on or off. This is known as Boolean logic, and it is the same logic computer circuits use and system programmers use to code simple fragments of data with 0s and 1s that build up packets of information. Boolean logic is limited to certain basic pieces of definition, using AND, OR, and NOT statements to control variables. AND refers to two inclusive possibilities, OR refers to exclusive possibilities, while NOT refers to a negative result that excludes all values.

Fuzzy logic, on the other hand, deals with multiple possibilities, the area between the digits 1 and 0, the semantics of analysis, and the grayer areas between *true* and *false*. This is referred to with such concepts as "degrees of truth," fractional values that are not opposites. Since most business decisions involve more than one value, none of which are directly opposed, fuzzy logic has a wide variety of applications in analyzing data, comparing decisions, and evaluating automatic responses. Such statements as "the boy is tall" or "this room is very warm" cannot be expressed in true or false definitions, because peoples' perceptions of these events vary. Not everyone agrees on an exact height that signifies tall, just as no one defines a room as "very warm" at a precise temperature. It is these nonprecise qualities that fuzzy logic seeks to explain.

As seen in the example above, fuzzy logic can be shone graphically as the entire series of possibilities intersecting with one another. Cold, warm, and hot are all possibilities, but according to input data they intersect one another, based on general perception—there are certain temperatures that some would consider hot, others merely warm. A thermostat, then, can theoretically be set to respond according to nonprecise variables, shown in IF and THEN statements. These statements are conditioned by the input data—IF a situation manifests, THEN a specific response is chosen. The statements neither include nor exclude any

variables, but wait on actions of the system. IF-THEN concepts are flexible, and they form the basis of fuzzy logic.

IF-THEN statements of fuzzy logic can be elaborated upon by using "hedges." A hedge is an intuitive, linguistic descriptor that fuzzy logic allows to be expressed mathematically. "Very," for instance, is a hedge that usually implies the square of a value in fuzzy logic. "Somewhat," "sort of," and "more or less" are other examples of hedges used to define IF-THEN statements.

Fuzzy sets are theory sets that cannot be easily defined through crisp logic. These age sets—young, middle-aged, old—are examples of fuzzy sets, since their parameters are subjective, depending on the views of those within the sets and those perceiving the sets as a whole. In the early twentieth century, philosopher and mathematician Bertrand Russell famously suggested that set theory as a whole suffered from fuzzy dilemmas, since a set including all sets may not be of the same nature as the sets within it—the set, for instance, of all age groups must include itself, yet a set of sets is not an age group.

Fuzzy sets are usually defined as the entire system, the data inputted, and the data received. The data inputs and outputs may be crisp and rigidly defined, but the overall system is an IF-THEN, fuzzy process. Inputs and outputs may also either be crisp or fuzzy, so fuzzy systems can come in many types, as required by programmers or analysts. One of the most common types of fuzzy sets is referred to as a *type 2* fuzzy logic set, or a set consisting of many fuzzy situations that culminate in one output under a single classification. These type 2 fuzzy sets are necessary for business applications where numerous sets of data come together to form a practical decision.

Fuzzy logic sets, or FLs, is one of the four main types of fuzzy logic. There are several commonly used types of fuzzy sets in this type of fuzzy logic, including L-Fuzzy sets, bipolar fuzzy sets, and intuitionistic fuzzy sets. These sets are "granulated," or split apart through intuitive means. For instance, the category of Age as seen in the example is granulated into three different sets based on similarity, proximity, and human reasoning. The second type of fuzzy logic is FLl, or the narrowest sense of fuzzy logic, the "l" standing only for logic. FLl deals with generalizations, philosophic insights into fuzzy procedures. The third type of fuzzy logic, fuzzy logic estimator (Fle), works with knowledge and semantics. A great deal of fuzzy logic depends on language and the way words are understood within cultures. This linguistic function is very important in applying fuzzy logic to real-life situations, and programmers of fuzzy systems must be very aware of language implications. The last type of fuzzy logic is FLr, or relational fuzzy logic that deals with the IF-THEN statements that govern fuzzy responses. Some IF-THEN situations can depend on other IF-THEN choices, creating a relational chain representing realistic events.

HISTORY OF FUZZY LOGIC

Many trace the origins of fuzzy logic back to Plato and Aristotle, both of whom explored the idea of the "excluded middle." This theory assumes that logic deals with Boolean concepts, true or false statements that held no room for middle ground. This is the opposite of fuzzy theory, which deals with the excluded middle especially; Aristotle, in creating the excluded middle concept, also made way for its counterpart.

Bertrand Russell began to explore the limits of logic by questioning set theories in the early twentieth century, and others began developing ultra-logic systems to explain more complicated situations. It was not until 1961, when electronic circuits were used to demonstrate how programmed responses could be inclusive, that fuzzy logic concepts found their way into thesis papers. In 1965, Lotfi Zadeh, considered by many as the father of modern fuzzy logic, wrote the paper "Fuzzy Sets," which defined the field and gave the concept its name. Contrary to linguistic assumptions, fuzzy sets do not come up with fuzzy results—they take imprecise concepts and assign mathematical values to them to produce very clear and precise data. Zadeh created an algebra for fuzzy sets so that they could be applied to real life questions.

In the 1970s, active applications of fuzzy logic slowed. A scientist by the name of Ebrahim Mamdani designed a fuzzy logic program for a steam engine. Most practical work on fuzzy logic was used by NASA on space programs and various flexible life support technology. Other countries, however, most notably Japan, proved more eager to use fuzzy logic in public technology; Japan achieved success in several famous fuzzy systems, including a subway. By the 1990s, programmers were beginning to make use of some flexibilities in fuzzy logic through their coding, and before long, businesses were considering fuzzy logic in everything from appliance creation to corporate decision making. Today, a number of technologies use fuzzy logic to become more adaptive and powerful. Fuzzy data mining, one of the newest fields for companies, is still evolving into a useful tool.

BUSINESS USES FOR FUZZY SYSTEMS

Daily, corporations face events that either defy prediction or are difficult to respond to, given traditional analysis methods. The use of fuzzy logic in finding answers to these problems is often referred to as *uncertainty management*. The more adaptable systems and business reactions are (using IF-THEN statements), the more fuzzy logic they implement. Many businesses employ fuzzy logic abilities without even knowing it, bypassing the mathematical basis.

Fuzzy logic also helps businesses with entrepreneurial goals, offering more flexibility for the "fuzzy front end,"

or the point when radical innovation meets the market. It is here that more organic, fuzzy systems are being put into play, reducing costs and increasing efficiency and decision making. The tenets of a fuzzy approach to such innovation are known to many managers and are becoming widespread business concepts. Such practices include the following:

- Always have a plan, and consistently improve understanding of consumers and the market.

- Expect that the plan will change. Companies refuse to entertain illusions that their master plan can succeed unaltered. The act of entering the market will automatically create changes in any plan.

- Make decisions before it is too late, without overanalyzing or waiting too long for data that will never be fully complete.

- Be on guard for new developments in the industry and new technologies that can change existing business methods.

- Balance customer feedback with potential, not giving either side too much weight in business decisions.

- Focus on opportunities and capabilities rather than purely on financial returns.

DATA MINING AND OTHER ANALYSIS

As businesses move on in their endeavors, fuzzy logic can be implemented in data mining, forecasting, and Internet tools. Data mining is one of the newest fuzzy logic fields, where new methods can be used to sort information according to applicability. While data mining programs have greatly increased in complexity and efficiency, fuzzy logic can add a relational aspect, allowing data to be sorted according to its relationship with other data sets. A good example is financial analysis—a company may have several different levels of possible financial outcomes, showing a range of earnings in which the business will fall. Fuzzy logic can take all those earnings, assign values to them based on objectives (good, not bad, poor, more than expected), and create useful forms of analysis through these "belief possibilities." A company will then know, based on intuitive notions and past performance, the likely earnings for the next quarter and where that falls in their hedged rating system.

In 2001, Lotfi Zadeh stated that fuzzy logic was the "brainware of the Internet." By this he meant that the Internet as a whole is approximate, dealing not with true or false information but with the "degrees of truth" in between. This is mostly due to linguistic fuzziness, in which words have general, not specific meanings, creating an e-commerce environment where such headings as "very cheap" or "slightly used" have only approximate values. This is seen clearly in Internet search engines, where crisp logic often fails and fuzzy logic often succeeds. A user attempting to search by crisp logic might set parameters so severe (including such exact variables as cost, location, accommodation, and deadlines) that the search produces no results. A fuzzy searcher, on the other hand, will know what level of impreciseness is necessary to produce useful search results.

This fuzzy online searching becomes very important to businesses when they construct their own search engines, whether for common use or for their online stores. Many search engines use Boolean logic AND and OR statements to search for keywords and related information, which is the reason crisp logic users have difficulties finding needed information. Search engines, however, can be constructed using fuzzy logic, so that AND and OR statements are granulated to include a range of possibilities more applicable to the search (such as costs above and below a searched cost). Also, fuzzy search engines can be easily tailored to individual use, allowing companies to personalize online stores for their customers who will find the more they search, the more the search engine understands their needs and produces results tuned into their interests.

By using these and other fuzzy logic concepts, companies can improve their analysis and the ways they conduct business. Other advantages of fuzzy logic for business, as shown in Hossein Bidgoli's 1998 book *Intelligent Management Support Systems*, include:

- **Simplicity**. Fuzzy logic removes areas of technicality from mathematic modeling, allowing models to be based more on intuitive phrases and goals than only on formulas. Fuzzy logic's IF-THEN statements allow for more streamlined analysis without the lengthy rules needed by crisp logic.

- **Contradiction**. Since fuzzy logic does not need to decide between two opposing choices, contradictions that crisp logic would not be able to handle can be included. This is very helpful to programmers, who can use IF-THEN statements to deal with contradictory options, putting the contradictions into multiple sets based on their applicability.

- **Reduced development time**. Analysis made with fuzzy logic will not take as long, since much of the data analysts need is immediately available based on relationship parameters. Fuzzy analysis can also be conducted focusing on objectives and objective phrases instead of getting lost in formulas and numbers the more traditional analysis methods sometimes fall into.

- **System autonomy**. Fuzzy systems' rules function independently of each other. This means that one rule can be faulty without affecting the efficiency of the other rules included in the system. Fuzzy systems

can survive these errors in a crisis, whereas crisp logic programs might flounder. Such fuzzy systems can be tested by removing rules sequentially to test each possibility.

- **Expert systems**. Expert systems can be combined with fuzzy systems with excellent results. Superior information and application is bolstered by adaptability and evolving processes, creating a powerful tool of analysis that produces degrees of possibility instead of a more dangerous single decision.

FUZZY LOGIC AND NEURAL NETWORKS

One of the principle technological uses for fuzzy logic lies in neural networks (NN). Neural networks operate through relationships found in data, and they are based on the way human brains interact with information. A neural network is made from a complex system of nodes, interconnected elements that contain related pieces of data. Each node is a separate system, but it is also related to other nodes as necessary. Neural networks are applauded for their learning capabilities and adaptive qualities that allow them to respond effectively to a variety of situations and intuitively gather important sets of data for analysis.

Fuzzy logic is one of the principles used in the creation of neural networks. Fuzzy sets allow the networks to choose between different pieces of information as needed, including any knowledge that may be applicable.

EXAMPLES OF FUZZY LOGIC TECHNOLOGY

Subway systems. One of the most famous applications of fuzzy logic occurred in the early 1980s, when Japan created a subway system in the city of Sendai based upon fuzzy logic mathematics. This control, created by Hitachi Ltd., is regarded as the first practical use of fuzzy technology. According to programming created by Hitachi engineers, the subway system automatically responded to changes from many incoming variables. The subway would speed up, slow down, stop, or start based on this information. Small fluctuations in velocity, weight, direction, incline, and speed relative to maximum and minimum speeds all had their impact on the subway. This was considered an improvement over human drivers who made more errors and had worse reaction times than the fuzzy programming. The fuzzy logic also out-performed crisp logic systems, which could not equal the smooth, continuous subway motions of the Sendai controller. This subway spawned many other lines of fuzzy logic programming in Japan.

Air conditioning. One of the most popular uses for fuzzy logic is in climate control systems for commercial buildings such as offices. A fuzzy programming system can anticipate subtle changes in the atmosphere and alter climate control units to respond.

TV clarity. Normal TVs operate by illuminating approximately 525 scanning lines with electronic pulses at intervals. Half of the electron lines are lit to form the picture, followed by the other half, and the alternation produces picture quality and resolution. This process loses much of the information, a problem that high definition television sets bypass by utilizing over a thousand scanning lines. These normal TV functions were combined with fuzzy logic by Sony engineers in the early 1990s to produce an adapting TV set that compared different parts of the incoming signal to "perfect" images held with the TV database. The TV then altered the image immediately to create as perfect a picture as it could. Today's LCD and high definition screens use other methods to improve clarity, but fuzzy logic can still maintain clarity for video imaging.

Elderly care. In the late 2000s, The University of Missouri—in collaboration with the English De Montfort University (DMU)—is conducting a study on improving centers for care of the elderly by implementing fuzzy logic systems. These systems work through a series of sensors that can be placed throughout homes for elderly care. With fuzzy logic, sensors can tell the difference between normal background noise, heat, and rhythms, and the functions of the people at the home. Sleep patterns, respiratory patterns, and pulse feedback can all give valuable information to the system. Health problems can be discovered, and emergency care automatically sent for if required. To preserve privacy, no sensors are video enabled.

Household appliances. Many household appliances currently use fuzzy systems to regulate their performance. Washing machines can tell how large a load is and respond appropriately based on what wash cycle the user wants. Refrigerators can also use fuzzy logic to cool different sections of the refrigerator correctly.

Traffic management. Traffic management systems require a certain amount of intelligence from either crisp logic directions or fuzzy logic parameters. Because of the constantly shifting traffic situations, fuzzy logic has proved to be more useful in anticipating problems. It is difficult to create any models of traffic, but IF-THEN logic can deal with vague expectations and respond to situations. People looking for traffic advice have different perspectives and human needs that cannot be easily quantified—the better a fuzzy system is at predicting traffic, the more trust drivers have in the process, and the smoother the system runs.

ISSUES WITH FUZZY LOGIC

Although fuzzy systems can be very simple to use, they are not necessarily easy to create. A large amount of work goes into creating fuzzy logic programs, and the more variables there are, the more complicated the creation

can be. This is known as the *curse of dimensionality*—every new variable that fuzzy systems have to deal with increases its complexity exponentially. The larger the system grows, the more server space it takes and the less precise it will be.

When a fuzzy logic application is developed, it must also be utilized effectively. People must learn to mine fuzzy systems for proper information and utilize data received effectively. The knowledge fuzzification produces is only good if businesses can take the results and make high quality decisions.

BIBLIOGRAPHY

Bidgoli, Hossein. *The Internet Encyclopedia.* John Wiley and Sons, 2004.

Bidgoli, Hossein. *Intelligent Management Support Systems.* Greenwood Publishing Group, 1998.

Castillo, Oscar, and Patricia Melin. *Type-2 Fuzzy Logic: Theory and Applications.* Springer, 2008.

Ferguson, Tim. "Fuzzy Logic Tech Project to Help Elderly." *Silicon.com.* CNET Networks, Inc, 2008.

Kay, Russel. "Quickstudy: Fuzzy Logic." *Computer World,* August 2008. Available from: http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=95497&pageNumber=1.

Kosko, Bart and Isaka, Satoru. "Fuzzy Logic." *Scientific American.* July 1993.

Kotelnikov, Vadim. "The Fuzzy Front End and Fuzzy Logic." *1000ventures.com,* 2008. Available from: http://www.1000ventures.com/business_guide/im_process_ffe.html.

Nanda, S., and G.P. Raja Sehkar. *Combinatorial and Computational Mathematics.* Alpha Science Int'l Ltd., 2004.

Plant, Robert, and Stephen Murrell. *An Executive's Guide to Information Technology.* Cambridge University Press, 2007.

Verbruggen, H. B., and Robert Babuska. *Fuzzy Logic Control: Advances in Application.* World Scientific, 1999.

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GAP ANALYSIS

Gap analysis generally refers to the activity of studying the differences between standards and the delivery of those standards. For example, it would be useful for a firm to document differences between customer expectation and actual customer experiences in the delivery of medical care. The differences could be used to explain satisfaction and to document areas in need of improvement.

However, in the process of identifying the gap, a before-and-after analysis must occur. This can take several forms. For example, in lean management leaders perform a Value Stream Map of the current process. They then create a Value Stream Map of the desired state. The differences between the two define the "gap." Once the gap is defined, a game plan can be developed that will move the organization from its current state toward its desired future state.

Another tool for identifying the gap is a step chart. With the step chart, various "classes" of performance are identified—including world-class status. Then, current state and desired future state are noted on the chart. Once again, the difference between the two defines the "gap."

The issue of service quality can be used as an example to illustrate gaps. For this example, there are several gaps that are important to measure. From a service quality perspective, these include: (1) service quality gap, (2) management understanding gap, (3) service design gap, (4) service delivery gap, and (5) communication gap.

1. **Service Quality Gap.** Indicates the difference between the service expected by customers and the service they actually receive. For example, customers may expect to wait only 20 minutes to see their doctor but, in fact, have to wait more than thirty minutes.

2. **Management Understanding Gap.** Represents the difference between the quality level expected by customers and the perception of those expectations by management. For example, in a fast food environment, the customers may place a greater emphasis on order accuracy than promptness of service, but management may perceive promptness to be more important.

3. **Service Design Gap.** This is the gap between management's perception of customer expectations and the development of this perception into delivery standards. For example, management might perceive that customers expect someone to answer their telephone calls in a timely fashion. To customers, "timely fashion" may mean within thirty seconds. However, if management designs delivery such that telephone calls are answered within sixty seconds, a service design gap is created.

4. **Service Delivery Gap.** Represents the gap between the established delivery standards and actual service delivered. Given the above example, management may establish a standard such that telephone calls should be answered within thirty seconds. However, if it takes more than thirty seconds for calls to be answered, regardless of the cause, there is a delivery gap.

5. **Communication Gap.** This is the gap between what is communicated to consumers and what is actually delivered. Advertising, for instance, may indicate to consumers that they can have their cars' oil changed within twenty minutes when, in reality, it takes more than thirty minutes.

IMPLEMENTING GAP ANALYSIS

Gap analysis involves internal and external analysis. Externally, the firm must communicate with customers. Internally, it must determine service delivery and service design. Continuing with the service quality example, the steps involved in the implementation of gap analysis are:

- Identification of customer expectations
- Identification of customer experiences
- Identification of management perceptions
- Evaluation of service standards
- Evaluation of customer communications

The identification of customer expectations and experiences might begin with focus-group interviews. Groups of customers, typically numbering seven to twelve per group, are invited to discuss their satisfaction with services or products. During this process, expectations and experiences are recorded. This process is usually successful in identifying those service and product attributes that are most important to customer satisfaction.

After focus-group interviews are completed, expectations and experiences are measured with more formal, quantitative methods. Expectations could be measured with a one-to-ten scale where one represents "Not At All Important" and ten represents "Extremely Important." Experience or perceptions about each of these attributes would be measured in a similar manner.

Gaps can be simply calculated as the arithmetic difference between the two measurements for each of the attributes. Management perceptions are measured much in the same manner. Groups of managers are asked to discuss their perceptions of customer expectations and experiences. A team can then be assigned the duty of evaluating manager perceptions, service standards, and communications to pinpoint discrepancies. After gaps are identified, management must take appropriate steps to fill or narrow the gaps.

THE IMPORTANCE OF SERVICE QUALITY GAP ANALYSIS

The main reason gap analysis is important to firms is the fact that gaps between customer expectations and customer experiences lead to customer dissatisfaction. Consequently, measuring gaps is the first step in enhancing customer satisfaction. Additionally, competitive advantages can be achieved by exceeding customer expectations. Gap analysis is the technique utilized to determine where firms exceed or fall below customer expectations.

Customer satisfaction leads to repeat purchases and repeat purchases lead to loyal customers. In turn, customer loyalty leads to enhanced brand equity and higher profits. Consequently, understanding customer perceptions is important to a firm's performance. As such, gap analysis is used as a tool to narrow the gap between perceptions and reality, thus enhancing customer satisfaction.

In the early twenty-first century, work by innovation expert Anthony Ulwick discusses the limitations of popular qualitative research methods, including gap analysis. In his book *What Customers Want: Using Outcome-Driven Innovation to Create Breakthrough Products and Services*, Ulwick writes that gap analysis considers only the difference between importance and satisfaction. As an alternative, Ulwick has devised a tool focused on opportunity for customer satisfaction, which yields data about outcomes that would lead to highest customer satisfaction.

PRODUCT APPLICATIONS

It should be noted that gap analysis is applicable to any aspect of industry where performance improvements are desired, not just in customer service. For example, the product quality gap could be measured by (and is defined as) the difference between the quality level of products expected by customers and the actual quality level. The measurement of the product quality gap is attained in the same manner as above. However, while service delivery can be changed through employee training, changes in product design are not as easily implemented and are more time consuming. Many product innovation experts are discussing new methods of gathering requirements for product design.

Gap analysis can be used to address internal gaps. For example, it is also applicable to human resource management. There may be a gap between what employees expect of their employer and what they actually experience. The larger the gap is, the greater the job dissatisfaction. In turn, job dissatisfaction can decrease productivity and have a negative effect on a company's culture.

Ford Motor Co., for example, utilized gap analysis while developing an employee benefit program. While management may believe it has a handle on employee perceptions, this is not always true. With this in mind, Ford's management set out to understand employee desires regarding flexible benefits. Their cross-functional team approach utilized focus groups, paper and pencil tests, and story boards to understand employee wants and needs. Their team, consisting of finance, human resources, line managers, benefits staff, and consultants, identified gaps in benefit understanding, coverage, and communications. As a result of gap analysis, Ford implemented a communications program that gained employee acceptance.

BIBLIOGRAPHY

Bettencourt, Lance, and Anthony Ulwick. "Giving Customers a Fair Hearing." *MIT Sloan Management Review* 49, no. 3, (2008): 62–68

Bettencourt, Lance, and Anthony Ulwick. "The Customer-Centered Innovation Map." *Harvard Business Review.* May 2008.

Chakrapani, Chuck. *The Informed Field Guide for Tools and Techniques: How to Measure Service Quality and Customer Satisfaction.* Chicago: American Marketing Association, 1998.

Frost, Julie. "Narrowing the Perception Gap: A Study in Employee Benefit Communications." *Compensation & Benefits Management* 14, no. 2 (1998): 22–28.

Fuller, Neil. "Service Quality Control." *Supply Management* 3, no. 19 (1998): 48.

———. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

Parasuraman, Valerie Z., and Leonard L. Berry. "SERVQUAL: A Multiple-Item Scale for Measuring Customer Perceptions of Service Quality." *Journal of Retailing* 64, no. 1 (1988): 12–40.

Plenert, Gerhard. *The eManager: Value Chain Management in an eCommerce World.* Dublin, Ireland: Blackhall Publishing, 2001.

Ulwick, Anthony. *What Customers Want: Using Outcome-Driven Innovation to Create Breakthrough Products and Services.* New York: McGraw-Hill, 2005.

GENERIC COMPETITIVE STRATEGIES

Three of the most widely read books on competitive analysis in the 1980s were Michael Porter's *Competitive Strategy*, *Competitive Advantage*, and *Competitive Advantage of Nations*. In his various books, Porter developed three generic strategies that, he argues, can be used singly or in combination to create a defendable position and to outperform competitors, whether they are within an industry or across nations. Porter states that the strategies are generic because they are applicable to a large variety of situations and contexts. The strategies are (1) overall cost leadership; (2) differentiation; and (3) focus on a particular market niche. The generic strategies provide direction for firms in designing incentive systems, control procedures, and organizational arrangements. Following is a description of this work.

OVERALL COST LEADERSHIP STRATEGY

Overall cost leadership requires firms to develop policies aimed at becoming and remaining the lowest-cost producer and/or distributor in the industry. Company strategies aimed at controlling costs include construction of efficient-scale facilities, tight control of costs and overhead, avoidance of marginal customer accounts, minimization of operating expenses, reduction of input costs, tight control of labor costs, and lower distribution costs. The low-cost leader gains competitive advantage by getting its costs of production or distribution lower than those of the other firms in its market. The strategy is especially important for firms selling unbranded commodities such as beef or steel.

Figure 1
Competitive Advantage Through Low Cost Leadership
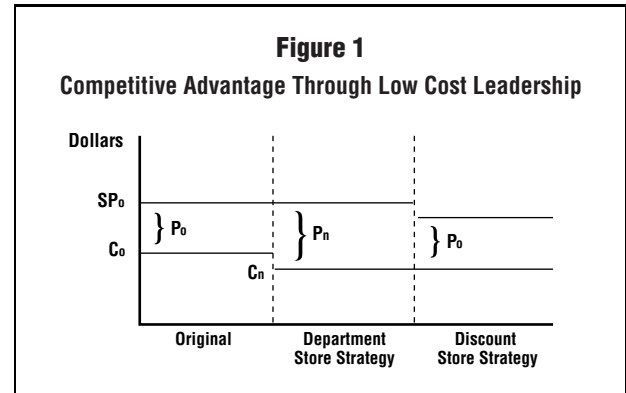
Figure 1 shows the competitive advantage firms may achieve through cost leadership. C is the original cost of production. C is the new cost of production. SP is the original selling price. SP is the new selling price. P is the original profit margin. P is the new profit margin.

If we assume our firm and the other competitors are producing the product for a cost of C and selling it at SP, we are all receiving a profit of P. As cost leader, we are able to lower our cost to C while the competitors remain at C. We now have two choices as to how to take advantage of our reduced costs.

1. Department stores and other high-margin firms often leave their selling price as SP, the original selling price. This allows the low-cost leader to obtain a higher profit margin than they received before the reduction in costs. Since the competition was unable to lower their costs, they are receiving the original, smaller profit margin. The cost leader gains competitive advantage over the competition by earning more profit for each unit sold.

2. Discount stores such as Wal-Mart are more likely to pass the savings from the lower costs on to customers in the form of lower prices. These discounters retain the original profit margin, which is the same margin as their competitors. However, they are able to lower their selling price due to their lower costs (C). They gain competitive advantage by being able to underprice the competition while maintaining the same profit margin.

Overall cost leadership is not without potential problems. Two or more firms competing for cost leadership may engage in price wars that drive profits to very low levels. Ideally, a firm using a cost leader strategy will develop an advantage that is not easily copied by others. Cost leaders also must maintain their investment in state-of-the-art equipment or face the possible entry of more cost-effective competitors. Major changes in technology may drastically change production processes so that previous investments in

production technology are no longer advantageous. Finally, firms may become so concerned with maintaining low costs that needed changes in production or marketing are overlooked. The strategy may be more difficult in a dynamic environment because some of the expenses that firms may seek to minimize are research and development costs or marketing research costs, yet these are expenses the firm may need to incur in order to remain competitive.

DIFFERENTIATION STRATEGY

The second generic strategy, differentiating the product or service, requires a firm to create something about its product or service that is perceived as unique throughout the industry. Whether the features are real or just in the mind of the customer, customers must perceive the product as having desirable features not commonly found in competing products. The customers also must be relatively price-insensitive. Adding product features means that the production or distribution costs of a differentiated product may be somewhat higher than the price of a generic, non-differentiated product. Customers must be willing to pay more than the marginal cost of adding the differentiating feature if a differentiation strategy is to succeed.

Differentiation may be attained through many features that make the product or service appear unique. Possible strategies for achieving differentiation may include:

- warranties (e.g., Sears tools)
- brand image (e.g., Coach handbags, BMW automobiles)
- technology (e.g., Apple iPhone)
- features (e.g., Jenn-Air ranges)
- service (e.g., Makita hand tools)
- quality/value (e.g., Pixar Animation Studios)
- dealer network (e.g., Caterpillar construction equipment)

Differentiation does not allow a firm to ignore costs; it makes a firm's products less susceptible to cost pressures from competitors because customers see the product as unique and are willing to pay extra to have the product with the desirable features. Differentiation can be achieved through real product features or through advertising that causes the customer to perceive that the product is unique.

Differentiation may lead to customer brand loyalty and result in reduced price elasticity. Differentiation may also lead to higher profit margins and reduce the need to be a low-cost producer. Since customers see the product as different from competing products and they like the product features, customers are willing to pay a premium for these features. As long as the firm can increase the selling price by more than the marginal cost of adding the features, the profit margin is increased. Firms must be able to charge more for their differentiated product than it costs them to make it distinct, or else they may be better-off making generic, undifferentiated products. Firms must remain sensitive to cost differences. They must carefully monitor the incremental costs of differentiating their product and make certain the difference is reflected in the price.

Firms pursuing a differentiation strategy are vulnerable to different competitive threats than firms pursuing a cost leader strategy. Customers may sacrifice features, service, or image for cost savings. Customers who are price sensitive may be willing to forgo desirable features in favor of a less costly alternative. This can be seen in the growth in popularity of store brands and private labels. Often, the same firms that produce name-brand products produce the private-label products. The two products may be physically identical, but stores are able to sell the private-label products for a lower price because very little money was put into advertising in an effort to differentiate the private-label product.

Imitation may also reduce the perceived differences between products when competitors copy product features. Thus, for firms to be able to recover the cost of marketing research or R&D, they may need to add a product feature that is not easily copied by a competitor.

A final risk for firms pursuing a differentiation strategy is changing consumer tastes. The feature that customers like and find attractive about a product this year may not make the product popular next year. Changes in customer tastes are especially obvious in the apparel industry. Polo Ralph Lauren has been a very successful brand in the fashion industry. However, some younger consumers have shifted to Abercrombie and Fitch, Aeropostale, and other youth-oriented brands.

Ralph Lauren, founder and CEO, has been the guiding light behind his company's success. Part of the firm's success has been the public's association of Lauren with the brand. Ralph Lauren leads a high-profile lifestyle of preppy elegance. His appearance in his own commercials, his Manhattan duplex, his Colorado ranch, his vintage car collection, and private jet have all contributed to the public's fascination with the man and his brand name. This image has allowed the firm to market everything from suits and ties to golf balls. Through licensing of the name, the Lauren name also appears on sofas, soccer balls, towels, tableware, and much more.

COMBINATION STRATEGIES

Can forms of competitive advantage be combined? Porter asserts that a successful strategy requires a firm to aggressively stake out a market position, and that different strategies involve distinctly different approaches to

competing and operating the business. An organization pursuing a differentiation strategy seeks competitive advantage by offering products or services that are unique from those offered by rivals, either through design, brand image, technology, features, or customer service. Alternatively, an organization pursuing a cost leadership strategy attempts to gain competitive advantage based on being the overall low-cost provider of a product or service. To be "all things to all people" can mean becoming "stuck in the middle" with no distinct competitive advantage. The difference between being "stuck in the middle" and successfully pursuing combination strategies merits discussion. Although Porter describes the dangers of not being successful in either cost control or differentiation, some firms have been able to succeed using combination strategies.

Research suggests that, in some cases, it is possible to be a cost leader while maintaining a differentiated product. One example is Netflix. Its online/mail order approach to video rental is a low-cost alternative to the overhead involved with a brick-and-mortar store (i.e. Blockbuster or Hollywood Video). At the same time, it is differentiated in the marketplace because it offers DVD rentals with no late fees.

Another firm that has pursued an effective combination strategy is Nike. When customer preferences moved to wide-legged jeans and cargo pants, Nike's market share slipped. Competitors such as Adidas offered less expensive shoes and undercut Nike's price. Nike's stock price dropped in 1998 to half its 1997 high. However, Nike reported a 70 percent increase in earnings for the first quarter of 1999 and saw a significant rebound in its stock price. Nike achieved the turnaround by cutting costs and developing new, distinctive products. Nike reduced costs by cutting some of its endorsements. Company research suggested the endorsement by the Italian soccer team, for example, was not achieving the desired results. Michael Jordan and a few other "big name" endorsers were retained while others, such as the Italian soccer team, were eliminated, resulting in savings estimated at over $100 million. Firing 7 percent of its 22,000 employees allowed the company to lower costs by another $200 million, and inventory was reduced to save additional money. While cutting costs, the firm also introduced new products designed to differentiate Nike's products from those of the competition. Fast forward to 2008, and one can see that Nike has retained its role as a leading brand in the apparel industry. It has been chosen by *Fortune* magazine as the most admired apparel brand, for attributes including social responsibility, innovation, and financial soundness. Nike contracts with 700 factories worldwide and employs close to 800,000. For the fiscal year ending in May 2007, the company reported record revenues of 16.3 billion dollars, a 1.3 billion increase over the previous year's earnings, proving the staying power of its strategy.

Some industry environments may actually call for combination strategies. Trends suggest that executives operating in highly complex environments such as health care do not have the luxury of choosing exclusively one strategy over the other. The hospital industry may represent such an environment, as hospitals must compete on a variety of fronts. Combination (i.e., more complicated) strategies are both feasible and necessary to compete successfully. For instance, DRG-based reimbursement (diagnosis-related groups) and the continual lowering of reimbursement ceilings have forced hospitals to compete on the basis of cost. At the same time, many of them jockey for position with differentiation based on such features as technology and birthing rooms. Thus, many hospitals may need to adopt some form of hybrid strategy in order to compete successfully, according to Walters and Bhuian.

FOCUS STRATEGY

The generic strategies of cost leadership and differentiation are oriented toward industry-wide recognition. The final generic strategy, focusing (also called niche or segmentation strategy), involves concentrating on a particular customer, product line, geographical area, channel of distribution, stage in the production process, or market niche. The underlying premise of the focus strategy is that a firm is better able to serve a limited segment more efficiently than competitors can serve a broader range of customers. Firms using a focus strategy simply apply a cost leader or differentiation strategy to a segment of the larger market. Firms may thus be able to differentiate themselves based on meeting customer needs, or they may be able to achieve lower costs within limited markets. Focus strategies are most effective when customers have distinctive preferences or specialized needs.

A focus strategy is often appropriate for small, aggressive businesses that do not have the ability or resources to engage in a nationwide marketing effort. Such a strategy may also be appropriate if the target market is too small to support a large-scale operation. Many firms start small and expand into a national organization. For instance, Wal-Mart started in small towns in the South and Midwest. As the firm gained in market knowledge and acceptance, it expanded throughout the South, then nationally, and now internationally. Wal-Mart started with a focused cost leader strategy in its limited market, and later was able to expand beyond its initial market segment.

A firm following the focus strategy concentrates on meeting the specialized needs of its customers. Products and services can be designed to meet the needs of buyers. One approach to focusing is to service either industrial

buyers or consumers, but not both. Martin-Brower, the third-largest food distributor in the United States, serves only the eight leading fast-food chains. With its limited customer list, Martin-Brower need only stock a limited product line, its ordering procedures are adjusted to match those of its customers, and its warehouses are located so as to be convenient to customers.

Firms utilizing a focus strategy may also be better able to tailor advertising and promotional efforts to a particular market niche. Many automobile dealers advertise that they are the largest volume dealer for a specific geographic area. Other car dealers advertise that they have the highest customer satisfaction scores within their defined market or the most awards for their service department.

Firms may be able to design products specifically for a customer. Customization may range from individually designing a product for a customer to allowing customer input into the finished product. Tailor-made clothing and custom-built houses include the customer in all aspects of production, from product design to final acceptance. Key decisions are made with customer input. However, providing such individualized attention to customers may not be feasible for firms with an industry-wide orientation.

Other forms of customization simply allow the customer to select from a menu of predetermined options. Burger King advertises that its burgers are made "your way," meaning that the customer gets to select from the predetermined options of pickles, lettuce, and so on. Similarly, customers are allowed to design their own automobiles within the constraints of predetermined colors, engine sizes, interior options, and so forth.

Potential difficulties associated with a focus strategy include a narrowing of differences between the limited market and the entire industry. National firms routinely monitor the strategies of competing firms in their various submarkets. They may then copy the strategies that appear particularly successful. The national firm, in effect, allows the focused firm to develop the concept, and then the national firm may emulate the strategy of the smaller firm or acquire it as a means of gaining access to its technology or processes. Emulation increases the ability of other firms to enter the market niche while reducing the cost advantages of serving the narrower market.

Market size is always a problem for firms pursing a focus strategy. The targeted market segment must be large enough to provide an acceptable return so that the business can survive. For instance, ethnic restaurants are often unsuccessful in small U.S. towns, since the population base that enjoys Japanese or Greek cuisine is too small to allow the restaurant operator to make a profit. Likewise, the demand for an expensive, upscale restaurant is usually not sufficient in a small town to make its operation economically feasible.

Another potential danger for firms pursuing a focus strategy is that competitors may find submarkets within the target market. In the past, United Parcel Service (UPS) solely dominated the package delivery segment of the delivery business. Newer competitors such as Federal Express and Roadway Package Service (RPS) have entered the package delivery business and have taken customers away from UPS. RPS contracts with independent drivers in a territory to pick up and deliver packages, while UPS pays unionized wages and benefits to its drivers. RPS started operations in 1985 with 36 package terminals. By 1999 it was a $1 billion company with 339 facilities. Federal Express was officially rebranded as FedEx Ground in late 2000, and is now part of a nationwide business-to-consumer package delivery network with capacity to serve every address in the United States.

GENERIC STRATEGIES AND THE INTERNET

Porter asserts that these generic competitive strategies were not only relevant for the old economy, but are just as vital today. Indeed, he goes on to say that terms such as "old economy" and "new economy" may be misguided, and the concept of a firm's Internet operation as a stand-alone entity preclude the firm from garnering important synergies. Furthermore, the Internet may enhance a firm's opportunities for achieving or strengthening a distinctive strategic positioning. Therefore, effective strategy formulation at the business level should pay off, not in spite of the Internet, but in concert with it.

Porter describes how companies can set themselves apart in at least two ways: operational effectiveness (doing the same activities as competitors but doing them better) and strategic positioning (doing things differently and delivering unique value for customers). "The Internet affects operational effectiveness and strategic positioning in very different ways. It makes it harder for companies to sustain operational advantages, but it opens new opportunities for achieving or strengthening a distinctive strategic positioning." Although the Internet is a powerful tool for enhancing operational effectiveness, these enhancements alone are not likely to be sustained because of copying by rivals. This state of affairs elevates the importance of defining for the firm a unique value proposition. Internet technology can be a complement to successful strategy, but it is not sufficient. "Frequently, in fact, Internet applications address activities that, while necessary, are not decisive in competition, such as informing customers, processing transactions, and procuring inputs. Critical corporate assets—skilled personnel, proprietary product technology, efficient logistical systems—remain intact, and they are often strong enough to preserve existing competitive advantages."

Consistent with the earlier discussion regarding combination strategies, Kim, Nam, and Stimpert found in their study of e-businesses that firms pursuing a hybrid strategy of cost leadership and differentiation exhibited the highest performance. These authors concluded that cost leadership and differentiation must often be combined to be successful in e-business.

Porter's generic business strategies provide a set of methods that can be used singly or in combination to create a defendable business strategy. They also allow firms that use them successfully to gain a competitive advantage over other firms in the industry. Firms either strive to obtain lower costs than their competitors or to create a perceived difference between their product and the products of competitors. Firms can pursue their strategy on a national level or on a more focused, regional basis.

Clearly, Michael Porter's work has had a remarkable impact on strategy research and practice. The annual Porter Prize, akin to the Deming Prize, was established in 2001 in Japan to recognize that nation's leading companies in terms of strategy.

Porter's ideas have stood the test of time and appear to be relevant both for profit-seeking enterprises and not-for-profit institutes in a variety of international settings. Torgovicky, Goldberg, Shvarts, and Bar Dayan have found a relationship between business strategy and performance measures in an ambulatory health care system in Israel, strengthening Porter's original theory about the impracticality of the stuck-in-the-middle strategy, and suggesting the applicability of Porter's generic strategies to not-for-profit institutes.

Research in 2006 (Akan, Allen, Helms, and Spralls) has focused on the experience of managers charged with implementing the generic strategies. According to some researchers, while the strategies seem self-explanatory, managers are still in need of further guidance. One study, which looked at more than two hundred organizations, found that managers need to follow several tactics in order to implement a single strategy. The researchers suggest that support is needed for managers to bridge the gap between theory and practice with regards to generic competitive strategy.

SEE ALSO *Strategic Planning Failure; Strategic Planning Tools; Strategy Formulation; Strategy Implementation; Strategy in the Global Environment; Strategy Levels*

BIBLIOGRAPHY
Akan, Obasi, et al. "Critical tactics for implementing Porter's generic strategies." *Journal of Business Strategy.* January 2006.
———. *Competitive Advantage of Nations.* New York: Free Press, 1989.
———. *Competitive Strategy: Techniques for Analyzing Industries and Companies.* New York: Free Press, 1980.
Deephouse, D. "To Be Different, or to Be the Same? It's a Question (and Theory) of Strategic Balance." *Strategic Management Journal* 20 (1999): 147–66.
Fortune Magazine. "America's Most Admired Companies: 2008." Available from: http://money.cnn.com/magazines/fortune/mostadmired/2008/snapshots/2184.html..
Harvard Business School Faculty Biography: Michael E. Porter. 2005. Available from: http://dor.hbs.edu/fi_redirect.jhtml?facInfo=bio&facEmId=mporter.
Kim, E., D. Nam, and J.L. Stimpert. "Testing the Applicability of Porter's Generic Strategies in the Digital Age: A Study of Korean Cyber Malls." *Journal of Business Strategies* 21, no. 1 (2004): 19–45.
Kroll, M., P. Wright, and R. Heiens. "The Contribution of Product Quality to Competitive Advantage." *Strategic Management Journal* 20 (1999): 375–384.
Nike Company Overview Available from: http://www.nikebiz.com/company_overview/facts.html.
Porter, Michael. *Competitive Advantage: Creating and Sustaining Superior Performance.* New York: Free Press, 1985.
Porter, Michael E. and Mark R. Kramer. "Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility." *Harvard Business Review* December 2006: 78–92.
Porter, Michael, and Elizabeth Olmsted Teisberg. *Redefining Health Care: Creating Value-Based Competition on Results.* Cambridge: Harvard Business School Press, 2006.
———. "Retrospective on Michael Porter's Competitive Strategy." *Academy of Management Executive* 16, no. 2 (2002): 40–65.
Sherer, P. "J&J in Talks to Purchase Centocor." *The Wall Street Journal* 4 May 1999, A3.
———. "Strategy and the Internet." *Harvard Business Review* March 2001: 63–78.
Torgovicky, R., A. Goldberg, S. Shvarts, Y. Bar Dayan, et al. "Application of Porter's Generic Strategies in Ambulatory Health Care: A Comparison of Managerial Perceptions in Two Israeli Sick Funds." *Health Care Management Review* 30, no. 1 (2005): 17–23.
Walters, B.A., and S. Bhuian. "Complexity Absorption and Performance: A Structural Analysis of Acute-Care Hospitals." *Journal of Management* 30 (2004): 97–121.

GLOBALIZATION

Globalization refers to the process of integration across societies and economies. The phenomenon encompasses the flow of products, services, labor, finance, information, and ideas moving across national borders. The frequency and intensity of the flows relate to the upward or downward direction of globalization as a trend.

There is a popular notion that there has been an increase of globalization since the early 1980s. However, a comparison of the period between 1870 and 1914 to the post-World War II era indicates a greater degree of globalization in the earlier part of the century than the latter half. This is true in regards to international trade growth and capital flows, as well as migration of people to America.

If a perspective starts after 1945, globalization is a growing trend with a predominance of global economic

Figure 1

International Export Trade, 1990-2003 (in billions of US dollars)
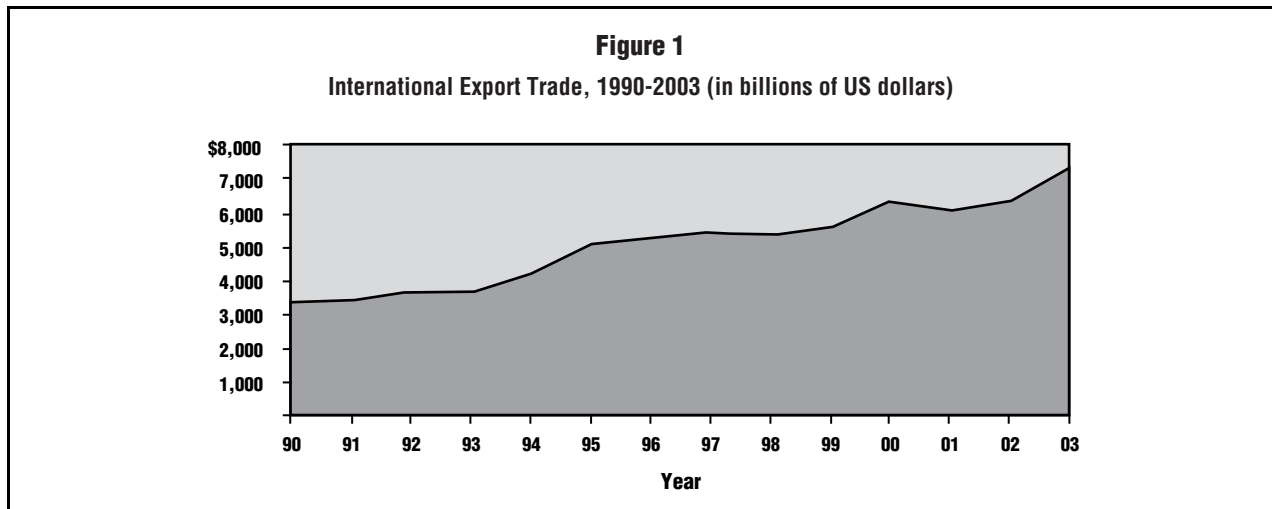
integration that leads to greater interdependence among nations. Between 1990 and 2001, total output of export and import of goods as a proportion of GDP rose from 32.3 percent to 37.9 percent in developed countries and 33.8 percent to 48.9 percent for low- to middle-income countries. From 1990 to 2003, international trade export rose by $3.4 to $7.3 trillion (see Figure 1). This amount continues to grow throughout the 2000s. Hence, the general direction of globalization is growth, but it is often unevenly distributed between wealthier and poorer countries.

RATIONALE

A primary economic rationale for globalization is reducing barriers to trade for the enrichment of all societies. The greater good would be served by leveraging comparative advantages for production and trade that are impeded by regulatory barriers between sovereignty entities. In other words, the betterment of societies through free trade for everyone is possible as long as each one has the freedom to produce with a comparative advantage and engage in exchanges with others.

This economic rationale for global integration depends on supporting factors to facilitate the process. The factors include advances in transportation, communication, and technology to provide the necessary conduits for global economic integration. While these factors are necessary, they are not sufficient. Collaboration with political will through international relations is required to leverage the potential of the supporting factors.

HISTORICAL BACKGROUND

Globalization from 1870 to 1914 came to an end with World War I, as various countries pursued isolationism and protectionism agendas through various treaties—the

Treaty of Brest-Litovsk (1918), the Treaty of Versailles (1918), the Treaty of St. Germain (1919), and the Treaty of Trianon (1920). U.S. trade policies—the Tariff acts of 1921, 1922, 1924, 1926, and the Smoot-Hawley Tariffs of 1930—raised barriers to trade. These events contributed to the implosion of globalization for more than forty years.

Toward the end of World War II, forty-four countries met in an effort to re-establish international trade. The milestone is referred to as Bretton Woods, named after the New Hampshire country inn where the meeting was held. Results of Bretton Woods included the creation of the International Monetary Fund (IMF), the World Bank, and subsequently, the General Agreements on Tariffs and Trade (GATT).

In 1948, the International Trade Organization (ITO) was established as an agency of the United Nations, with fifty member countries and the Havana Charter to facilitate international trade, but it failed. As a result, GATT rose to fill the void as a channel for multilateral trade negotiations and recognition of "Most Favored Nation" status that applied the same trading conditions between members that applied to other trading partners with "most favored" partner standing.

GATT involved a number of different multilateral rounds of trade negotiations to reduce trade barriers and facilitate international trade. In the first round, the twenty-three founding members of GATT agreed to 45,000 tariff concessions affecting 20 percent of international trade worth $10 billion. Many of GATT's trade rules were drawn from the ITO charter. Subsequent trade rounds involved more members and additional issues, but the basic foundation of GATT remained the same.

In the second round, the Kennedy Round of the mid-1960s, the focus continued with tariff reductions.

In the third round, the Tokyo Round (1973 to 1979), 102 countries participated to reform the trading system, resulting in tariffs on manufactured products which were reduced to 4.7 percent from a high of 40 percent at the inception of GATT. Important issues revolved around anti-dumping measures, and subsidies and countervailing measures. The reduction of trade barriers enabled about an average of 8 percent growth of world trade per year in the 1950s and 1960s.

In the fourth round, the Uruguay Round (1986 to 1993), 125 countries participated to develop a more comprehensive system. An increasing importance was placed on globalization and on new, uncharted territories such as intellectual property. Additionally, other areas were discussed for coverage under new regulations, including agricultural and other old world industries (including textiles).

On April 15, 1995, in Marrakesh, Morocco, a deal was signed to create the World Trade Organization (WTO), which replaced GATT with a permanent institution that required a full and enduring commitment. The WTO encompasses trade in goods, services, and intellectual property related to trade with a more efficient dispute settlement system.

The most recent round, formally titled the Doha Development Agenda, began in 2001 in Doha, Qatar. The mission of this round was to give a hand up to impoverished peoples and nations of the world by lowering more trade barriers and strengthening local workers, farmers, and other members of agricultural communities by creating new rules for assisting underdeveloped nations. The overall goal is to create a truly global economy by stimulating all economies everywhere, rather than favoring those that are already thriving in well-developed nations. However, the Doha round has been plagued by deadlock and contention; less-developed nations have accused wealthier nations of protectionist policies, especially regarding national agricultural subsidies and tariffs. Talks to reach an agreement collapsed in 2003, 2005, 2006, 2007, and 2008.

COMPLEXITIES AND CONTROVERSIES

The increase of globalization surfaced many complex and controversial issues as economies and societies became more interdependent with greater frequency of interactions between one another. A number of important trends make up globalization, including: (1) location of integration activities; (2) impact upon poorer societies; (3) flow of capital; (4) migration of laborers and labor; (5) diffusion of technology; (6) sustainability of the natural environment; (7) reconfiguration of cultural dynamics; and (8) development of organizational strategies for global competition.

Many authors specialize in exploring each issue with much greater depth. The purpose of reviewing the different trends in this essay is to provide some highlights concerning the interrelated complexities underlying globalization.

Location of integration activities. The extent of globalization unfolds in an uneven fashion to the degree that the question is raised whether international trade is more focused on regional rather than global integration. Trading blocs, such as the North American Free Trade Agreement (NAFTA), the European Union (EU), the Asia-Pacific Economic Co-operation (APEC), Mercosur (South American trading bloc), the Association of South East Asian Nations (ASEAN), The Dominican Republic-Central America Free Trade Agreement (DR-CAFTA), and the East Africa Community (EAC), support regional cooperation between geographical neighbors. According to global economists' forecasts, most of these agreements will eventually work in unison as parts of a larger, more global agreement.

Georgios Chortareas's and Theodore Pelagidis's 2004 research findings on openness and convergence in international trade indicate that intraregional trade increased more than global trade in most situations. They stated that "...despite the positive international climate resulting from important reductions in transportation costs, the development of new technologies and trade liberalization markets continue to be determined, to a large extent, regionally and nationally..."

Within NAFTA, intraregional exports rose from 34 percent in the 1980s to more than 56 percent in 2000; exports between Asian country members amounted to 48 percent in 2000; and exports within the EU were sustained at about 62 percent. By 2005, exports from the United States to Mexico had quadrupled, and exports from the United States to Canada doubled. The trend of rapid exports growth continued into 2008.

An example of limitations to fair market access for developing countries is that developed countries subsidize agricultural producers with about $330 billion per year, which creates a significant disadvantage for poorer economies without such subsidies. The impact is exacerbated because 70 percent of the world's poorest population lives in rural communities and depends heavily on agriculture as a staple of survival and economy. Hence, one of the concerns with uneven distribution of globalization is its impact on poorer economies by perpetuating systems of inequality. Opponents of free-trade agreements suggest that in many cases, especially the case of DR-CAFTA, trade agreements can further hinder the progress of the

poor and keep the wealthiest class well moneyed, perpetuating a centuries-old cycle of impoverishment for many.

Impact on poorer societies. A challenge to globalization is that inequality arises from imbalances in trade liberalization, where the rich gain disproportionately more than the poor. Ajit K. Ghose examined the impact of international trade on income inequality and found that intercountry inequality increased from 1981 to 1997, in a sample of 96 national economies, but international inequality measured by per capita GDP declined. The ratio of average income for the wealthiest 20 percent compared to the poorest 20 percent rose from 30 to 74 from the early 1960s to the late 1990s. According to a GDP listing of nations released by the *CIA World Factbook* from 2008, the per capita difference between the top 10 percent of countries and the remaining 90 percent shows an overall decline in international inequality, but a disparity remains nonetheless.

In 2004 one billion people owned 80 percent of the world's GDP, while another billion survived on one dollar. However, during the same period, when factoring average income that is weighted by population, income inequality dropped by 10 percent. Global income distribution became more equal with other measures such as purchasing power parity or the number of people living in poverty.

The World Development Indicators for 2004 showed a drop in the absolute number of people living on one dollar per day from 1.5 billion in 1981 to 1.1 billion in 2001 with most of the achievements taking place in the East Asia region. Thus, the impact of globalization on inequality is a complex issue depending on the particular measures. More specific examination needs to account for other contributing factors, such as how regionalism increases concentration of trade between countries that are wealthier and leaving poorer countries at or below the margin.

Flow of capital. The flow of capital relates to both regionalism and inequality issues. Two forms of capital flow are foreign direct investments (FDI) made by business firms and investment portfolios, diversified with foreign assets or borrowers seeking foreign funding. Data from the World Bank indicated that FDI grew from an average of $100 billion per year in the 1980s to $370 billion in 1997. Net private capital flow amounts to about $200 billion in 2004. According to OCO Global, the FDI increased by another 5.1 percent in 2007, bringing the global total to $947 billion.

Also, some economies have significant remittance flows from labor migration, which were approximately $100 billion in 2003 and $126 billion in 2004 for 90

developing countries. Some Caribbean countries receive more than 10 percent of their GDP from remittances. While developing countries are the primary recipients of remittances, transaction costs can amount to 10 to 15 percent per transaction. Reducing such obstacles would benefit poorer countries with heavy dependencies on remittances. The flow of money across national borders relates to the migration of both labor and work.

Migration of labor and work. An important dimension of globalization is the migration of people. While the proportion of migration was greater during the earlier mercantilism period, sovereign border controls to a large extent create a filtration process for migration. About 175 million people lived in a different country than their birth country in 2000. They can be separated into three categories: 158 million international migrants, 16 million refugees, and 900,000 asylum seekers.

An important global trend in the future is the movement of labor from developing to developed countries because of the latter's need for labor with an aging population. Family-sponsored migration makes up 45 to 75 percent of international migrants who mainly originate from developing countries to countries in Europe and North America.

Even before 9/11, legal migration of labor needed to overcome substantial bureaucracy in the border control process. The number applying for entry into developed countries often far exceeds the number permitted. Due to extensive legal processes, some migrants enter illegally, while others become illegal with expiration of legal status.

Anti-terrorism measures imposed shortly after the 9/11 attacks resulted in a minor shift in the flow of migrants away from the United States toward other developed countries. With the aging of baby boomers in many developed countries, future globalization of migrant labor flow is receiving more attention, especially in education, health care, retirement funding, and housing.

Although migrant labor often entails the movement of people in search of work, a related globalization trend is the migration of work to different geographical locations. While multinational corporations (MNCs) often seek low-cost labor, innovation advances in computer technology, satellite communication infrastructures, Internet developments, and efficient transportation networks enable companies to distribute work in ways not possible before.

Compression of time and space with Internet technology allows for the distribution of work to take place around the world with global virtual teams. The phenomena of outsourcing and offshoring expand on the earlier sourcing of low-cost manufacturing. During the 1960s

and 1970s MNCs switched to low-wage labor to manufacture products that entailed significant labor costs.

Expansion of MNCs in the 1990s encompassed highly skilled workers, service work, and global virtual teams. Firms started to outsource information technology (IT) functions as early as the 1970s, but a major wave of outsourcing started in 1989 with the shortage of skilled IT workers in developed countries. At the same time, the trend of shifting work around the globe to leverage the different time zones began with the financial industry's ability to shift trading between the various stock exchanges in New York, Tokyo, Hong Kong, and London.

Technological innovations in computers and the Internet enabled other industries, such as software engineering, data transcription, and customer service centers to also shift work around the globe. Higher education and high-skill health care jobs are also embarking on global outsourcing.

In 2001 outsourcing expenditures amounted to $3.7 trillion and approximately $5.1 trillion in 2003. Global outsourcing of just IT services cost nearly $830 billion in 2008 alone. The impact of global outsourcing is not just a relocation of jobs, but also a dampening of employee compensation levels in more developed economies. For example, in 2000, salaries for senior software engineers were as high as $130K, but dropped to about $100K at the end of 2002; and entry-level computer help-desk staff salaries dropped from about $55K to $35K. For IT vendor firms in India, IT engineering jobs offer a salary considered outstanding in India, that is a fraction of the going U.S. rate. The migration of labor and work create complex globalization dynamics in management of people and finances for most firms.

Diffusion of technology. Innovations in telecommunication, information technology, and computing advances all support progression of globalization. In 1995 the World Wide Web had 20 million users, exploded to 400 million by late 2000, and had over 1.4 billion users in 2008. However, the rapid growth and adoption of information technology is not evenly diffused around the world.

The gap between high versus low adoption rates is often referred to as the digital divide. In 2004, over 30 percent of Americans and Europeans had Internet access, while the number for Africa was 1.8 percent. The digital divide reflects other disparities of globalization. Globalization of computer technology also entails a growing trend of computer crimes on an international basis, which requires cross-border collaboration to address. Additional globalization trends related to computer technology include developments in artificial intelligence, high-speed connections such as wireless applications, the

use of handheld and mobile devices to access the Internet and e-mail, and integration with biotechnology.

Sustainability of the natural environment. The impacts of globalization on environment sustainability are hotly contested, with major environmental protests held at international economic meetings or prominent multilateral trade forums. In the United Nations 1987 publication *Brundtland Report* (named for Gro Brundtland, Prime Minister of Norway), galvanized international attention on sustainable development was a major concentration. The assumption was that the degradation of the environment in developing countries was due primarily to poverty.

Some advocates of globalization consider free trade to be a solution to alleviate poverty and subsequently, reduce pollution. However, the arguments depend upon corporate social responsibility, managerial knowledge of environmental sustainability, and the level of ignorance in the developing community.

Critics find that often large MNCs have greater financial resources than some developing countries, which can be used to compromise and derail regulatory regimes from protecting the environment. For example, while an MNC may not produce or sell certain environmentally damaging products in a country with tight regulatory controls, they may find their way to markets with fewer environmental regulatory constraints—"pollution havens." This line of logic leads to the notion of globalization becoming a "race to the bottom" as countries compete with lowering of environmental standards to attract foreign capital for economic development.

One of the landmarks on environmental globalization is the Kyoto Accord, an international treaty to reduce greenhouse gas emissions based on exchanging limited pollution credits between countries. After lengthy, multilateral, and complex negotiations, the Kyoto Accord was concluded in December 1997, for ratification by national governments. On February 16, 2005, the date for the Kyoto Protocol to take effect, 141 nations ratified the agreement. Even though the United States is the world's largest polluter in volume and per capita output of greenhouse gases, the Bush administration refused to ratify the Kyoto Accord.

Reconfiguration of cultural dynamics. Culture is another area of complex controversies with globalization. Competing perspectives about how globalization affects cultures revolve around the debates of cultural homogenization versus cultural diversification. The optimistic view of cultural globalization is that cultural diversity focuses on freer cultural exchanges with broader choices and enrichment of learning from different traditions. People have greater

choices of globally produced goods, in addition to local offerings, without being bound by their geographic location. Alternatively, critics of cultural globalization present evidence demonstrating the depletion of cultural diversity through processes referred to as "Disneyfication" or "McDonaldization."

Cultural diversity and quality are diminished with mass produced goods being directed toward a common denominator. The criticisms are related to a sense of "Americanization" of the world, rather than globalization. The process involves a sense of far-reaching, anonymous cultural imperialism. Debates from each perspective are intense with substantial evidence that also reveals complex ties to social and political dynamics within and between national borders.

Cultural globalization continues into the foreseeable future with many more controversial dynamics related to three important issues: 1) the impact of extractive industries on the socio-economic, cultural exclusion and dislocation of indigenous peoples and their traditional knowledge; 2) international trading of cultural goods and knowledge; and 3) inflow of immigration impacts on national culture, which creates a tension between a sense of threat to the national culture and migrant demands for respect to their traditions in a multicultural society.

Development of organizational strategies for global competition. The multiple dynamics of globalization—regionalism, inequality, financial flow, migration of labor and work, technological innovations, environmental sustainability, and cultural dynamics—form a turbulent and complex environment for managing business operations. While seven trends were highlighted to provide a brief sketch of interrelated complexities and controversies globalization, it also surfaced other significant issues.

Global concerns revolve around terrorism, rapid transmission of pandemic diseases and viruses, the rise of China's and India's economies, an aging population in wealthier northern countries versus younger growing populations in the southern hemisphere, and advances in biotechnology. These issues are intricately embedded in the globalization processes.

COMPETING IN THE GLOBAL ECONOMY

Globalization entails both opportunities and threats for creating and sustaining competitive strategies. Emerging economies offer resources in terms of labor, as well as expanding market opportunities. However, geopolitical relationships and backlashes from perceptions of cultural imperialism, such as the tensions between the United States and the European Union during the Iraq war create challenges for business operations.

Global managers have a wide range of options to deal with globalization. Organizational strategies for international operations involve two related demands—the need for local orientation and the need for integration (as shown in Figure 2). Firms with low need for local orientation, but high need for integration require a global strategy that centralizes core operations with minor modifications for local adaptation. However, firms with a need for high local orientation, but low need for integration, require a multinational strategy that decentralizes significant operations to respond to local market conditions. Firms integrating a high need for both local orientation and organizational integration should strive for a transnational strategy.

In addition to selecting a strategy for global competition, managers also need to make decisions regarding the internationalization process. Two processes are important.

First, the development of innovations in a home market as products move along the product life cycle stages. Firms can take products entering into the plateau of a mature stage to new international markets. Often the flow moves from developed to developing countries.

Second, stages of internationalization with foreign entry modes that involve increasing resource commitment and risks. The stage approach to internationalization takes time because it involves licensing and exportation, which can be mired with national and international bureaucracy.

Kenichi Ohmae argued that the speed and complexities of globalization require firms to rethink their internationalization processes because incremental stage models are often too slow. Given the rate and quantity of knowledge within the global business community, firms are likely to face competition in their home markets, with comparable innovations before they are able to establish a foothold in the international marketplace.

The incremental stage models are too slow for competing in an increasingly integrated global economy. Ohmae suggested that firms form global strategic alliances with partners established in three major markets—North America, Europe, and Asia, particularly Japan. Development of global competitive intelligence and innovation among partners provides for rapid market development and the establishment of strategic positions in multiple locations.

Basically, globalization into the twenty-first century creates a fundamentally different competitive environment that shifted from incremental internationalization processes to almost simultaneous deployment of innovations. This internationalization process also shifts the work of global managers from managing a field of expatriates to collaborating with strategic partners across national borders, managing global offshore outsourcing vendors in multiple geographical locations and working remotely with telecommuting staff in regions of import and export.

Figure 2
Skill Profile of the Effective Global Manager

- The ability to envision and implement the strategy of thinking globally while acting locally
- Being able to manage change and transition
- Being able to manage cultural diversity
- The ability to design and function in flexible organizational structures
- Being able to deal with stress and ambiguity
- Having the skills required to work with others-especially in team setting
- Being able to communicate well, and having a command of more than one language
- Having the ability to learn and transfer knowledge in a organization
- Entering into trusting alliances and operating with personal integrity and honesty
- Being able to turn ideas into action
- Having a stateless perception of the world
- Being willing to take risks and to experiment

Globalization is the culmination of complex and controversial trends that include a degree of geographical integration, inequalities, financial flows, labor and laborers, technological innovations, environmental sustainability, cultural dynamics, and organizational strategies for global competition. Given a historical perspective, globalization has fluctuated over time and many indicators support a trend of increasing globalization since the 1980s.

The United States is no longer the dominant superpower in the global economy; the rise of both China and India are the most important developments in globalization of the economy since the onset of the twenty-first century. Asia is proving to be a powerful competitor and excellent partner in commerce as economic trends move toward a universal system. The United States and China should not be considered foes—their mutual respect is a major consideration for international business in the future. Global managers have options for strategies and structures, as well as different internationalization processes. In summary, globalization creates a competitive arena as well as a platform for unlikely partnerships where MNCs evolve into global networks, the business model of the modern world.

SEE ALSO *International Business; International Management*

BIBLIOGRAPHY

Agenor, Pierre-Richard. "Does Globalization Hurt the Poor?" *International Economics and Economic Policy* 1, no. 1 (2004): 21–51.

Central Intelligence Agency. "The CIA World Factbook 2008." New York: Skyhorse Publishing, 2007.

Chortareas, Georgios E., and Theodore Pelagidis. "Trade Flows: A Facet of Regionalism or Globalisation?" *Cambridge Journal of Economics* 28, no. 2 (March 2004): 353–271.

Clott, Christopher B. "Perspectives on Global Outsourcing and the Changing Nature of Work." *Business and Society Review* 109, no. 2 (2004): 153–170.

Corbett, M. "Outsourcing's Next Wave." *Fortune,* 14 June 2002.

Cowan, Tyler. *Creative Destruction: How Globalization Is Changing the World's Culture.* Princeton, NJ: Princeton University Press, 2002.

Doyle, Michael W. "The Challenge of Worldwide Migration." *Journal of International Affairs* 57, no. 2 (Spring 2004): 1–5.

Ghose, Ajit K. "Global Inequality and International Trade." *Cambridge Journal of Economics* 28, no. 2 (March 2004): 229–252.

"Global Foreign Direct Investment Grows to Almost $1 Trillion in 2007, 20% Increase in FDI Capital Expenditure in US." *Thomson Rueters.* (March 2008) Available from: http://www.reuters.com/article/pressRelease/idUS137410+04-Mar-2008+PRN20080304.

Johanson, J. and J.E. Vahlne. "The Internationalization Process of the Firm: A Model of Knowledge Development and Increasing Foreign Market Commitment." *Journal of International Business* 8 (1977): 23–32.

Keohane, Robert O., and Joseph S. Nye, Jr. "Globalization: What's New?" *Foreign Policy,* Spring, 104–119.

Minyard, Alan D. "The World Trade Organization: History, Structure, and Analysis." 1996. Available from: http://www2.netdoor.com/~aminyard/.

Neal, Christopher. "Global Poverty Down by Half Since 1981 but Progress Uneven as Economic Growth Eludes Many Countries." The World Bank Group, 2004. Available from: http://web.worldbank.org.

Ohmae, Kenichi. *The Borderless World.* New York: Harper Business, 1990.

O'Neil, Tim. "Globalization: Fads, Fictions, and Facts." *Business Economics* 39 (January 2004): 16–27.

Palvia, Shallendra. "Global Outsourcing of IT and IT Enabled Services: Impact on U.S. and Global Economy." *Journal of Information Technology Cases and Applications* 5, no. 3 (2003): 1–11.

Pastor, Robert A. "Beyond NAFTA: The Emergence and Future of North America" *North American Politics: Globalization and Culture.* Toronto: Broadview Press, forthcoming, 2007.

Simon, David. "Dilemmas of Development and the Environment in a Globalizing World: Theory, Policy and Praxis." *Progress in Development Studies* 3, no. 1 (2003): 5–41.

United Nations Development Program. *Human Development Report, 2004: Cultural Liberties in Today's Diverse World.* New York: Oxford University Press, 2004.

United Nations Development Program. *Human Development Report, 2001: Making New Technologies Work for Human Development.* New York: Oxford University Press, 2001.

Wolf, Martin. *Why Globalization Works.* New Haven, CT: Yale University Press, 2004.

World Bank. *World Development Report, 2003: Sustainable Development in a Dynamic World.* New York: Oxford University Press, 2003.

World Commission on Environment and Development. *Brundtland Report: Our Common Future.* New York: Oxford University Press, 1987.

GOALS AND GOAL SETTING

Goals and objectives provide organizations with a blueprint that determines a course of action and aids them in preparing for future changes. A goal can be defined as a future state that an organization or individual strives to achieve. For each goal that an organization sets, it also sets objectives. An objective is a short-term target with measurable results. Without clearly-defined goals and objectives, organizations will have trouble coordinating activities and forecasting future events.

According to Barney and Griffin, organizational goals serve four basic functions; they provide guidance and direction, facilitate planning, motivate and inspire employees, and help organizations evaluate and control performance. Organizational goals inform employees where the organization is going and how it plans to get there. When employees need to make difficult decisions, they can refer to the organization's goals for guidance. Goals promote planning to determine how goals will be achieved. Employees often set goals in order to satisfy a need; thus, goals can be motivational and increase performance. Evaluation and control allows an organization to compare its actual performance to its goals and then make any necessary adjustments.

According to Locke and Latham, goals affect individual performance through four mechanisms. First, goals direct action and effort toward goal-related activities and away from unrelated activities. Second, goals energize employees. Challenging goals lead to higher employee effort than easy goals. Third, goals affect persistence. Employees exert more effort to achieve high goals. Fourth, goals motivate employees to use their existing knowledge to attain a goal or to acquire the knowledge needed to do so.

The elements of goal-setting theory are shown in Figure 1. The goal-setting model indicates that individuals have needs and values that influence what they desire.

A need is defined as a lack of something desirable or useful. According to Maslow's hierarchy of needs, all individuals possess the same basic needs. Individuals do, however, differ in their values. Values are defined as a group of attitudes about a concept that contains a moral quality of like or dislike and acceptable or unacceptable. Values determine whether a particular outcome is rewarding. Employees compare current conditions to desired conditions in order to determine if they are satisfied and fulfilled. If an employee finds that he or she is not satisfied with the current situation, goal setting becomes a way of achieving what he or she wants.

Research suggests that individual differences play a role in determining goal effectiveness. Individuals may differ in their goal orientations, priorities, and self-regulation ability. Research suggests that an individual's goal orientation may influence goal effectiveness. Employees with a learning orientation desire to acquire knowledge and skills, whereas employees with a performance goal orientation focus on the outcome rather than the achievement process. While employees with a learning goal orientation view goals as a challenge, employees with a performance goal orientation may view goals as a threat. Studies provide some support that assigned goals are more effective for individuals with a learning goal orientation. Personal and organizational goals are not always congruent. For example, as the number of two-income families increases, work-family conflicts increase. Employees now have to balance professional and personal goals. An employee's desire to achieve personal goals may affect his or her motivation to achieve organizational goals.

When organizational and personal goals are not aligned, it may have a detrimental effect on performance. Self-regulation is also important in goal setting and goal achievement. Research has shown that employees improved self-regulation when they were trained in self-management. Self-regulation training can provide employees with an opportunity to set specific high goals, to monitor ways

Figure 1

Personal Values	Present Conditions	Goal Setting Process	Goal Setting Attributes	Behavior
Desired Conditions	Assessment of Current Conditions	1. Participative goals 2. Assigned goals 3. Do-your-best goals	1. Specificity 2. Difficulty 3. Acceptance 4. Committment	1. Perfomance 2. Satisfaction

Source: Adapted from Cherrington, D.J., *Organizational Behavior* (Boston, MA: Allyn and Bacon, 1994) pg 117.

the environment may hinder goal attainment, and to identify and administer rewards for making goal progress, as well as assign punishments for failing to make progress.

GOAL-SETTING ATTRIBUTES

Goal-setting attributes have been the subject of extensive research. The four attributes are; specificity, difficulty, acceptance, and commitment. Studies show that there is a direct relationship between goal specificity and employee performance. The more specific the goal, the less ambiguity involved and the higher the performance. When employees are given do-your-best goals, they do not have an external reference by which they can measure their own performance. For example, telling a salesperson to "do the best you can" is an extremely vague goal that may not increase performance. However, "increase sales by 10 percent" is much more specific and encourages high performance because the employee has past sales as a reference point.

Goal difficulty also has a direct relationship with performance. Research shows that more difficult goals lead to higher performance, as long as the goals do not become so difficult that employees perceive them as impossible. Unreasonable goals frustrate, rather than motivate, employees. On the other hand, difficult but realistic goals lead to increased performance and motivation. Research suggests that employees are highly motivated when the probability of achieving a specific goal is 50 percent.

Goal acceptance is the degree to which employees accept a goal. Employees need to feel that the goal is fair and consistent in order to make it their own. Even if a goal is specific and attainable, individual acceptance is still necessary for effectiveness. Employees may reject goals for a multitude of reasons: they feel the work is meaningless, they do not trust the organization, or they do not receive feedback regarding their performance.

Finally, employees must be committed to the goal for it to be achieved. Commitment refers to the degree to which employees are dedicated to reaching the goal, and is determined by both situational and personal variables. Commitment to a goal can be increased by developing goals that appeal to employees' values and needs. Employees must be convinced that the goal is important. It should be relevant and significant to some personal value. For example, goals that are tied to company success, and therefore job security, often appeal to employees' need for security. It is also important that a leader or manager who is respected and credible convey the goal to employees. Goals must be attainable for employees to be committed. While goals may be challenging, employees should be convinced that goals are within reach. Research shows

that commitment to goals increases when employees have the opportunity to participate in goal setting. Additionally, developing strategies is useful in helping employees achieve goals. Organizations that provide continuous training for employees build confidence and increase commitment to organizational goals.

TYPES OF GOALS AND OBJECTIVES

Goals should be closely tied to an organization's mission and vision statement. The strategic goals, tactical goals and objectives, and operational goals and objectives support the mission statement of the organization.

Strategic Goals. Strategic goals are set at the top of an organization and directly support the mission statement. Strategic goals are related to the entire organization instead of any one department. There are eight types of strategic goals found in organizations. The first type of strategic goal affects market standing, for example "to control 45 percent of the market share in the United States by the year 2014." Strategic goals regarding market standing help position a company as a market leader in any given industry. An example of the second strategic goal, innovation, is "to develop three new applications for use in businesses in the United States over the next three years." Productivity, the third type of strategic goal, involves reductions in manufacturing costs or increases in output. The fourth type of strategic goal is the efficient use of physical assets and financial resources, such as human resources. The fifth type of strategic goal involves the organization's profits and is usually defined in terms of return on assets or market value of stocks. Management development and performance is the sixth type of strategic goal, which concerns the conduct of managers as well as their continuing development. An example of this type of strategic goal is "to increase the number of hours offered in management training courses by 15 percent over the next year." The seventh type of strategic goal addresses the conduct of employees, as well as the concern for their attitudes and performance. An example of this type of strategic goal is "to reduce turnover by 12 percent over the next two years." Finally, the eighth type of strategic goal is concerned with the public and social responsibility of the organization. These types of goals might be concerned with reducing pollution or contributing to different charities.

Tactical Goals. Tactical goals and objectives are directly related to the strategic goals of the organization. They indicate the levels of achievement necessary in the departments and divisions of the organization. Tactical goals and objectives must support the strategic goals of the organization. For example, if a strategic goal states that the organization is going to reduce total costs by 15

percent next year, then the different departments of the company would set tactical objectives to decrease their costs by a certain percentage so that the average of all departments equals 15 percent.

Operational Goals. Operational goals and objectives are determined at the lowest level of the organization and apply to specific employees or subdivisions in the organization. They focus on the individual responsibilities of employees. For example, if the department's tactical goal is related to an increase in return on assets by 5 percent, then the sales manager may have an operational objective of increasing sales by 10 percent.

Super-ordinate Goals. Super-ordinate goals are those goals that are important to more than one party. They are often used to resolve conflict between groups. Through cooperating to achieve the goal, the tension and animosity between groups is often resolved. Feelings of camaraderie are created along with trust and friendship. Super-ordinate goals can be powerful motivators for groups to resolve their differences and cooperate with one another. In order for them to be successful, the parties must first perceive that there is mutual dependency on one another. The super-ordinate goal must be desired by everyone. Finally, all parties involved must expect to receive rewards from the accomplishment of the goal.

GOAL-SETTING APPROACHES

When choosing goals and objectives, there are several approaches an organization can take. Three common approaches are the top-down approach, the bottom-up approach, and the interactive approach. In the top-down approach, goal setting begins at the top of the organization. Management by objectives (MBO) is a commonly-used top-down approach. This approach focuses on coordinating goal setting, incentives, and feedback. Studies suggest that approximately 50 percent of large organizations currently use or have used MBO. First, upper level managers (such as the CEO and other executives) establish the organizational mission and then determine strategic goals. The strategic goals determine the tactical goals and objectives as they are passed down to the next level of management.

The tactical goals in each department dictate the operational goals and objectives to individual employees. On the lowest level, the supervisor and employee agree upon performance objectives, as well as how goal attainment will be measured. This gives the supervisor a chance to address employee concerns or potential obstacles to goal achievement. When the next evaluation occurs, the supervisor and subordinate meet to assess to what extent performance objectives have been met. The top-down

approach has several advantages. It helps guarantee that the goals and objectives of the organization are directly tied to and support the mission statement. It increases the likelihood that ambitious goals set by upper-level managers will trickle down to lower levels of the organization; thus, ambitious goals will be set for everyone in the organization. However, the top-down approach has several disadvantages. Oftentimes, members of upper-level management are so far removed from the day-to-day activities of the employees that the goals may be overly ambitious and unrealistic. Goals set at the top of the organization do not change as quickly with the organization, so they are not as flexible as goals set at the bottom of the organization. Finally, the top-down approach does not always involve employee participation in the goal-setting process. Thus, employees may not have a sense of ownership.

The bottom-up approach begins at the lower levels of the organization. Individuals at the bottom of the organization's chart set the goals and objectives for members directly above. Operational goals and objectives determine the tactical objectives, which in turn determine the strategic goals and objectives. Finally, the organizational mission is defined according to the guidelines set by the employees. Goals determined by bottom-up goal setting are likely to be more realistic than those set at the top of the organization. They are more flexible and reflect the current situation of the organization. Finally, goals created by all levels of the organization, and by all types of employees, are more likely to encourage employee commitment. There are disadvantages to bottom-up goal setting. Goals and objectives formulated by bottom-up goal setting are not always in line with the organization's mission. Often, organizations that use a bottom-up approach lack clear direction and focus. There is no hierarchical alignment with the goals of the organization. Another disadvantage of this type of goal setting is that the goals created by employees are not always challenging and ambitious. Studies have shown that challenging (yet realistic) goals are more motivational than those that are not.

The third approach to goal setting is interactive. It is a process by which employees at different levels of the organization participate in developing goals and objectives. Top levels of the organization begin by developing a mission statement. Managers at different levels and departments of the organization then come together and determine the strategic goals. Next, discussions regarding the tactical goals and objectives are decided upon by including lower-level managers and supervisors. Finally, individuals contribute to the process by defining their own operational goals and objectives.

This approach to goal setting involves the consensus of many different levels of management and frontline employees. Interactive goal setting involves discussion

and cooperation among management and employees. The interactive approach enjoys the same advantages as bottom-up goal setting without many of the disadvantages. Goals are more realistic and current than in the top-down approach. Because it involves cooperation at all levels, employees feel valued and important. Their commitment to the organization, as well as the goals, is increased. Input from upper management helps to ensure that the goals are challenging and ambitious, which increases motivation. There are, however, a few disadvantages to the interactive approach. It is very time-consuming because of the cooperation and consensus involved. It is also difficult to manage and maintain. If managers do not stay actively involved, it can quickly turn into a top-down or bottom-up approach with the disadvantages of each.

FEEDBACK AND EVALUATION

Employees should be provided with specific performance-related feedback to help them determine if they are achieving their goals. Frequent feedback is beneficial because it allows employees to adjust their level of effort to achieve their goals. Feedback from management should consistently be provided. However, feedback can also come from coworkers or customers. It may be in the form of tallies, charts, or graphs that depict performance over time. Feedback not only allows employees to assess their accomplishments, but it also provides them with the continued motivation to achieve their goals.

Not only should the employees be evaluated, but goals should be evaluated periodically. Because organizations face many changes, goals need to be flexible enough so that organizations can respond to dynamic environments. Goals that were set at the beginning of the year may not be realistic at the end of the year. When organizations set goals that are unattainable or unrealistic in the long or short run, employees become unmotivated. When evaluating the appropriateness of a goal, managers should determine whether or not the goal covers the most important aspects of performance. Are the goals realistic yet ambitious enough to motivate employees? Objectives should be measurable and specific. Objectives that are not measurable are often not directly tied to the organization's overall mission. They should be linked to rewards that are valued by employees and associated with specific time periods.

Goal setting is a commonly used motivational approach. Numerous studies have shown that goal setting is related to profit and performance. In one study, goal setting led to improved productivity in 95 percent of the organizations. It also led to a 16 percent increase in worker productivity. Additionally, 61 percent of organizations surveyed used goal-setting theory specifically to increase performance. Organizations that set goals experienced higher levels of annual profit than those that did not.

Dissent to this opinion comes from a study conducted internally within Deutsche Telekom, an organization of more than 50,000 employees. As noted in 2008, the study found that goal setting was expensive and placed a huge drain on resources, thus decreasing productivity. The research identified large groups of employees within the organization who were not part of the goal-setting process. Dr. Christian Stein, the researcher in the study, lists several other flaws with the goal-setting approach. These include lack of proof of its positive cost-benefit ratio and the difficulty in setting goals that are mutual for employee and company. Stein also points to the extreme difficulty in coming up with a system that works for everyone without including a prohibitively large number of goals and subgoals. Stein concludes that in a time of high cost-pressure, abandoning goal-setting systems would do little harm and would, in fact, free up resources for processes that can be better controlled and managed.

As this study highlights, while goal setting may be advantageous to organizations, as well as employees, it is not an easy process to undertake. Managers sometimes underestimate the difficulty involved in setting goals. They are attracted to the benefits without understanding the limitations. Often beneficial are training courses on how to set goals, as well as a continuous follow-up process that involves all areas of the organization. Follow-up and refresher courses are often necessary to keep employees and managers focused on the goal-setting process. By offering courses that involve both managers and frontline employees, organizations are able to increase the level of consensus when it comes time to define goals.

SEE ALSO *Feedback; Management Styles; Mission and Vision Statements; Strategy Formulation; SWOT Analysis*

BIBLIOGRAPHY
Barney, Jay B., and Ricky W. Griffin. *The Management of Organizations.* Boston: Houghton Mifflin Company, 1992.

Bloch, Brian. "Targets Are Often More Trouble than They're Worth." *Daily Telegraph.* (London). 13, March 2008: 7.

Cherrington, David J. *Organizational Behavior.* Boston: Allyn and Bacon, 1994.

Fried, Yitzhak, and Linda H. Slowik. "Enriching Goal-Setting Theory With Time: An Integrated Approach." *Academy of Management Review* 29, no. 3 (2004): 404–422.

Latham, Gary P. "The Motivational Benefits of Goal-Setting." *Academy of Management Executives* 18, no. 4 (2004): 126–129.

Locke, Edwin A., and Gary P. Latham. "Building a Practically Useful Theory of Goal Setting and Task Motivation: A 35-Year Odyssey." *American Psychologist* 57, no. 9 (2002): 705–717.

Morgan, Mark, Raymond Elliot Levitt, and William Malek. *Executing Your Strategy: How to Break It Down and Get It Done.* Cambridge: Harvard Business Press, 2008.

Terpstra, David E., and Elizabeth J. Rozell. "The Relationship of Goal Setting to Organizational Profitability." *Group & Organization Management* 19 (1994): 285–295.

Tubbs, Mark E. "Goal Setting Research in Industrial/ Organizational Psychology." *Multiple Perspectives on the Effects of Evaluation on Performance: Toward an Integration.* ed. Stephen Harkins. Boston: Kluwer Academic Publishers, 2001.

GROUP DECISION MAKING

Group decision making is a type of participatory process in which multiple individuals—acting collectively—analyze problems or situations, consider and evaluate alternative courses of action, and select from among the alternatives a solution or solutions. The number of people involved in group decision making varies greatly, but often ranges from two to seven. The individuals in a group may be demographically similar or quite diverse. Decision-making groups may be relatively informal in nature, or formally designated and charged with a specific goal. The process used to arrive at decisions may be unstructured or structured. The nature and composition of groups, their size, demographic makeup, structure, and purpose, all affect their functioning to some degree. The external contingencies faced by groups (time pressure and conflicting goals) impact the development and effectiveness of decision-making groups as well.

In organizations, many decisions of consequence are made after some form of group decision-making process is undertaken. However, groups are not the only form of collective work arrangement. Group decision making should be distinguished from the concepts of teams, teamwork, and self managed teams. Although the words "teams" and "groups" are often used interchangeably, scholars increasingly differentiate between the two. The basis for the distinction seems to be that teams act more collectively and achieve greater synergy of effort. Katzenback and Smith spell out specific differences between decision-making groups and teams:

- The group has a definite leader, but the team has shared leadership roles.

- Members of a group have individual accountability; the team has both individual and collective accountability.

- The group measures effectiveness indirectly, but the team measures performance directly through their collective work product.

- The group discusses, decides, and delegates, but the team discusses, decides, and does real work.

GROUP DECISION-MAKING METHODS

There are many methods or procedures that can be used by groups. Each is designed to improve the decision-making process in some way. Some of the more common group decision-making methods are brainstorming, dialetical inquiry, nominal group technique, and the delphi technique.

Brainstorming. Brainstorming involves group members verbally suggesting ideas or alternative courses of action. The "brainstorming session" is usually relatively unstructured. The situation at hand is described in as much detail as necessary so that group members have a complete understanding of the issue or problem. The group leader or facilitator then solicits ideas from all members of the group. Usually, the group leader or facilitator will record the ideas presented on a flip chart or marker board. The "generation of alternatives" stage is clearly differentiated from the "alternative evaluation" stage, as group members are not allowed to evaluate suggestions until all ideas have been presented. Once the ideas of the group members have been exhausted, the group members then begin the process of evaluating the utility of the different suggestions presented. Brainstorming is a useful means by which to generate alternatives, but does not offer much in the way of a process for the evaluation of alternatives or the selection of a proposed course of action.

One of the difficulties with brainstorming is that despite the prohibition against judging ideas until all group members have had their say, some individuals are hesitant to propose ideas because they fear the judgment or ridicule of other group members. Some online tools attempt to change this equation. For example, VERN, a tool developed by researchers at UC Berkeley, allows users to make decisions using a visual interface so that all members of the group can contribute equally. Other tools, such as ThinkTank, provide anonymity in polling; this allows for more creativity with less fear of judgment.

Dialetical Inquiry. Dialetical inquiry is a group decision-making technique that focuses on ensuring full consideration of alternatives. Essentially, it involves dividing the group into opposing sides, which debate the advantages and disadvantages of proposed solutions or decisions. A similar group decision-making method, devil's advocacy, requires that one member of the group highlight the potential problems with a proposed decision. Both of these techniques are designed to try and make sure that the group considers all possible ramifications of its decision.

Nominal Group Technique. The nominal group technique is a structured decision-making process in which

group members are required to compose a comprehensive list of their ideas or proposed alternatives in writing. The group members usually record their ideas privately. Once finished, each group member is asked, in turn, to provide one item from their list until all ideas or alternatives have been publicly recorded on a flip chart or marker board. Usually, at this stage of the process verbal exchanges are limited to requests for clarification—no evaluation or criticism of listed ideas is permitted. Once all proposals are listed publicly, the group engages in a discussion of the listed alternatives, which ends in some form of ranking or rating in order of preference. As with brainstorming, the prohibition against criticizing proposals as they are presented is designed to overcome individuals' reluctance to share their ideas. Empirical research conducted on group decision making offers some evidence that the nominal group technique succeeds in generating a greater number of decision alternatives that are of relatively high quality.

Delphi Technique. The Delphi technique is a group decision-making process that can be used by decision-making groups when the individual members are in different physical locations. The technique was developed at the RAND Corporation. The individuals in the Delphi "group" are usually selected because of the specific knowledge or expertise of the problem they possess. In the Delphi technique, each group member is asked to independently provide ideas, input, and/or alternative solutions to the decision problem in successive stages. These inputs may be provided in a variety of ways, such as e-mail, fax, or online in a discussion room or electronic bulletin board. After each stage in the process, other group members ask questions and alternatives are ranked or rated in some fashion. After an indefinite number of rounds, the group eventually arrives at a consensus decision on the best course of action.

ADVANTAGES AND DISADVANTAGES OF GROUP DECISION MAKING

The effectiveness of decision-making groups can be affected by a variety of factors. Thus, it is not possible to suggest that "group decision making is always better" or "group decision making is always worse" than individual decision making. For example, due to the increased demographic diversity in the workforce, a considerable amount of research has focused on diversity's effect on the effectiveness of group functioning. In general, this research suggests that demographic diversity can sometimes have positive or negative effects, depending on the specific situation. A demographically diverse group may have to overcome social barriers and difficulties in the early stages of group formation and this may slow down

the group. However, some research indicates that diverse groups, if effectively managed, tend to generate a wider variety and higher quality of decision alternatives than demographically homogeneous groups.

Despite the fact that there are many situational factors that affect the functioning of groups, research through the years does offer some general guidance about the relative strengths and weaknesses inherent in group decision making. The following section summarizes the major pros and cons of decision making in groups.

Advantages. Group decision making, ideally, takes advantage of the diverse strengths and expertise of its members. By tapping the unique qualities of group members, it is possible that the group can generate a greater number of alternatives that are of higher quality than the individual. If a greater number of higher quality alternatives are generated, then it is likely that the group will eventually reach a superior problem solution than the individual.

Group decision making may also lead to a greater collective understanding of the eventual course of action chosen, since it is possible that many affected by the decision implementation actually had input into the decision. This may promote a sense of "ownership" of the decision, which is likely to contribute to a greater acceptance of the course of action selected and greater commitment on the part of the affected individuals to make the course of action successful.

Disadvantages. There are many potential disadvantages to group decision making. Groups are generally slower to arrive at decisions than individuals, so sometimes it is difficult to utilize them in situations where decisions must be made very quickly. One of the most often cited problems is groupthink. Irving Janis, in his 1972 book *Victims of Groupthink*, defined the phenomenon as the "deterioration of mental efficiency, reality testing, and moral judgment resulting from in-group pressure." Groupthink occurs when individuals in a group feel pressure to conform to what seems to be the dominant view in the group. Dissenting views of the majority opinion are suppressed and alternative courses of action are not fully explored.

Research suggests that certain characteristics of groups contribute to groupthink. In the first place, if the group does not have an agreed upon process for developing and evaluating alternatives, it is possible that an incomplete set of alternatives will be considered and that different courses of action will not be fully explored. Many of the formal decision-making processes (e.g., nominal group technique and brainstorming) are designed, in part, to reduce the potential for groupthink by ensuring that group members offer and consider a large number of decision alternatives.

Secondly, if a powerful leader dominates the group, other group members may quickly conform to the dominant view. Additionally, if the group is under stress and/or time pressure, groupthink may occur. Finally, studies suggest that highly cohesive groups are more susceptible to groupthink.

Group polarization is another potential disadvantage of group decision making. This is the tendency of the group to converge on more extreme solutions to a problem. The "risky shift" phenomenon is an example of polarization; it occurs when the group decision is a riskier one than any of the group members would have made individually. This may result because individuals in a group sometimes do not feel as much responsibility and accountability for the actions of the group as they would if they were making the decision alone.

Decision making in groups is a fact of organizational life for many individuals. Because so many individuals spend at least some of their work time in decision-making groups, groups are the subjects of hundreds of research studies each year. Despite this, there is still much to learn about the development and functioning of groups. Research is likely to continue to focus on identifying processes and tools that will make group decision making more efficient and effective. It is also likely to examine how the internal characteristics of groups (demographic and cognitive diversity) and the external contingencies faced by groups affect their functioning.

BIBLIOGRAPHY

Good, Robin. *Decision Making and Consensus Building Online: ThinkTank Video Intro.* 16 Sept. 2006. Available from: http://www.masternewmedia.org/news/2006/09/16/group_decision_making_and_consensus.htm.

Hinsz, V.B., and G.S. Nickell. "Positive Reactions to Working in Groups in a Study of Group and Individual Goal Decision-Making." *Group Dynamics* 8 (2004): 253–264.

Janis, I. *Victims of Groupthink.* Boston: Houghton Mifflin, 1972.

Kaner, Sam, et al. *Facilitator's Guide to Participatory Decision-Making.* Gabriola Island, B.C.: New Society Publishers, 1996.

Kemp, Jana. *Moving Out of the Box: Tools for Team Decision Making.* Westport, CT: Praeger Publishers, 2007.

Luthans, F. *Organizational Behavior.* 10th ed. Boston: McGraw Hill Irwin, 2005.

Maznevski, M.L. "Understanding Our Differences: Performance in Decision-Making Groups with Diverse Members." *Human Relations* 47, no. 5 (1994): 531–542.

Nelson, D.L., and J.C. Quick. *Organizational Behavior.* 3rd ed. Australia: Southwestern College Publishing, 2000.

Thomas-Hunt, M.C., and K.W. Phillips. "When What You Know Is Not Enough: Expertise and Gender Dynamics in Task Groups." *Personality & Social Psychology Bulletin* 30, no. 12 (2004): 1585–1598.

van de Ven, A. and A. Delbecq. "The Effectiveness of Nominal, Delphi, and Interacting Group Decision-Making Processes." *Academy of Management Journal* 17 (1974): 147–178.

van Knippenberg, D., C.K.W. De Dreu, and A.C. Homan. "Work Group Diversity and Group Performance: An Integrative Model and Research Agenda." *Journal of Applied Psychology* 89 (2004): 1008–1022.

Yardi, Sarita, Hill, Benjamin, and Chan, Stephen. "VERN: facilitating democratic group decision making online." *Proceedings of the 2005 International ACM SIGGROUP Conference on Supporting Group Work.* (2005) Available from: http://doi.acm.org/10.1145/1099203.1099223.

GROUP DYNAMICS

A group can be defined as several individuals who come together to accomplish a particular task or goal. Group dynamics refers to the attitudinal and behavioral characteristics of a group. Group dynamics concern how groups form, their structure and process, and how they function. Group dynamics are relevant in both formal and informal groups of all types. In an organizational setting, groups are a very common organizational entity and the study of groups and group dynamics is an important area of study in organizational behavior.

The following sections provide information related to group dynamics. Specifically, the formation and development of groups is first considered. Then some major types or classifications of groups are discussed. Then the structure of groups is examined.

GROUP DEVELOPMENT

As applied to group development, group dynamics is concerned with why and how groups develop. There are several theories as to why groups develop. A classic theory, developed by George Homans, suggests that groups develop based on activities, interactions, and sentiments. Basically, the theory means that when individuals share common activities, they will have more interaction and will develop attitudes (positive or negative) toward each other. The major element in this theory is the interaction of the individuals involved.

Social exchange theory offers an alternative explanation for group development. According to this theory, individuals form relationships based on the implicit expectation of mutually beneficial exchanges based on trust and felt obligation. Thus, a perception that exchange relationships will be positive is essential if individuals are to be attracted to and affiliate with a group.

Social identity theory offers another explanation for group formation. Simply put, this theory suggests that individuals get a sense of identity and self-esteem based upon their membership in salient groups. The nature of the group may be demographically based, culturally based, or organizationally based. Individuals are motivated to belong to and contribute to identity groups because of

the sense of belongingness and self-worth membership in the group imparts.

Group dynamics as related to development concerns not only why groups form but also how. The most common framework for examining the "how" of group formation was developed by Bruce Tuckman in the 1960s. In essence, the steps of group formation imply that groups do not usually perform at maximum effectiveness when they are first established. They encounter several stages of development as they strive to become productive and effective. Most groups experience the same developmental stages with similar conflicts and resolutions.

According to Tuckman's theory, there are five stages of group development: forming, storming, norming, performing, and adjourning. During these stages group members must address several issues and the way in which these issues are resolved determines whether the group will succeed in accomplishing its tasks.

1. **Forming.** This stage is usually characterized by some confusion and uncertainty. The major goals of the group have not been established. The nature of the task or leadership of the group has not been determined (Luthans, 2005). Thus, forming is an orientation period when members get to know one another and share expectations about the group. Members learn the purpose of the group as well as the rules to be followed. The forming stage should not be rushed because trust and openness must be developed. These feelings strengthen in later stages of development. Individuals are often confused during this stage because roles are not clear and there may not be a strong leader.

2. **Storming.** In this stage, the group is likely to see the highest level of disagreement and conflict. Members often challenge group goals and struggle for power. Individuals often vie for the leadership position during this stage of development. This can be a positive experience for all groups if members can achieve cohesiveness through resolution. Members often voice concern and criticism in this phase. If members are not able to resolve the conflict, then the group will often disband or continue in existence but will remain ineffective and never advance to the other stages.

3. **Norming.** This stage is characterized by the recognition of individual differences and shared expectations. Hopefully, at this stage the group members will begin to develop a feeling of group cohesion and identity. Cooperative effort should begin to yield results. Responsibilities are divided among members and the group decides how it will evaluate progress.

4. **Performing.** Performing, occurs when the group has matured and attains a feeling of cohesiveness. During this stage of development, individuals accept one another and conflict is resolved through group discussion. Members of the group make decisions through a rational process that is focused on relevant goals rather than emotional issues.

5. **Adjourning.** Not all groups experience this stage of development because it is characterized by the disbandment of the group. According to Luthans, some groups are relatively permanent. Reasons that groups disband vary, with common reasons being the accomplishment of the task or individuals deciding to go their own ways. Members of the group often experience feelings of closure and sadness as they prepare to leave.

GROUP TYPES

One common way to classify groups is by whether they are formal or informal in nature. Formal work groups are established by an organization to achieve organizational goals. Formal groups may take the form of command groups, task groups, and functional groups.

Command Groups. Command groups are specified by the organizational chart and often consist of a supervisor and the subordinates that report to that supervisor. An example of a command group is an academic department chairman and the faculty members in that department.

Task Groups. Task groups consist of people who work together to achieve a common task. Members are brought together to accomplish a narrow range of goals within a specified time period. Task groups are also commonly referred to as task forces. The organization appoints members and assigns the goals and tasks to be accomplished. Examples of assigned tasks are the development of a new product, the improvement of a production process, or the proposal of a motivational contest. Other common task groups are ad hoc committees, project groups, and standing committees. Ad hoc committees are temporary groups created to resolve a specific complaint or develop a process. Project groups are similar to ad hoc committees and normally disband after the group completes the assigned task. Standing committees are more permanent than ad hoc committees and project groups. They maintain longer life spans by rotating members into the group.

Functional Groups. A functional group is created by the organization to accomplish specific goals within an unspecified time frame. Functional groups remain in existence after achievement of current goals and objectives. Examples

of functional groups would be a marketing department, a customer service department, or an accounting department.

In contrast to formal groups, informal groups are formed naturally and in response to the common interests and shared values of individuals. They are created for purposes other than the accomplishment of organizational goals and do not have a specified time frame. Informal groups are not appointed by the organization and members can invite others to join from time to time. Informal groups can have a strong influence in organizations that can either be positive or negative. For example, employees who form an informal group can either discuss how to improve a production process or how to create shortcuts that jeopardize quality. Informal groups can take the form of interest groups, friendship groups, or reference groups.

Interest Groups. Interest groups usually continue over time and may last longer than general informal groups. Members of interest groups may not be part of the same organizational department but they are bound together by some other common interest. The goals and objectives of group interests are specific to each group and may not be related to organizational goals and objectives. An example of an interest group would be students who come together to form a study group for a specific class.

Friendship Groups. Friendship groups are formed by members who enjoy similar social activities, political beliefs, religious values, or other common bonds. Members enjoy each other's company and often meet after work to participate in these activities. For example, a group of employees who form a friendship group may have an exercise group, a softball team, or a potluck lunch once a month.

Reference Groups. A reference group is a type of group that people use to evaluate themselves. According to Cherrington, the main purposes of reference groups are social validation and social comparison. Social validation allows individuals to justify their attitudes and values while social comparison helps individuals evaluate their own actions by comparing themselves to others. Reference groups have a strong influence on members' behavior. By comparing themselves with other members, individuals are able to assess whether their behavior is acceptable and whether their attitudes and values are right or wrong. Reference groups are different from the previously discussed groups because they may not actually meet or form voluntarily. For example, the reference group for a new employee of an organization may be a group of employees that work in a different department or even a different organization. Family, friends, and religious affiliations are strong reference groups for most individuals.

GROUP STRUCTURE

Group structure is a pattern of relationships among members that hold the group together and help it achieve assigned goals. Structure can be described in a variety of ways. Among the more common considerations are group size, group roles, group norms, and group cohesiveness.

Group Size. Group size can vary from two people to a very large number of people. Small groups of two to ten are thought to be more effective because each member has ample opportunity to participate and become actively involved in the group. Large groups may waste time by deciding on processes and trying to decide who should participate next. Group size will affect not only participation but satisfaction as well. Evidence supports the notion that as the size of the group increases, satisfaction increases up to a certain point. In other words, a group of six members has twice as many opportunities for interaction and participation as a group of three people. If the size of the group increases beyond ten or twelve members, the result is decreased satisfaction. It is increasingly difficult for members of large groups to identify with one another and experience cohesion.

GROUP ROLES

In formal groups, roles are usually predetermined and assigned to members. Each role will have specific responsibilities and duties. There are, however, emergent roles that develop naturally to meet the needs of the groups. These emergent roles will often replace the assigned roles as individuals begin to express themselves and become more assertive. Group roles can then be classified into work roles, maintenance roles, and blocking roles.

Work roles are task-oriented activities that involve accomplishing the group's goals. They involve a variety of specific roles such as initiator, informer, clarifier, summarizer, and reality tester. The initiator defines problems, proposes action, and suggests procedures. The informer role involves finding facts and giving advice or opinions. Clarifiers will interpret ideas, define terms, and clarify issues for the group. Summarizers restate suggestions, offer decisions, and come to conclusions for the group. Finally, reality testers analyze ideas and test the ideas in real situations.

Maintenance roles are social-emotional activities that help members maintain their involvement in the group and raise their personal commitment to the group. The maintenance roles are harmonizer, gatekeeper, consensus tester, encourager, and compromiser. The harmonizer will reduce tension in the group, reconcile differences, and explore opportunities. Gatekeepers often keep communication channels open and make suggestions that encourage participation. The consensus tester will ask if the

Exhibit 1
Role Ambiguity and Role Conflict
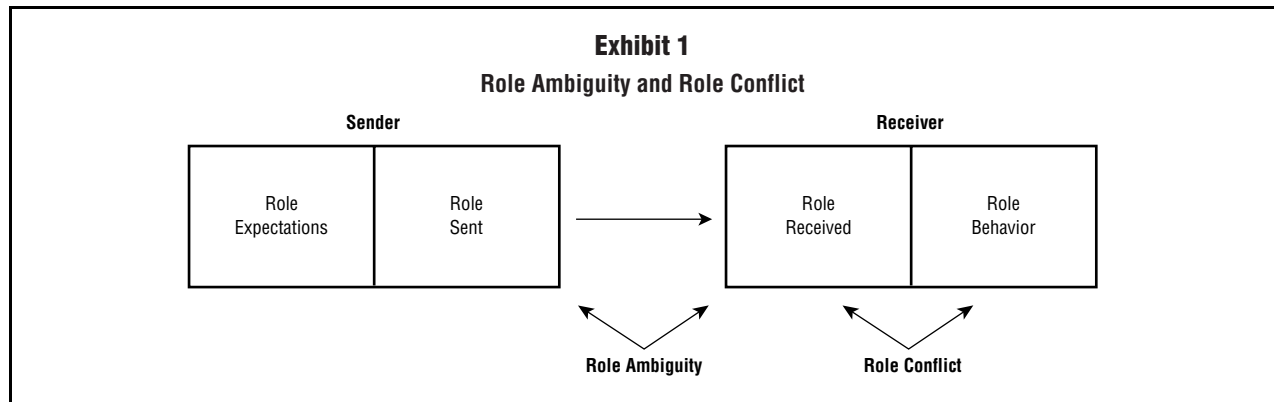
group is nearing a decision and test possible conclusions. Encouragers are friendly, warm, and responsive to other group members. The last maintenance role is the compromiser. This role involves modifying decisions, offering compromises, and admitting errors.

Blocking roles are activities that disrupt the group. They may take the form of dominating discussions, verbally attacking other group members, and distracting the group with trivial information or unnecessary humor. Often times the blocking behavior may not be intended as negative. Sometimes a member may share a joke to break the tension, or may question a decision to force group members to rethink the issue. The blocking roles are aggressor, blocker, dominator, comedian, and avoidance behavior.

The aggressor criticizes members' values and makes jokes in a sarcastic or semi-concealed manner. Blockers will stubbornly resist the group's ideas, disagree with group members for personal reasons, and will have hidden agendas. The dominator role attempts to control conversations by patronizing others. They often interrupt others and assert authority in order to manipulate members. Comedians often abandon the group even though they may physically still be a part. They are attention-getters in ways that are not relevant to the accomplishment of the group's objectives. The last blocking role, avoidance behavior, involves pursuing goals not related to the group and changing the subject to avoid commitment to the group.

Role ambiguity concerns the discrepancy between the sent role and the received role, as shown in Exhibit 1. Supervisors, directors, or other group leaders often send (assign) roles to group members in formal groups. Group members receive roles by being ready and willing to undertake the tasks associated with that role. Ambiguity results when members are confused about the delegation of job responsibilities. This confusion may occur because the members do not have specific job descriptions or because the instructions regarding the task were not clear.

Group members who experience ambiguity often have feelings of frustration and dissatisfaction, which ultimately lead to turnover.

Role conflict occurs when there is inconsistency between the perceived role and role behavior. There are several different forms of role conflict. Interrole conflict occurs when there is conflict between the different roles that people have. For example, work roles and family roles often compete with one another and cause conflict. Intra-role conflict occurs when individuals must handle conflicting demands from different sources while performing the tasks associated with the same role.

Group Norms. Norms are acceptable standards of behavior within a group that are shared by the members of the group. Norms define the boundaries of acceptable and unacceptable behavior. They are typically created in order to facilitate group survival, make behavior more predictable, avoid embarrassing situations, and express the values of the group. Each group will establish its own set of norms that might determine anything from the appropriate dress to how many comments to make in a meeting. Groups exert pressure on members to force them to conform to the group's standards. The norms often reflect the level of commitment, motivation, and performance of the group.

Performance norms determine how quickly members should work and how much they should produce. They are created in an effort to determine levels of individual effort. They can be very frustrating to managers because they are not always in line with the organization's goals. Members of a group may have the skill and ability to perform at higher levels but they don't because of the group's performance norms. For example, workers may stop working a production machine at twenty minutes before quitting time to wash up, even though they produced fewer items that day than management intended.

Reward-allocation norms determine how rewards are bestowed upon group members. For example, the norm

of equality dictates equal treatment of all members. Every member shares equally so rewards are distributed equally to everyone. Equity norms suggest that rewards are distributed according to the member's contribution. In other words, members who contribute the most receive the largest share of the rewards. Members may contribute through effort, skill, or ability. Social responsibility norms reward on the basis of need. Members who have special needs therefore receive the largest share of the reward.

The majority of the group must agree that the norms are appropriate in order for the behavior to be accepted. There must also be a shared understanding that the group supports the norms. It should be noted, however, that members might violate group norms from time to time. If the majority of members do not adhere to the norms, then they will eventually change and will no longer serve as a standard for evaluating behavior. Group members who do not conform to the norms will be punished by being excluded, ignored, or asked to leave the group.

Group Cohesiveness. Cohesiveness refers to the bonding of group members and their desire to remain part of the group. Many factors influence the amount of group cohesiveness. Generally speaking, the more difficult it is to obtain group membership the more cohesive the group. Groups also tend to become cohesive when they are in intense competition with other groups or face a serious external threat to survival. Smaller groups and those who spend considerable time together also tend to be more cohesive.

Cohesiveness in work groups has many positive effects, including worker satisfaction, low turnover and absenteeism, and higher productivity. However, highly cohesive groups may be detrimental to organizational performance if their goals are misaligned with organizational goals. Highly cohesive groups may also be more vulnerable to groupthink. Groupthink occurs when members of a group exert pressure on each other to come to a consensus in decision-making. Groupthink results in careless judgments, unrealistic appraisals of alternative courses of action, and a lack of reality testing. It can lead to a number of decision-making issues such as the following:

1. Incomplete assessments of the problem

2. Incomplete information search

3. Bias in processing information

4. Inadequate development of alternatives

5. Failure to examine the risks of the preferred choice

Evidence suggests that groups typically outperform individuals when the tasks involved require a variety of skills, experience, and decision making. Groups are often more flexible and can quickly assemble, achieve goals, and disband or move on to another set of objectives. Some early twenty-first century research focuses on the traits that comprise a good team player in order to identify specific facets relevant to team performance. This in turn may help increase team effectiveness. Driskill, Goodwin, O'Shea, Salas, and Gavan have identified core teamwork dimensions underlying effective team performance. Further work in this area will provide guidance for managers in successful group formation.

Many organizations have found that groups have many motivational aspects as well. Group members are more likely to participate in decision-making and problem-solving activities leading to empowerment and increased productivity. Groups complete most of the work in an organization; thus, the effectiveness of the organization is limited by the effectiveness of its groups.

SEE ALSO *Brainstorming; Group Decision Making; Teams and Teamwork*

BIBLIOGRAPHY

Cherrington, D.J. *Organizational Behavior.* Boston: Allyn and Bacon, 1994.

Driskill, James E., et al. "What Makes a Good Team Player? Personality and Team Effectiveness." *Group Dynamics: Theory, Research, and Practice* 10, no. 4 (2006): 249–271.

Frey, L.R., and S. Wolf. "The Symbolic & Interpretive Perspective on Group Dynamics." *Small Group Research* 35, no. 3 (2004): 277–316.

Greenberg, J., and R.A. Baron. *Behavior in Organizations.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2000.

Hellriegel, D., and J.W. Slocum, Jr. *Organizational Behavior.* 10th ed. Mason, OH: Thomson South-Western, 2004.

Katz, D., and R. Kahn. *The Social Psychology of Organizations.* 2nd ed. New York: John Wiley & Sons, 1978, 196.

Levin, Daniel. *Group Dynamics for Teams.* Santa Barbara: Sage Publications, 2007.

Luthans, F. *Organizational Behavior.* 10th ed. Boston: McGraw-Hill, 2005.

Robbins, S.P. *Essentials of Organizational Behavior.* Upper Saddle River, NJ: Prentice Hall, 1997.

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HANDHELD COMPUTERS

Handheld computers—also known as personal digital assistants (PDAs)—are small, portable devices that offer users many of the same features and capabilities as desktop computers at a fraction of the size. Although the terms "handheld computer" and "PDA" are often used interchangeably, handhelds tend to be larger and feature miniature keyboards, while PDAs tend to be smaller and rely on a touch screen and stylus for data entry.

Since their introduction in the late 1990s, handheld computers have become standard equipment for many professionals, providing them with tiny, versatile electronic alternatives to paper day planners. "Once the domain of early-adopting gadget lovers, handhelds now organize and update millions of mobile business professionals," reports Mike Brown at Handheldcomputerdepot.com. Users have found PDAs to be particularly helpful tools for organizing and maintaining personal data, such as address books, appointment calendars, project lists, and expense reports. Later incarnations of the technology have also offered users mobile access to electronic mail, news, and entertainment through connectivity to the Internet.

When shopping for a handheld computer, experts recommend that users start by identifying their needs. They should consider, for example, whether they require only personal information management (PIM) functions, or whether they also wish to take notes during meetings, download e-mail and other information from the Internet, and connect with other users through a company computer network. Considering such needs, as well as the available budget, will help users decide among the basic options in handheld computers, including size, display, memory, operating system, and power source.

The size of handheld computers ranges from credit card to small notebook computer, and the available features and power generally increase with greater size. The most popular size for the devices is palm size, which falls somewhere between a calculator and a paperback book. Most handheld computers utilize a liquid crystal display (LCD), which acts as both an input and an output device. Larger PDAs feature keyboards, and most others require users to enter information on a touch screen, either by tapping letters with a stylus or by writing letters on the screen, which the device interprets using handwriting-recognition software. In the future, many handheld units are expected to incorporate voice-recognition technology.

In a 1999 article for *Computerworld,* Matt Hamblen and Sharon Gaudin warned that many corporate information technology (IT) managers were unprepared to deal with the proliferation of handheld computers among employees. They found that some companies ignored the devices, while others simply banned them from connecting to corporate networks. Instead, Hamblen and Gaudin recommended that IT managers embrace the new technology, helping employees choose products and find ways to use them to increase productivity. They argued that businesses should take an active role in deciding which handheld platforms and software applications their networks will support. They cautioned that businesses should also be aware of the security threats posed by handheld devices and take steps to protect the corporate network by establishing software synchronization standards.

SECURITY

A chief concern for companies who have adopted the widespread use of handheld computer devices is the growing number of security threats affecting handheld technology. Many businesses cannot take the risk of sending, receiving, or searching for sensitive information when there is the danger of having that information stolen. PDA devices do not often include the same security technology that protects a company's intranet and desk computers. According to a 2008 survey by the Computing Technology Industry Association spanning four countries, about 71 percent of the companies used some sort of handheld device technology to conduct business, including accessing company data. However, only 39 percent of those companies provided security awareness training to their employees.

Symantec Business Solutions offers a helpful series of guidelines on what steps to take and what habits to form to avoid dangerous security breaches on business handheld devices:

- Create a security program that informs employees on how to use their handheld devices, including where they can use the devices, what areas are off-limits, what sort of company data is to be stored and accessed from the devices, how to create passwords, and what programs may or may not be downloaded.

- Use various security measures, especially file encryption and authentication. This can protect any company data that is lost or stolen, making it unreadable or locked for outside users. Current devices will usually offer some sort of encryption, but for sensitive material a company can hire an outside firm to give them an even more reliable encryption program.

- Take care when transmitting data to and from handheld devices, whether by beam or other methods. Viruses can be spread between handhelds in such transmissions, regardless of which is the sender and which is the receiver. Even when connecting the handheld devices to desktops, security precautions should be taken.

- Consistently update handheld devices through connections to a desktop computer. If data is synchronized with a desktop at regular intervals, then there is a better chance information will be saved. If the data has been copied, the handheld can be compromised without losing much information.

- Install and run antivirus software on all devices: handheld, laptop, and desktop.

- Always go through the proper channels when connecting to the business network.

- Consider using a bit-wiping package to help protect handhelds. Bit-wiping programs erase all data and application on computer devices, formatting the memory so that no information can be recalled. Such programs can be set to activate when a certain number of attempts to access the device have failed, such as failed passwords.

- Be very careful with downloads. Download only from Web sites and from other devices that can be trusted. Be wary when accepting free downloads, and always double-check download packages and instructions.

- Create strong passwords as the first line of defense for handheld devices. Many devices are hacked directly through the user interface, so having a good password is an effective deterrent.

SMARTPHONES

The past several years have seen the a steady decline in the number of PDAs bought and used by companies in the United States. The first quarter of 2006, for instance, dropped more than 22 percent from the previous year's first quarter. Although Palm still dominates the PDA market, more and more businesses are investing in other handheld devices, especially smartphones. Smartphones are high-tech cell phones with wireless capabilities, Internet connections, and often the same keypad capabilities that PDAs have.

Since smartphones can be used to manage e-mail, edit spreadsheets and notes, and search the Internet with the same interfaces that true handheld devices do, it is an easy step for companies to make between PDAs and the new technology that also allows them to receive calls. The devices are seen as more versatile because phone and text messages can be sent in areas that do not provide wireless technology, and e-mails can be used in areas that do not offer telephone service. The most common smartphone platforms used in business are the RIM Blackberry and Windows Mobile. The popular iPhone is not usually used for business purposes because of its unfamiliar interface and the security issues of the older models.

Companies looking to choose a smartphone for their business transactions should carefully consider which type of system is best for their purpose. CEOs may prefer a different sort of application than managers or the sales force. Depending on where the smartphones will be used, a more durable, long-lasting device or one with superior wireless capabilities should be considered. A particular platform should also be chosen: Windows Mobile works well with browsing and managing e-mail, while Blackberry platforms are useful for more general purposes.

PUSH TECHNOLOGY

Push technology refers to the ability of transferring data through a system automatically to a specific user, often to a handheld device. E-mail is usually "pushed" from a desktop to a smartphone or PDA in this fashion, and other programs can be set to respond in the same fashion, so that users receive updates instantaneously no matter what device they are using. Pushing is defined by its automatic nature.

SEE ALSO *Computer Security; Knowledge Management; Knowledge Workers; Technology Management; Technology Transfer; Telecommunications; Time-Based Competition; Virtual Organizations*

BIBLIOGRAPHY

Brown, Mike. *"Handheld Buying Guide."* Handheldcomputerdepot.com. Available from: http://www.handheldcomputerdepot.com/buyingguide.html.

Chunovic, Louis. "Security Risks Seen in Handheld Computer Devices." *Government Security News,* 2008. Available from: http://www.gsnmagazine.com/cms/features/news-analysis/787.html.

Duryee, Tricia. "Apple Ranks As Second-Largest U.S. Smartphone Maker After RIM's Blackberry: Report." *mocoNews.net,* June 2008. Available from:washingtonpost.com/wp-dyn/content/article/2008/06/06/AR2008060603335.html.

Freundenrich, Craig C. "How PDAs Work." *HowStuffWorks.com.* Available from: http://computer/howstuffworks.com/pda.htm.

Gardner, David W. "Handheld Device Market Shrivelling." *Techweb Technology News,* 2006. Available from: http://www.techweb.com/wire/hardware/showArticle.jhtml?articleID=187000191.

Hamblen, Matt, and Sharon Gaudin. "IT Risks Chaos in Handheld Boom: Wireless Trend, Lack of Policies Feed Concern." *Computerworld,* 8 February 1999.

"How-To: Secure your Handheld Device." *PCW Business Center,* 2007. Available from: http://www.pcworld.com/businesscenter/article/135203/howto_secure_your_handheld_device.html.

"PDA, RIP: The Next Big Thing that Wasn't—Or Was It?" *Economist,* 16 October 2003.

"Push." *Phonescoop,* 2008. Available from: http://www.phonescoop.com/glossary/term.php?gid=266.

———."The World at Your Fingertips: Handhelds that Deliver On Phone Calls, E-Mail, and Just Plain Fun." *Business Week,* 6 September 2004.

Zeman, Eric. "Best Smartphone Platforms for Business." *InformationWeek,* June 2008. Available from: http://www.informationweek.com/news/mobility/smart_phones/showArticle.jhtml?articleID=208401988.

HEALTH SAVINGS ACCOUNTS

A health savings account (HSA) is an investment vehicle from which individuals can withdraw funds to pay qualified medical expenses as defined by the Internal Revenue Code. Accumulated funds can be used to pay current medical expenses or can be saved for medical expenses incurred in the future. The account can be set up by an employee in conjunction with his or her employer, but may also be set up by individuals through participating insurance companies and banks. To participate, an individual must have a high-deductible health insurance plan as their only form of health insurance and must not be eligible for Medicare. According to the IRS, for 2009, a high-deductible health care plan is one with at least a $1,100 deductible for an individual or $2,200 for a family, and annual out-of pocket expenses (deductibles and co-payments but not premiums) of up to $5,800 for self-only coverage or $11,600 for family coverage. Participants contribute to the HSA and pay a premium for the high-deductible medical insurance, which is usually lower than the premium for conventional medical insurance. Also, an eligible individual cannot be a dependent of another taxpayer.

The Health Opportunity Patient Empowerment Act of 2006 specified that the maximum annual contribution is the indexed statutory amount for taxable years beginning after December 31, 2006, rather than the previous maximum contribution which was the lesser of the deductible of the accompanying high deductible health plan or the indexed statutory amount.

For 2009, the maximum annual HSA contribution for an eligible individual with self-only coverage is $3,000. For a family, the maximum annual HSA contribution is $5,950. Those who are 55 or older are permitted to make so-called "catch up contributions." In 2009 and all years going forward, the maximum catch-up amount is increased by statute to $1,000.

Eligible individuals on the first day of the last month of the taxable year are allowed the full annual contribution (plus catch-up contribution, if 55 or older by year's end), regardless of the number of months the individual participated.

The individual's contributions to the account are tax deductible and, if an employer contributes to the account on behalf of an employee, the contribution is not taxable to the employee and the employer's taxable income is reduced by the amount of the contribution. Money placed in the account may be invested in a variety of investment vehicles, including stocks, bonds, and mutual funds. Investment gains are non-taxable, as long as money withdrawn from the fund is used for qualified medical expenses. There are maximum annual contributions, which are adjusted for inflation annually.

PURPOSE

Most individuals in the United States who are not self-employed and who are not eligible for Medicare or

Medicaid obtain their health insurance through their employers. There are two major problems with the current system of employer-sponsored health care coverage. First, since the employer usually pays some or all of the insurance premiums and bears the brunt of health care cost increases, the true cost of coverage is hidden from individuals, who therefore have little incentive to manage their health care efficiently. Second, employer-sponsored insurance creates a link between employment and health care that may be broken when an employee loses his or her job. These facts, combined with the tremendous increase in health care costs in the United States since the 1980s, has led the government and employers to look for ways to deliver health care insurance more efficiently and effectively.

Health maintenance organizations (HMOs), adopted by many employers in the 1980s, addressed the cost problem by allowing employers to make arrangements with health care providers to deliver health care services to their employees on a fixed-fee basis. In return for price concessions, employers essentially restricted the choices of participating employees to participating providers. HMOs were successful in reducing health care cost inflation, but their lack of flexibility and perceived over-emphasis on cost containment led to widespread dissatisfaction. Less restrictive preferred provider organizations, which allowed employees more freedom of choice if they were willing to pay a higher portion of costs, became the dominant form of employer-sponsored plans in the 1990s. But PPOs appear to be less successful in restraining health care costs. Thus, the government and employers continue to search for alternatives.

Attention focused on attempting to decouple health insurance from employment and increasing consumer involvement in health care decisions. Such consumer-driven approaches place greater responsibility on individuals to choose and manage their health care. The goal of such approaches is to encourage individuals to be more careful consumers of health care. Flexible spending accounts and medical savings accounts are both consumer-driven approaches.

Health savings accounts overcome many of the difficulties with the earlier approaches to consumer-driven health care. For example, flexible spending accounts require the individual to use all contributed funds annually or lose the funds. Accumulated funds in HSAs carry over from year to year and can be held for life. Medical savings accounts are available only to the self-employed or those employed by small businesses. HSAs are available to anyone, regardless of employment status.

SEE ALSO *Employee Benefits; Employment Law and Compliance; Human Resource Management*

BIBLIOGRAPHY

"2007, 2008 HAS Contribution Limits Released." *Business and Legal Reports.* 13 June 2007. Available from: http://compensation.blr.com/display.cfm/id/155590

Gleckman, H., and L. Woellert. "Your New Health Plan." *Business Week* 8 November 2004, 88–94.

Moran, A.E. "HSAS: The New Consumer Health Plan: Is This the Real Thing?" *Employee Relations Law Journal* 30, no. 1 (2004): 101–111.

U.S. Treasury. Press Release. "Treasury, IRS Issue 2009 Indexed Amounts for Health Savings Accounts." 13 May 2008. Available from: http://www.ustreas.gov/press/releases/hp975.htm.

HUMAN RESOURCE INFORMATION SYSTEMS

Human Resource Information Systems (HRIS) have become one of the most important tools for many businesses. Even the small, twenty-person office needs to realize the benefits of using HRIS to be more efficient. Many firms do not realize how much time and money they are wasting on manual human resource management (HRM) tasks until they sit down and inventory their time. HRIS is advancing to become its own information technology (IT) field. It allows companies to cut costs and offer more information to employees in a faster and more efficient way. Especially in difficult economic times, it is critical for companies to become more efficient in every sector of their business; human resources (HR) is no exception.

In his 2008 book, *The New Human Capital Strategy*, Bradley Hall defines human resources management as watching over and growing human capital, one of the greatest aids businesses have in gaining competitive advantage. The modern human resource concept is based on four integrated parts: skills, structure, systems, and shared values. Skills are the abilities and knowledge that people bring to an organization. Structure refers to the communication channels within the human resource department, who manages and who is accountable. Systems are the tools used to make human resource decisions, the reviews and measures HR managers control. Shared values are the less tangible beliefs and cultural strengths an organization possesses. This four-part concept has been used since the 1960s and still functions as a basic understanding of human resources in the business world.

Although the basic components of the modern human resource system have stayed relatively unchanged since their inception, HR operations are still subject to flaws. According to a study cited by Hall, 75 percent of

studied companies attempt to bend prefabricated HR plans to their particular needs without considering a more integrated, top-down strategy. In many cases, lower-level managers were involved neither in creating the HR processes nor in implementing them. Others chose to focus more on assumed HR positions such as compensation director and staffing director, rather than overall business strategy. Few implemented third-party regular reports and accountability standards. There are, then, many opportunities available for companies to improve their existing HR systems.

ETHICS IN HUMAN RESOURCE MANAGEMENT

Ethical considerations are becoming increasingly important to HR departments in American industries. A tension often exists between a company's financial goals and strategies to improve profits, and ethical considerations with right-behavior concerns. Since human resources departments are often most focused on employees and employee behavior, it falls to them to define ethical behavior, communicate specialized ethical codes, and update or elaborate on existing right-behavior expectations. Human resource management systems are expected to communicate ethical values and so improve company performance.

In the absence of a fully separate ethics department, HR departments can struggle with this ethical burden. A 2008 study done by SHRM, the Society for Human Resource Management, showed that over 50 percent of employers did not make ethical considerations part of their employee evaluations. About half of employees did not think they had means to find ethical advice within their company, and even 19 percent of human resources professionals felt pressure to compromise their ethical standards, coming from multiple directions within their companies, though the HR department was the primary resource for ethical information in 80 percent of studied companies.

One of the ways the HR department can support ethics management for their company is through the maintenance of a code of ethics. Briefly, an ethical code for a business should help employees build trust with each other and their company, while clarifying any uncertain or gray areas that may exist in the company's ethical considerations. Instead of only supporting existing ethical standards, a proper code of ethics should seek to raise the standard and improve employee behavior. The code should show members of the company how to make judgment decisions and encourage such proper decision making, while at the same time providing enforcement protocols to prevent misconduct. When writing the code

of ethics, an HR department should be sure to do the following:

- Create clear objectives for the code and other ethical endeavors to accomplish within the organization.

- Bring all levels of the organization into the process of creating the code, gaining support throughout the company.

- Check on all the latest legislation, both national and state, that may affect the company's ethical processes, expectations, and requirements, so that the ethical code can be as current as possible.

- Use the clearest language possible, making the code accessible and simple to understand.

- Willingly answer realistic problems and address real-life scenarios so that employees will have clear answers to their questions.

- List several resources for employees to seek continuing ethical education, from other reports by the HR department to helpful Web sites that can provide guidance.

- Keep in mind that the code of ethics is meant to be used, making sure that it is communicated to all levels of the organization and readily available to any employee who may need aid making judgment calls.

A code of ethics is only one part of the entire ethical system in an organization. The HR department should also make use of several other ethical tools to ensure employees are practicing right-behaviors and fully understand their ethical requirements.

MERGING AND HR

Whenever there is merger activity, the HR department often has a large responsibility to make sure that employee transitions go smoothly. When companies merge, some of the most significant changes occur in number and treatment of employees. If human resources can successfully deal with these important issues, they can have enormous impact on the success of the transition.

First, the HR department should ascertain the precise number of companies and company subsidiaries involved in the merger. This will give a clear idea of how many employees will be involved in the transition. Some of these employees may work in different businesses or on different products than the HR department has previous experience in, requiring new protocols. Employees across all companies involved will have a variety of reactions to the merger, raising both ethical and temperamental issues for the HR department to solve. To prepare for these issues, HR should pinpoint the managers involved in the

company integration, and gain their assistance throughout the merging of the business lines.

In certain mergers there will be an excess of employees, requiring multiple layoffs. The HR department should ascertain how many excess positions there are and how they will communicate the layoff information to employees and managers alike. Legal issues should also be dealt with; a legal consult with someone who has experience in mergers can be an excellent asset. If employees will be terminated in the merger, it is also up to HR to find out how severance pay and extended benefits will be distributed. Will the company provide assistance for employees seeking new jobs? The HR department will be in charge of such out-placement assistance, and the protocols for who gets such assistance and what qualities (experience, position, etc.) extended benefits will be based on.

While layoff deadlines are being established and employee benefits managed, the HR department should also perform a careful internal audit. The companies merging will have differing employee handbooks offering two sets of employee instructions regarding training and expected behavior. Most will also have different instructions for managers and their treatment of personnel, including chains of communication and conflict resolution. The HR department should be sure to review these separate manuals and create one unifying handbook for the merged procedures. Other plans requiring combination by HR include compensation plans, employee benefits, and ethical standards.

EMPLOYEE SEPARATION AND TURNOVER

One of the most important functions of HRM is to oversee smooth and successful employee separations and turnover. There is always a certain amount of employee turnover at any company, with people voluntarily quitting their jobs for a host of different reasons. These employee separations differ from normal personnel losses resulting from acquisitions, in which employees are laid off and not replaced. For every separation, HR must use recruitment strategies to find a new employee and make sure that the company workforce does not suffer through less skilled workers or workers who are more likely to quit.

There are three types of external employee movement that concern HR departments. The first consists of pure growth, or acquisitions where the company only gains employees without having an excess to lay off, usually involving the annexation of a department or production line. The second type is pure reduction, or movement that only loses employees, such as a series of layoffs to cut costs. Third is all the possible combinations of the first two.

When HR needs to manage such employee separation (and the collective efforts to replace them with other talented workers), separation is divided into three different components, from which policies toward the change can be formed. The first component is quantity: how many employees are leaving the company? These leaving employees, once quantified, are sometimes separated further into categories based on company branches or position. The second component is the quality of employees leaving the organizations. This can refer to the positions they held, the particular talents they possessed (which may be hard to replace), and how they fit into the company's strategies. The third component consists of the costs to the company (costs involved in losing employees, recruiting new ones, and/or training those acquired during a merger).

Succession Planning. Succession planning is another vital part of the HR planning process. It refers to the way in which a company forms policies for replacing key members of its organization, shifting transfer of authority and responsibility carefully from a leaving member to a new member. Often, this means making sure that an arriving employee has the necessary training and experience to fulfill their functions.

RECORDKEEPING IN HR

Another major concern of the HR department are employee personnel records. These records are filed, maintained, and updated through HRM processes. A good HRM system will allow access to files both by the employee they belong to and the managers who require them. Among the informational data kept in employee files, HR should make sure the files include names, addresses, telephone numbers, marital status, dependents, and beneficiaries.

Most HRM strategies have policies established regarding treatment of personnel information. Companies usually collect information that is required only for legal reasons, or reasons necessary to that business. Employees are given chances to read and correct their files, and files are kept strictly by the company, with rules in place for viewing, maintenance, and outside transfer.

Certain pieces of legislation passed affect the storage and retrieval of personnel records. The Sarbanes-Oxley Act requires that every company has some confidential system in place for the communication of fraud-related activities and malfeasance. The Securities and Exchange Commission (SEC) has recently begun to penalize brokers who do not keep complete and detailed records of all their transactions, and the Health Insurance Portability and Accountability Act (HIPAA) requires that all

electronic records concerning patients be put into an easy-transfer format.

BACKGROUND CHECKS

HR departments also manage background checks for potential employees, an increasingly important job as the risk of hiring a misrepresenting employee rises. USA Fact, a provider of screening services for recruiting departments, recently conducted a survey of over 300,000 background checks, and found that among the potential employees, 5 percent had criminal histories, more than a third had motor vehicle violations, 18 percent had employment histories that could not be verified, and approximately 11 percent had been falsifying their education experience. By catching fraudulent records such as these, human resources departments can significantly reduce employee theft, turnover, and even workplace violence.

The sorts of background checks companies can perform include criminal background reviews, Social Security number verification, employment history and education verifications, professional license verification, credit history reviews, and motor vehicle record checks.

There are several guidelines that can be used when HR departments form policies on conducting background checks. First, all inquiries should be strictly related to the position HR is trying to fulfill. Second, all background checks should first be agreed upon by the employee—formal consent in writing is the best way. This gives employees a chance to rethink their applications, especially if they realize a background check would disqualify them for the position. Third, employers should be reasonable. If background checks become over-extensive, they could cost the company too much money and the organization could risk invasion of privacy charges.

HUMAN RESOURCE PLANNING

HR planning attempts to connect employees to the vision, needs, and strategic plans of the company, including management of all aspects of human resources. Essentially, good HR planning will ensure that the best possible employees (with the right talents, ambitions, and personalities) will find the best possible positions within the organization. HR planning can be done in both the short and long term, although long-term strategies are the most common for HR planning purposes.

When HR planning, the company should tie in all of its HR processes to the company's goal and objectives. If HR planning does not exist to further specific objectives of the country, it is not fulfilling its purpose. This can lead to very wide parameters in HR planning, which can include most activities involving connections between employees and the structure of the business itself. There

Exhibit 1

HR Trend Analysis for a Manufacturing Firm

	2006	2007	2008	2009	2010
Projected sales (thousands of dollars)	10,200	8,700	7,800	9,500	10,000
Number of employees	240	200	165	215	?

are many types of analysis HR planning can use, including the following:

- *Workforce analysis* judges the future trends of specific jobs in the company and how they will change, such as technological trends, expected surpluses or layoffs, and needed skill sets.

- *Internal scans* are used to identify key movements and patterns within the organization which may affect HR operations.

- *External scans* look at outside factors which affect employment, such as economic conditions and the need for certain skills.

- *Gap analysis* is used to plot where the HR policies currently are, where they will need to be to meet future goals, and how a company can move ahead in its human resources strategy.

- *Priority setting* allows HR managers to set HR priorities and form strategies for reaching them, based on information previously gathered through other scans.

Demand Forecasting. Demand forecasting is the process of judging future trends in the employment market so that good HR recruitment decisions can be made. It involves analysis of such factors as competition, international movements, legislation, and changes in both technology and society. With proper demand forecasting, employers will be able to tell what skill sets their new employees will need and what positions will become more necessary to business. They will also be able to accurately budget for recruitment endeavors.

There are many different techniques used in demand forecasting, including those listed here:

- Managerial judgment is a type of brainstorming that involves a meeting of managers who gather to diagnose and predict the future job market. These can generally be either top-down or bottom-up, with either the executives forming their plans and trend analysis for discussion, or the mid-level managers bringing their forecasts to the meeting. The best

Exhibit 2

Regression Line Depicting Relationship Between Sales Volume and Workforce Size

The value on the Y axis corresponding to that point (i.e., 230) reflects the needed workforce size.

- The Delphi technique involves recruiting experts on employees and employee trends, and gathering their various forecasts concerning job markets. The resulting statistics are then combined and recombined until the final result is a usable forecast.

- Structured analogies are similar to regression analyses, but they are more creative-oriented, comparing past scenarios involving employment trends and looking at examples from similar situations in the past.

- Judgmental decomposition tries to break a forecasting situation down into smaller parts, which are then separately analyzed and recombined to form a complete view.

These are just some of the techniques used in demand forecasting—what other techniques a company decides to use are based on its HRM strategy.

Judgmental Approaches. Judgmental approaches to demand forecasting involve the use of human judgment, rather than a manipulation of numbers. Two of the most commonly used judgmental techniques are group brainstorming and sales force estimates. The group brainstorming technique of demand forecasting uses a panel of experts (i.e., people within the organization who collectively understand the market, the industry, and the technological developments bearing on HRM needs). These experts are asked to generate a forecast through the process of brainstorming. A variety of brainstorming techniques exist. Most involve a face-to-face discussion among group members, who are asked to reach a consensus.

When using a *group brainstorming* technique to forecast human resources demand, participants must make certain assumptions regarding the future. That is, they must examine the firm's strategic plans for developing new products or services, expanding to new markets, and so forth, and then try to predict such things as:

- Future marketplace demands for the organization's products and services

- The percentage of the market that the organization will serve

- The availability and nature of new technologies that may affect the amounts and types of products or services that can be offered

The accuracy of the forecasts depends on the correctness of these assumptions. Of course, the future is very difficult to predict because it is subject to many uncertainties. Therefore, the organization must continually monitor its demand forecasts in light of any unexpected

types of managerial judgment will combine forecasts from many sources, including HRM.

- Ratio-trend analysis involves researching past trends in organizational employment, with an eye on current changes the organization is going through, to come up with reliable projections concerning future activity. This usually involves ratios, such as that between the number of workers and the revenue of the company. An example of a trend analysis is illustrated in Exhibit 1, which depicts the relationship between a business factor (namely, sales volume) and workforce size. As one can see from the exhibit, if the company expects its 2010 sales to be $10 million, it will need to increase its workforce to a size of nearly 240, which is the number of employees it had in 2006 when sales were $10.2 million.

- Regression analysis is a more advanced version of ratio-trend analysis, involving the plotting of past relationships so that regression lines can be drawn and trends planned out. An example of how regression analysis can be used to project HR demand is shown in Exhibit 2. In this example, the figures used in the trend analysis (Exhibit 1) are now depicted in the form of a scatter diagram. The line running through the center of the points plotted on the scatter diagram is the regression line. To determine the number of employees needed when the sales volume is $10 million, one would follow the path indicated by the dashed line. One would start at the point on the X axis reading "10,000" and then move up vertically until reaching the regression line.

changes. HRMS packages facilitate the calculation and monitoring of demand forecasts.

The use of *sales force* estimates represents another judgmental approach for forecasting HR demand. This approach is most appropriately used when the need for additional employees arises from the introduction of new products. When a new product is launched, sales personnel are asked to estimate the demand for the product (i.e., expected sales volume) based on their knowledge of customer needs and interests. The organization then uses this information to estimate how many employees will be needed to meet this demand. One drawback of this approach is the possibility of bias. Some sales personnel may purposely underestimate product demands so they will look good when their own sales exceed the forecasts. Others may overestimate demand because they are overly optimistic about their sales potential.

SUPPLY FORECASTING

Once a demand forecast has been made, an organization has a relatively good idea of the number and nature of positions it will need to carry out its work at a particular point in time. It then estimates which of these positions will be filled at that time by individuals who already are employed by the company. The process used to make this estimation is called supply forecasting.

Supply forecasting is a two-step process. HRMS packages provide the employer with the means to automate much of these two steps. In the first step, the organization groups its positions by title, function, and responsibility level. These groupings should reflect levels of positions across which employees may be expected to advance. For instance, the HRM group might include the job titles of HR assistant, HR manager, and HR director. The secretarial group might include secretarial clerk, principal secretary, senior secretary, and administrative assistant.

The second step of supply forecasting is to estimate, within each job group, how many current employees will remain in their positions during the planning period, how many will move to another position (e.g., through transfer, promotion, or demotion), and how many will leave the organization. These predictions are partially based on past mobility trends (e.g., turnover and promotion rates). The organization also should consider any plans for mergers, acquisitions, unit or division divestitures, layoffs, retrenchments and downsizing, and even hostile take-overs. When making its supply forecast, the organization also should look at specific individuals. Some may have already announced, for instance, that they are retiring at the end of the year, returning to school in the fall, or getting married and planning on moving to a different part of the country.

Computerized statistical packages are available to help estimate the flow of employees through an organization. The estimates generated by these packages can be fairly accurate in stable environments. When the environment is unstable, of course, these estimates are suspect. For instance, an organization may base its estimates on past turnover rates, which have been about 10 percent during each of the past five years. If the turnover rate were to change drastically because of factors such as job dissatisfaction or downsizing, the organization would severely underestimate its future staffing needs.

OUTCOMES OF THE HR PLANNING PROCESS

When the HR planning process is completed, a firm must establish and implement HRM practices in order to meet its human resource needs. Following is a brief overview of how HRM practices can help organizations deal with anticipated oversupplies and undersupplies of personnel.

The trend toward organizational restructuring usually results in a smaller workforce. Therefore, when an organization's strategic plan calls for restructuring, the HRM response usually is one of downsizing. Downsizing usually results in layoffs. Because of the negative outcomes that are often associated with layoffs, employers are encouraged to seek alternatives, such as hiring freezes, early retirements, restricted overtime, job sharing, and pay reductions.

When the results of demand and supply forecasting project an undersupply of personnel at some future point in time, the organization must decide how to resolve this problem. The solution may involve hiring additional staff, but there are other options. When HR plans indicate an undersupply of employees, firms can recruit personnel to staff jobs with anticipated vacancies. HRMS packages provide employers with capabilities to carry out recruitment in all of its steps. The first step is to conduct a job analysis to determine the qualifications needed for each vacant job.

The next step is to determine where and how to recruit the needed individuals. For instance, a company must decide whether to fill its vacancies externally (i.e., from the external labor market) or internally (i.e., from its own current workforce). When recruiting externally, an organization should first assess its attractiveness in the eyes of potential applicants; unattractive employers may have trouble generating a sufficiently large applicant pool. Such employers should attempt to increase the number of people who are attracted to the organization and thus interested in applying for a job there. This may be accomplished by increasing starting pay levels and/or improving benefit packages. Another option is to target certain protected groups whose members may be

underemployed in the local labor market, such as older, disabled, or foreign-born individuals.

Internal recruitment efforts can be improved through the use of career development programs. When designing such a program, the organization should collect work history and skill-level information on each of its employees. Such information would include age, education level, training, special skills (e.g., foreign language spoken), and promotion record, and should be stored on a computer. This employee information allows the organization to identify current employees who are qualified to assume jobs with greater responsibility levels. For instance, in departments where skilled managers are in short supply, a management replacement chart can be prepared that lists present managers, proposes likely replacements, and gives an estimate of when the replacement candidate will be trained and available to fill an open position.

Instead of hiring new workers to meet increasing demands, an organization may decide to improve the productivity of the existing workforce through additional training. Other options include the use of overtime, additional shifts, job reassignments, and temporary workers. Another option is to improve retention rates. When this aim is met, firms will have fewer job vacancies to fill.

Retention rates can be improved at the outset of the employer/employee relationship, when applicants are first recruited. Retention rates are likely to improve when applicants are given a realistic preview of what their jobs would actually be like (warts and all), rather than an overly glowing one.

Workers want to feel valued and needed by their organization. In a climate characterized by mergers, acquisitions, and layoffs, many workers feel very insecure about their jobs. Employees with such feelings often begin shopping around for other jobs. These fears can be eased by implementing HR plans for training and cross-training. Such plans allow workers to perform a variety of functions, thus ensuring that they have the necessary skills to continue making contributions to the firm. Management training also is crucial in this regard. Organizations must train managers to be good supervisors. Poor "people management" is a primary cause of voluntary turnover. Managers at all levels should know what is expected of them, in terms of managing people instead of just managing budgets.

HUMAN RESOURCE MANAGEMENT SYSTEMS

Several major software companies provide HRMS packages. SAP, PeopleSoft, Oracle, and ADP are the largest. Depending on the company's needs and size, package options may include some or all of the following services:

- Employee career cycle management
- 24/7 data access to authorized managers
- Customized levels of access to confidential data
- Pre-populated forms and templates
- Access to real-time data—with instantaneous updates
- Employee administration
- Benefits administration
- Compliance
- Recruitment
- Performance and development
- Safety and health
- Succession planning
- Time-off management
- Organization management
- Payroll
- Training
- 401(k) plan administration

The opportunities to add more services are endless and continue to improve.

For most companies, the hardware and software needed to run these programs are fairly standard. Hardware and software is dependent on the complexity of the HRMS package; more complex HRMS packages require more hardware (e.g., server space and speed).

Another benefit of HRMS includes allowing HR to transition from an administrative department to a strategic management department. The strategic value aspect of the HRMS investment focuses on managing human capital by supporting functions such as recruitment, performance/competency management, employee development, and employee customer service. By executing well in these areas, companies can reduce employee turnover, reduce hiring costs, and improve individual performance.

Another HRMS trend is the use of online surveys. This allows companies to get fast information on their employees, policies, procedures, competition, and anything else they decide to survey. This also gives employees a sense of belonging and contributing to their company. Online employee surveys usually have an 80 percent return ratio, which is much higher than paper surveys.

Employees are becoming more self sufficient in the workplace because of HRMS and the growth of technology. They are able to answer questions, download forms, enroll in benefits, change payroll options, and complete training on their own. This saves both time and money. An employee does not have to make several phone calls in order to speak with the one person who knows the answer

to their questions. Answers are readily available, usually on the company intranet. This also frees up HR to focus on more profitable activities for the company, such as recruiting and employee development.

Another growing trend includes improved methods for monitoring and managing employees' use of the Internet. This helps management to improve productivity, reduce legal liabilities, and control IT costs. Companies are blocking e-mail that may be offensive in order to reduce legal liabilities. They also are blocking Web sites that are inappropriate for workplace viewing. This has improved productivity by reducing nonproductive activities.

HRMS providers have products for companies of all sizes. These providers profit by maximizing the services they offer. Therefore, they are going to target large companies that need more support. However, providers are still interested in small companies, and those that will need more support as they grow.

SOFTWARE EXAMPLES

There are many software programs designed to help in HRIS process. The following are only a few of the companies currently providing HRIS software:

- *Ascentis* offers payroll and HRM programs for small- to mid-level organizations, software that tracks many traditional employee benefits and several nontraditional such as paid parking and club memberships.

- *Apex Business Software* offers HR programs to meet company objectives and manage many facets of the HR process, including employee leave and benefit tracking. They also offer instant access to employee attendance information that can be made available even to customers, thereby enforcing accountability.

- *People Trak* has a wide variety of HR software, including personnel, compensation, safety, applicant, and position management. They also have programs for COBRA and benefit administration, for both simple tasks and strategic planning of HRM.

- *ManagerAssistant* offers software with many different modules developed to assist HR employees in each stage of HR analysis.

- *Atlas Business Solutions* creates programs that allow easy filing and retrieval of employee information, including vacation accruals and performance evaluations, in their software package called Staff Files.

As the need for corporate cost-cutting, efficiency, and productivity becomes more important, the HRMS industry is going to continue to have strong growth potential. Not only can HRMS help with employee administration from recruiting to benefits, it can save companies thousands of dollars by lowering workforce and employee turnover levels. By 2005, the corporate world had only seen the beginning potential of HRMS.

SEE ALSO *Human Resource Management*

BIBLIOGRAPHY

Aswathappa, K. *Human Resource and Personnel Management: Text and Cases.* Tata McGraw-Hill, 2005.

Cascio, Wayne F., and John W. Boudreau. *Investing in People: Financial Impact of Human Resource Initiatives.* FT Press, 2008.

"Code of Ethics Toolkit." *Ethics Resource Center,* 2001. Available from: http://www.shrm.org/ethics/chapter-coe.pdf.

Cook, Mary F. *The Complete Do-It-Yourself Human Resources Department, 2007 Edition.* Aspen Publishers Online, 2006.

Deckop, John Raymond. *Human Resource Management Ethics.* IAP, 2006.

Dessler, Gary. *Human Resource Management.* 10th ed. Englewood Cliffs, NJ: Pearson/Prentice-Hall, 2004.

Gueutal, Hal G., and Dianna L. Stone, eds. *The Brave New World of eHR: Human Resources Management in the Digital Age.* San Francisco: Jossey-Bass, 2005.

Hamerman, Paul. "HR and Administrative B2E: Maturing and Expanding." Business.com, 2005. Available from: http://www.business.com/directory/human_resources/outsourcing/hrms_hris.

Hall, Bradley W. *The New Human Capital.* AMACOM Div Management Assn, 2008..

———. "Justifying IT Investments: Human Resources Management Systems." Giga Information Group. Available from: http://www.majoraccounts.adp.com/news/art_hrms.htm.

HR Resources. *HR-Software.net.* www.hr-software.net.

"Human Resource Information Systems (HRIS) Outsourcing." Business.com. Available from: http://www.business.com/directory/human_resources/outsourcing/hrms_hris.

"Human Resource Management." *Accel Team.* www.accel-team.com, 2008.

"Human Resources Solutions." *Strategic HR.* www.strategichr.com, 2008.

Losey, Mike, Sue Meisinger, and Dave Ulrich, eds. *The Future of Human Resource Management: 64 Thought Leaders Explore the Critical HR Issues of Today and Tomorrow.* New York: John Wiley & Sons, 2005.

Mattis, Michael. "Where Ethics and HR Collide." *Bnet.* blogs.bnet.com, 2008.

Oracle Corp. "Products and Industries." Available from: http://www.peoplesoft.com/corp/en/products.

"Running Background Checks on Job Applicants." *Nolo.* Nolo.com, 2008.

HUMAN RESOURCE MANAGEMENT

Human resource management (HRM), also called personnel management, consists of all the activities undertaken by an enterprise to ensure the effective utilization of

employees toward the attainment of individual, group, and organizational goals. An organization's HRM function focuses on the people side of management. It consists of practices that help the organization to deal effectively with its people during the various phases of the employment cycle, including pre-hire, staffing, and post-hire. The pre-hire phase involves planning practices. The organization must decide what types of job openings will exist in the upcoming period and determine the necessary qualifications for performing these jobs. During the hire phase, the organization selects its employees. Selection practices include recruiting applicants, assessing their qualifications, and ultimately selecting those who are deemed to be the most qualified.

In the post-hire phase, the organization develops HRM practices for effectively managing people once they have "come through the door." These practices are designed to maximize the performance and satisfaction levels of employees by providing them with the necessary knowledge and skills to perform their jobs and by creating conditions that will energize, direct, and facilitate employees' efforts toward meeting the organization's objectives.

HRM DEVELOPMENT AND IMPLEMENTATION RESPONSIBILITIES

While most firms have a human resources or personnel department that develops and implements HRM practices, the ultimate responsibility lies with both HR professionals and line managers. The interplay between managers and HR professionals leads to effective HRM practices. For example, consider performance appraisals. The success of a firm's performance appraisal system depends on the ability of both parties to do their jobs correctly. HR professionals develop the system, while managers provide the actual performance evaluations.

The nature of these roles varies from company to company, depending primarily on the size of the organization. This discussion assumes a large company with a sizable HRM department. However, in smaller companies without large HRM departments, line managers must assume an even larger role in effective HRM practices.

HR professionals typically assume the following four areas of responsibility: establishing HRM policies and procedures, developing/choosing HRM methods, monitoring/evaluating HRM practices, and advising/assisting managers on HRM-related matters. HR professionals typically decide (subject to upper-management approval) what procedures to follow when implementing an HRM practice. For example, HR professionals may decide that the selection process should include having all candidates (1) complete an application, (2) take an employment test,

and then (3) be interviewed by an HR professional and line manager.

Usually the HR professionals develop or choose specific methods to implement a firm's HRM practices. For instance, in selection the HR professional may construct the application blank, develop a structured interview guide, or choose an employment test. HR professionals also must ensure that the firm's HRM practices are properly implemented. This responsibility involves both evaluating and monitoring. For example, HR professionals may evaluate the usefulness of employment tests, the success of training programs, and the cost effectiveness of HRM outcomes such as selection, turnover, and recruiting. They also may monitor records to ensure that performance appraisals have been properly completed.

HR professionals also consult with management on an array of HRM-related topics. They may assist by providing managers with formal training programs on topics like selection and the law, how to conduct an employment interview, how to appraise employee job performance, or how to effectively and appropriately discipline employees. HR professionals also provide assistance by giving line managers advice about specific HRM-related concerns, such as how to deal with problem employees.

Line managers direct employees' day-to-day tasks. From an HRM perspective, line managers are mainly responsible for implementing HRM practices and providing HR professionals with necessary input for developing effective practices. Managers carry out many procedures and methods devised by HR professionals. For instance, line managers are responsible for the following activities:

- Interview job applicants.

- Provide orientation, coaching, and on-the-job training.

- Provide and communicate job performance ratings.

- Recommend salary increases.

- Carry out disciplinary procedures.

- Investigate accidents.

- Settle grievance issues.

The development of HRM procedures and methods often requires input from line managers. For example, when conducting a job analysis, HR professionals often seek job information from managers and ask managers to review the final written product. Additionally, when HR professionals determine an organization's training needs, managers often suggest what types of training are needed and who, in particular, needs the training.

HISTORICAL MILESTONES IN HRM DEVELOPMENT

Table 1 identifies some of the major milestones in the historical development of HRM. Frederick Taylor, known as the father of scientific management, played a significant role in the development of the personnel function in the early 1900s. In his book, *Shop Management*, Taylor advocated the "scientific" selection and training of workers. He also pioneered incentive systems that rewarded workers for meeting and/or exceeding performance standards. Although Taylor's focus primarily was on optimizing efficiency in manufacturing environments, his principles laid the groundwork for future HRM development. As Taylor was developing his ideas about scientific management, other pioneers were working on applying the principles of psychology to the recruitment, selection, and training of workers. The development of the field of industrial psychology and its application to the workplace came to fruition during World War I, as early vocational and employment-related testing was used to assign military recruits to appropriate functions.

The Hawthorne Studies, which were conducted in the 1920s and 1930s at Western Electric, sparked an increased emphasis on the social and informal aspects of the workplace. Interpretations of the studies emphasized "human relations" and the link between worker satisfaction and productivity. The passage of the Wagner Act in 1935 contributed to a major increase in the number of unionized workers. In the 1940s and 1950s, collective bargaining led to a tremendous increase in benefits offered to workers. The personnel function evolved to cope with labor relations, collective bargaining, and a more complex compensation and benefits environment. The human relations philosophy and labor relations were the dominant concerns of HRM in the 1940s and 1950s.

HRM was revolutionized in the 1960s by passage of Title VII of the Civil Rights Act and other anti-discrimination legislation—as well as presidential executive orders that required many organizations to undertake affirmative action in order to remedy past discriminatory practices. Equal employment opportunity and affirmative action mandates greatly complicated the HRM function, but also enhanced its importance in modern organizations. As discussed more fully in a later section, these responsibilities continue to comprise a major part of the HRM job. Finally, changes in labor force demographics, technology, and globalization since the 1980s have had a major impact on the HRM function. These factors also are discussed in more detail in a later section.

PRE-HIRING, HIRING, AND POST-HIRING

Pre-hire phase. The major HRM activities in the pre-hire phase are human resource planning and job analysis.

Table 1

Milestones in the Development of Human Resource Management

1890-1910	Frederick Taylor develops his ideas on scientific management. Taylor advocates scientific selection of workers based on qualifications and also argues for incentive-based compensation systems to motivate employees.
1910-1930	Many companies establish departments devoted to maintaining the welfare of workers. The discipline of industrial psychology begins to develop. Industrial psychology, along with the advent of World War I, leads to advancements in employment testing and selection.
1930-1945	The interpretation of the Hawthorne Studies begins to have an impact on management thought and practice. Greater emphasis is placed on the social and informal aspects of the workplace affecting worker productivity. Increasing the job satisfaction of workers is cited as a means to increase their productivity.
1945-1965	In the U.S., a tremendous surge in union membership between 1935 and 1950 leads to a greater emphasis on collective bargaining and labor relations within personnel management. Compensation and benefits administration also increase in importance as unions negotiate paid vacations, paid holidays, and insurance coverage.
1965-1985	The Civil Rights movement in the U.S. reaches its apex with passage of the Civil Rights Act of 1964. The personnel function is dramatically affected by Title VII of the CRA, which prohibits discrimination on the basis of race, color, sex, religion, and national origin. In the years following the passage of the CRA, equal employment opportunity and affirmative action become key human resource management responsibilities.
1985-present	Three trends dramatically impact HRM. The first is the increasing diversity of the labor force, in terms of age, gender, race, and ethnicity. HRM concerns evolve from EEO and affirmative action to "managing diversity." A second trend is the globalization of business and the accompanying technological revolution. These factors have led to dramatic changes in transportation, communication, and labor markets. The third trend, which is related to the first two, is the focus on HRM as a "strategic" function. HRM concerns and concepts must be integrated into the overall strategic planning of the firm in order to cope with rapid change, intense competition, and pressure for increased efficiency.

These activities form the cornerstone upon which other HRM practices are built. Human resource planning helps managers to anticipate and meet changing needs related to the acquisition, deployment, and utilization of employees. The organization first maps out an overall plan called a strategic plan. Then, through demand and supply forecasting it estimates the number and types of employees needed to successfully carry out its overall plan. Such information enables a firm to plan its recruitment, selection, and training strategies. For example, assume that a firm's HR plan estimates that fifteen additional engineers will be needed during the next year. The firm typically hires recent engineering graduates to fill such positions. Because these majors are in high demand, the firm decides to begin its campus recruiting early in the academic

year, before other companies can "snatch away" the best candidates.

Job analysis is the systematic process used for gathering, analyzing, and documenting information about particular jobs. The analysis specifies what each worker does, the work conditions, and the worker qualifications necessary to perform the job successfully. The job analysis information is used to plan and coordinate nearly all HRM practices, including:

- Determining job qualifications for recruitment purposes
- Choosing the most appropriate selection techniques
- Developing training programs
- Developing performance appraisal rating forms
- Helping to determine pay rates
- Setting performance standards for productivity improvement programs

For example, an organization may decide to use a mechanical aptitude test to screen applicants because a job analysis indicated that mechanical aptitude is an important job skill for a specific position. Or, a firm may raise the pay of one of its employees because a job analysis indicated that the nature of the work recently changed and is now more demanding or requires further education.

Hiring Phase. The hiring phase of human resource management is also called staffing. Staffing involves policies and procedures used by organizations to recruit and select employees. Organizations use recruitment to locate and attract job applicants for particular positions. They may recruit candidates internally (i.e., recruit current employees seeking to advance or change jobs) or externally. The aim of recruitment practices is to identify a suitable pool of applicants quickly, cost-efficiently, and legally. Selection involves assessing and choosing among job candidates. To be effective, selection processes must be both legal and technically sound, accurately matching people's skills and experience with available positions.

Post-Hiring Phase. Training and development are planned learning experiences that teach workers how to effectively perform their current or future jobs. Training focuses on present jobs, while development prepares employees for possible future jobs. Training and development practices are designed to improve organizational performance by enhancing the knowledge and skill levels of employees. A firm must first determine its training needs and then select/develop training programs to meet these needs. It also must take steps to ensure that workers apply what they have learned on the job. Many companies will pay for refresher courses for long-term employees

or offer a tuition reimbursement program for courses an employee takes that enhance his or her on-the-job ability.

Through the performance appraisal process, organizations measure the adequacy of their employees' job performances and communicate these evaluations to them. One aim of appraisal systems is to motivate employees to continue appropriate behaviors and correct inappropriate ones. Management also may use performance appraisals as tools for making HRM-related decisions, such as promotions, demotions, discharges, and pay raises.

Compensation entails pay and benefits. Pay refers to the wage or salary employees earn, while benefits are a form of compensation provided to employees in addition to their pay, such as health insurance or employee discounts. The aim of compensation practices is to help the organization establish and maintain a competent and loyal workforce at an affordable cost.

Productivity improvement programs tie job behavior to rewards. Rewards may be financial (e.g., bonuses and pay raises) or nonfinancial (e.g., improved job satisfaction). Such programs are used to motivate employees to engage in appropriate job behaviors, namely those that help the organization meet its goals.

CONTEMPORARY ISSUES

HRM departments within organizations, just as the organizations themselves, do not exist in a vacuum. Events outside of work environments have far-reaching effects on HRM practices. The following paragraphs describe some of these events and indicate how they influence HRM practices.

As mentioned previously, the enactment of federal, state, and local laws regulating workplace behavior has changed nearly all HRM practices. Consider, for instance, the impact of anti-discrimination laws on hiring practices. Prior to the passage of these laws, many firms hired people based on reasons that were not job-related. Today, such practices could result in charges of discrimination. To protect themselves from such charges, employers must conduct their selection practices to satisfy objective standards established by legislation and fine-tuned by the courts. This means they should carefully determine needed job qualifications and choose selection methods that accurately measure those qualifications.

Social, economic, and technological events also strongly influence HRM practices. These events include:

- An expanding cultural diversity at the workplace
- The emergence of work and family issues
- The growing use of part-time, seasonal, contracted, and temporary employees
- An increased emphasis on quality and teamwork

- The occurrence of mergers and takeovers
- The occurrence of downsizing and layoffs
- The rapid advancement of technology
- An emphasis on continuous quality improvement
- A high rate of workforce illiteracy

These events influence HRM practices in numerous ways. For example:

- Some firms are attempting to accommodate the needs of families by offering benefit options like maternity leave, child care, flextime, telecommuting, and job sharing.
- Some firms are attempting to accommodate the needs of older workers through skill upgrading and training designed to facilitate the acceptance of new techniques.
- Some firms are educating their employees in basic reading, writing, and mathematical skills so that they can keep up with rapidly advancing technologies.

Unions often influence a firm's HRM practices. Unionized companies must adhere to written contracts negotiated between each company and its union. Union contracts regulate many HRM practices, such as discipline, promotion, grievance procedures, and overtime allocations. HRM practices in non-unionized companies may be influenced by the threat of unions. For example, some companies have made their HRM practices more equitable (i.e., they treat their employees more fairly) simply to minimize the likelihood that employees would seek union representation.

Legal, social, and political pressures on organizations to ensure the health and safety of their employees have had great impacts on HRM practices. Organizations respond to these pressures by instituting accident prevention programs and programs designed to ensure the health and mental well-being of their employees, such as wellness and employee assistance programs.

Today's global economy also influences some aspects of HRM. Many firms realize that they must enter foreign markets in order to compete as part of a globally interconnected set of business markets. From an HRM perspective, such organizations must foster the development of more globally-oriented managers: individuals who understand foreign languages and cultures, as well as the dynamics of foreign market places. These firms also must deal with issues related to expatriation, such as relocation costs, selection, compensation, and training.

EMPLOYMENT

Someone wishing to enter the HRM field may choose one of two routes: generalist or specialist. Entry-level HRM

Exhibit 1a

HRM Specialty Areas

Traditional Specialty Areas

Training/Development
Conducts training needs analysis; designs/conducts/evaluates training programs; develops/implements succession planning programs.

Compensation/Benefits
Develops job descriptions; facilitates job evaluation processes; conducts/interprets salary surveys; develops pay structure; designs pay-for-performance and/or performance improvement programs; administers benefits program.

Employee/Industrial Relations
Helps resolve employee relations problems; develops union avoidance strategies; assists in collective bargaining negotiations; oversees grievance procedures.

Employment/Recruiting
Assists in the HR planning process; develops/purchases HR information systems; develops/updates job descriptions; oversees recruiting function; develops and administers job posting system; conducts employment interviews, reference checks, and employment tests; validates selection procedures; approves employment decisions.

Safety/Health/Wellness
Develops accident prevention strategies; develops legal safety and health policies; implements/promotes EAP and wellness programs; develops AIDS and substance abuse policies.

EEO/Affirmative Action
Develops and administers affirmative action programs; helps resolve EEO disputes; monitors organizational practices with regard to EEO compliance; develops policies for ensuring EEO compliance, such as sexual harassment policies.

HRM Research
Conducts research studies, such as cost-benefit analysis, test validation, program evaluation, and feasibility studies.

(cont. Exhibit 1b)

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generalist positions are most often found in small or mid-sized organizations that employ few HR professionals—one or two people who must perform all functions. Because of their many responsibilities, HRM generalists have neither time nor resources to conduct in-depth studies or projects. They usually hire outside consultants who specialize in these kinds of services. For example, consultants might help the organization to revamp its compensation system, validate its selection practices, or analyze its training needs.

In larger organizations, each HR professional's area tends to be more focused, zeroing in on particular HRM tasks. Individuals holding these positions are called HRM specialists. Exhibits 1a and 1b describe some traditional and newer HRM specialty areas.

In most professions a direct path leads to entering the field. For instance, someone aspiring to be a lawyer, physician, accountant, or psychologist enrolls in appropriate educational programs and enters the field upon receiving a degree or license. HRM is atypical in this

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Exhibit 1b

HRM Specialty Areas (cont.)

New HRM Specialty Areas

Work and Family Programs
Develops and administers work and family programs including flextime, alternative work scheduling, dependent-care assistance, telecommuting, and other programs designed to accommodate employee needs; identifies and screens child- or elder-care providers; administers employer's private dependent-care facility; promotes work and family programs to employees.

Cross-Cultural Training
Translates the manners, mores, and business practices of other nations and cultures for American business people. Other cross-cultural trainers work with relocated employees' families, helping them adjust to their new environment.

Managed-Care
As a company's health-care costs continue to escalate, employers are embracing managed-care systems, which require employees to assume some of the costs. Employers hire managed-care managers to negotiate the best options for employees.

Managing Diversity
Develops policies and practices to recruit, promote, and appropriately treat workers of various ages, races, sexes, and physical abilities.

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regard; people may enter the profession in a variety of ways. For instance, most of today's HR professionals enter the field through self-directed career changes. Approximately one-third of these individuals entered HRM by transferring from another part of the company; the remainder entered from other fields such as education, social services, accounting, sales, and administrative secretarial positions.

HR professionals entering the field directly out of college (about one-third of all HR professionals) traditionally come from a variety of academic backgrounds, including business, psychology, and liberal arts. More recently, however, HRM new hires have earned degrees in some area of business, such as HRM, management, or general business. For instance, when it hires recent graduates for entry-level HRM positions, Bell Atlantic considers business school graduates with concentrations in business administration, finance and commerce, management, or industrial relations. A survey of HR professionals revealed the following college majors: HRM (17 percent), business administration (23 percent), management (13 percent), psychology (12 percent), and labor/industrial relations (10 percent).

As one might expect, large organizations provide the greatest opportunities for HRM career growth. Most senior-level HR professionals take one of two paths up the corporate ladder. Some begin their careers as specialists and eventually become managers of their specialty units. To advance beyond this level, they must broaden their skills and become HRM generalists. The other path to securing a senior-level HRM position is to begin as an assistant HRM generalist at a small plant or unit within the organization and advance into an HRM managerial role at successively larger plants or units. An HRM career in manufacturing might progress as follows:

1. The individual is hired as an HRM assistant at a manufacturing plant.

2. Within five or six years, the individual advances to the HRM manager's post at the plant.

3. Between six and ten years, the HR professional becomes the HRM manager at a larger plant.

4. During the eleven- to fifteen-year range, the person reaches a senior-level HRM position at the divisional level and has several HRM generalists and/or specialists reporting to him or her.

5. Between fifteen and twenty years, the person reaches a senior-level executive position, such as vice president of human resources.

ORGANIZATIONAL ETHICS

HR professionals primarily are responsible for developing HRM practices that enhance a firm's competitive advantage. HR professionals also have the responsibility to ensure that employees are treated ethically. Almost all HRM decisions have ethical consequences. Despite the abundance of laws designed to ensure fair treatment at the workplace, employees often are treated in an unethical manner. In some instances, employers skirt the law; in others, the law is followed meticulously, but employees are nonetheless treated unfairly by management or by other employees. One survey revealed that the most serious ethical problems involve managerial decisions regarding employment, promotion, pay, and discipline that are based on favoritism, rather than ability or job performance.

HR professionals play three roles in the area of workplace ethics. One role is monitoring: they must observe the actions of organizational members to ensure that all individuals are treated fairly and legally. Second, HR professionals investigate complaints bearing on ethical issues, such as sexual harassment or violations of employees' privacy rights. Third, HR professionals serve as company spokespeople by defending the company's actions when confronted by a regulatory agency or the media.

HR professionals should act ethically themselves. When faced with ethical dilemmas, HR professionals must be willing to take a strong stand, even if it means putting their jobs at risk. If they choose not to recognize a situation that needs their attention, they become part of the problem and thus must assume some of the blame.

HR professionals should be guided by the Society for Human Resource Management Code of Ethics, which dictates that HR professionals should always:

- Maintain the highest standards of professional and personal conduct

- Encourage employers to make fair and equitable treatment of all employees a primary concern

- Maintain loyalty to employers and pursue company objectives in ways consistent with the public interest

- Uphold all laws and regulations relating to employer activities

- Maintain the confidentiality of privileged information

The future of HRM includes a strong concentration in managing the people side of a multinational, globally positioned firm. In other words, those in the HRM field will need to know how to manage employees from many cultures and countries as well as those who work from home and those who work in other countries and regions. With the U.S. economy depending heavily on China and India for workforces and for products and services, HRM will have to evolve into a comprehensive study of global sociology in order to understand the needs of the ever changing workforce.

SEE ALSO *Human Resource Information Systems*

BIBLIOGRAPHY

Dessler, Gary. *Human Resource Management.* 10th ed. Englewood Cliffs, NJ: Pearson/Prentice-Hall, 2004.

Dowling, Peter J., Marion Festing, and Allen Engle. *International Human Resource Management.* 5th ed. London, England: Thomson Learning, 2008.

Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* Cincinnati: South-Western College Publishing, 2000.

Lado, A.A., and M.C. Wilson. "Human Resource Systems and Sustained Competitive Advantage: A Competency-Based Perspective." *Academy of Management Review* 19, no. 4 (1994): 699–727.

Noe, Raymond A., et al. *Human Resource Management: Gaining a Competitive Advantage.* 5th ed. Boston: McGraw-Hill, 2006.

SHRM Online. Society for Human Resource Management. Available from: http://www.shrm.org.

I

IMPORTING

SEE *Exporting and Importing*

INCOME STATEMENTS

The income statement is one of the three major financial statements that all publicly held firms are required to prepare annually. It provides a record of a company's revenues and expenses for a given period of time, and thus serves as the basic measuring stick of profitability. In fact, the income statement is often referred to as the profit-and-loss statement, with the bottom line literally revealing which result a company achieved. Along with the balance sheet and cash flow statement, the income statement provides important financial information to business managers, investors, lenders, and analysts.

"The income statement is simply a scorecard that summarizes the revenues and expenses of an organization for a specific period of time," Jayson Orr wrote in *CMA Management*. "It reveals critical information about the operations and profitability of a business unit. It also reveals little secrets that may not be so obvious. In short, the income statement tells how successfully a business unit is fulfilling its prime directive—to generate profit."

Preparing an income statement is one of the basic responsibilities of the accounting function. Accounting is the process of recording and disclosing the financial information for a company so that operating results can be known and comparisons between different years and different companies can be made. Accounting has been described as the language of business. Because managers

of all organizations use accounting information, perhaps on a daily basis, it is critical that they understand the language. One of the obstacles to the best use of accounting information is that its terminology is confusing, especially when some of the terms used in accounting have alternate meanings in other business settings.

One of the purposes of this essay is to provide logical definitions for key business terms from an accounting perspective, thus avoiding misunderstandings from applying an inappropriate definition. A second purpose is to describe the contents of the typical income statement prepared for a profit-seeking corporation.

ACCRUAL ACCOUNTING VS. CASH BASIS ACCOUNTING

An area of confusion for many people is the concept known as accrual accounting. When individuals and small companies spend money, the expenditure is generally considered to be an *expense*. This is what accountants refer to as the *cash basis* of accounting. But larger companies, particularly publicly held corporations, are required to use the *accrual basis* of accounting. From the accrual accounting perspective, the purpose of the expenditure determines whether or not the expenditure is an expense at the time of payment. For example, if a business expends cash for office supplies, no expense occurs until the office supplies are used in business operations. The spending of cash is not the critical event. Thus, when a business buys postage stamps, it has purchased an *asset*, that is, an item that has a future potential to benefit the company. If the stamps are used to mail an invoice to a customer or supplier, then the *expense* occurs because the stamp (asset) has no further benefit for the company.

The same logic would apply to other expenditures wherein a company acquires an asset that offers future benefits on a long-term basis, such as a delivery truck. Identifying when the benefit occurs, and therefore when the expense occurs, is a more difficult task in this instance, and the point will be discussed later as the concept of *depreciation.* One unique aspect of an expense is that expenses are incurred in order to produce revenues.

The concept of revenues also proves confusing to some people. Revenues can be defined as the amount charged to customers for the services and products that are provided to them. When employees receive paychecks, they consider that they have earned their pay at that time. The paycheck represents the completion of labor for the previous work period. For a company that uses accrual accounting, however, the receipt of payment is not the critical event for determining when revenues have been earned. From an accrual accounting perspective, a company generally earns revenues at the time a product or service is provided to the customer. Thus, whether a customer pays for the purchase of a product or service with cash (or check) or charges the purchase on a credit card, the company earns revenue when the product or service is provided. This concept is complicated because revenue is earned, and yet no cash might be paid to the company at the time that accounting says that revenue is earned. Using the paycheck example, employees actually earn their pay on a daily basis as they perform services for their company, but they do not receive payment until payday.

To merge the two concepts of revenues and expenses together, consider a rule accountants refer to as the *matching principle.* This rule can be summarized as follows: revenues are recorded in the time period when earned and expenses are matched (offset) against the revenues in the same time period that they cause revenues to be earned. More formal definitions can be summarized as follows: revenues can be defined as the total amount earned from providing goods and services to customers. Revenues are equal to (measured by) the amount of cash or legal claim to receive cash or other items of value to be received at a later date in payment from the customer. The receipt of payment might occur immediately or it might occur, say, thirty days after the invoice's date. In either case, the revenues are earned when the service or product is provided, not necessarily when the cash is received.

Expenses can be viewed as representing the use of the benefits that an employee or asset provides; the payment for the asset or services might or might not occur at the same time that the benefits are used. The important thing to remember is that expenses are incurred, and therefore matched with revenues, in the period in which the company earns the revenues.

THE INCOME STATEMENT

The income statement is considered by many to be a company's most important financial statement. It discloses the dollar amount of the profitability for a company during a specific period of time. Since published annual financial statements usually cover a twelve-month period, this will be the assumption here.

The heading of the income statement should contain three crucial elements of information: the name of the company involved, the title of the statement identifying it as an income statement, and the specific twelve-month period during which the income was earned. The basic format of the income statement is represented by the following equation: revenues minus expenses equal net income.

Revenues. The income statement discloses total revenue and total expenses for the period in question. The amount of the revenues in excess of the expenses is the net income, or profit, earned by the company for the year covered by the statement. Notice that revenues are considered as a total or gross concept, whereas profit is considered a net concept, as in net income. Revenues represent the total amount that products and services are worth, expenses represent the amount that products or services cost the company, and the excess of the revenues over the expenses is the profit.

Consider a simple example: say that a company sells automobiles for profit. The company buys a car for a cost of $20,000 and sells it for $30,000 in revenue. Ignoring expenses other than the cost of the car, the profit can be determined by taking the $30,000 in revenue minus the $20,000 in expenses (the cost of the car), giving a figure of $10,000. If the total of all such sales for a year are shown and all related expenses incurred in that same year to produce the sales are deducted, the result is an income statement.

There are two basic formats of the income statement. The one summarized above is known as the *single-step income statement,* used by many service companies. All revenues are disclosed at the top of the statement, followed by all expenses of the company for the same time period. Some companies prefer to disclose their income tax expense after having deducted all other expenses from the revenues, since it doesn't relate directly to operations of the company, as do the other expenses. Net income is the bottom line, just as the expression says. However, for a company that is a corporation, an amount that is roughly the net income earned per share of corporate voting stock is disclosed last. This figure is entitled *earnings per share,* and when tracked over time it is used widely as an indicator of corporate performance from period to period.

The other format for the income statement is known as the *multiple-step income statement.* Its form is somewhat more complex; its purpose is to disclose in more detail

Table 1

Sales Revenues	$1,000,000
Less Cost of Goods Sold	-600,000
Gross Profit on Sales	400,000
Less Operating Expenses	-250,000
Income Before Income Taxes	150,000
Less Income Tax Expense	-50,000
Net Income	$100,000
Earnings Per Share	$1.00

certain relationships that many users of financial statements consider important. An abbreviated version of the multiple-step income statement is shown in Table 1.

The following paragraphs examine each line in this hypothetical income statement. To begin with, revenues would follow the general description presented earlier; in other words, they would be recorded on an accrual basis as customers take delivery of products. Thus, in this sample the *sales revenue* refers to the revenue earned from providing products to the customer. Note, however, that a bank would not have sales revenue but, instead, would have interest revenue, while a car rental company would have rental revenue. The nature of the revenue would determine the adjective used to describe the source of the revenue. There are other points in time that revenue may be recorded as being earned, but point of sale is the dominant usage.

Cost of Goods Sold. *Cost of goods sold* (often abbreviated COGS) is the expense representing the cost that a company expends to manufacture a product, if it is a manufacturing firm, or to acquire a product for resale, if a wholesaler or retailer. This represents only the direct cost of providing the product to the customer; other costs of operating the business, such as management and sales staff salaries, are deducted as expenses in other locations of the income statement. Of course, a company that provides a service instead of a product would not have a COGS expense to be deducted on its income statement.

Gross Profit on Sales. *Gross profit on sales* (or simply gross profit or gross margin) represents the total profit on the sales, if only the cost of the product itself is considered. This amount is used in calculating numerous financial ratios, such as the gross margin percent; thus it is provided for the financial statement user's benefit to analyze operating performance and make comparisons with other firms in the same line of business.

Operating Expenses. *Operating expenses* are deducted next. Sometimes this category is divided into two major components: selling (marketing) expenses and general and administrative (G&A) expenses (or both together, SG&A). Selling expenses include any expense incurred in an attempt to sell the products. Expenses such as advertising, salaries of sales personnel, and sales commissions would be included. G&A expenses include all other expenses; these relate to the general administration activities needed to run the business for the current year covered by the income statement. Examples of G&A expenses include rent expense, insurance expense, and other expenses related to the general administration of the company.

A few special expenses in this category require added discussion. Based on the accrual accounting definition of expenses presented above, expenses are deducted when incurred to earn revenue, and this may not correspond with the point in time that cash is spent to pay for the expense. For example, one of the operating expenses might be *warranty expense.* A product might be sold with a two-year warranty to cover labor and parts needed for repairs. In the year that the product is sold and the revenue from the sale is recorded, the future two years of warranty expense must also be recorded. This might seem illogical except for two important reasons. First, accrual accounting requires that expenses be matched with related revenues when the revenues are earned. Second, the warranty expense was incurred to create the sale in the first place. The sale might not have occurred without the warranty made available to the customer. This means that the accountant, with management's approval, must estimate and currently deduct what the future sacrifice will be during the subsequent two-year period, long before any cash expenditures are made.

Another example of an estimated expense is an *uncollectible accounts expense* or *bad debt expense.* Any company that offers credit terms to its customers will experience a few instances when customers are unable to pay the balance of an account when it comes due. Since accrual accounting requires the disclosure of revenue when it is earned, even when on a credit basis, the company must deduct at the time the revenue is recorded an estimate of the total of the accounts that may prove to be uncollectible in the future.

The next example of an expense that must be estimated, but one that is common to many income statements, is *depreciation expense.* If a company owns a long-lived asset, such as a building, delivery truck, machine, or computer equipment, the company should not (and often cannot for tax purposes) deduct the total cost of the item in the year it is acquired and placed into service. Since the asset has potential benefit to the company in future years, the asset's cost must be allocated over the years of its estimated life as the company receives its benefits. When a long-lived asset is first acquired for use, therefore,

management must make some good-faith estimates concerning the asset. The accountant can then calculate, by one of a number of mathematical formulas, the amount of the asset's cost that will be recorded as an expense each year of the asset's life. If, after a few years, it becomes clear that the original estimate was incorrect, an updated estimate is then used to calculate the new depreciation for the asset's remaining life. The total of all depreciation expensed over an asset's life should be equal to its cost less any amount for which it can be sold at the end of its useful life.

The final estimated expense that will be covered here is a *pension expense.* The nature of the pension expense is somewhat similar to the warranty expense. Pension expenses are also deducted before they are paid in cash. The main distinction is that a pension expense is much more difficult to estimate. Nonetheless, management must make a good-faith effort to determine the expense to be deducted each year. What makes the amount so difficult to estimate is that the actual payment to the employee might not occur for decades into the future. Meanwhile, management, with the assistance of actuaries, must make assumptions as to how long the employee will work for the company, how much the employee will earn in future years, how long the employee will live after retirement, and other such seemingly insurmountable hurdles. It will sound repetitive, but accrual accounting requires that expenses be deducted in the year that they are incurred to earn revenue. Since the employee is working currently to help the company earn revenues, the cost of all post-employment benefits must be deducted while the employee is currently employed. This is true for medical and dental benefits, just as it is for pension benefits.

Income before Income Taxes. *Income before income taxes* is the result of subtracting operating expenses from gross profit on sales. This amount is shown separately so that the profit from regular operations—before the impact of income taxes—can be seen easily.

Income Tax Expense. The final expense normally shown as a deduction on the income statement is the *income tax expense.* The amount of the expense is the result of accrual accounting rules, which differ from rules required for filing tax returns. In other words, the income tax expense is matched to the revenues that give rise to that expense, regardless of the amount computed on the tax return or paid to the IRS.

Net Income. This is the "bottom line" amount that shows the excess of the revenue over all the expenses. It does not reflect the amount of cash left over at year-end. Because revenues are recorded when they are earned (and not necessarily when they are collected), and expenses are

deducted from revenues when the expenses are incurred (and not necessarily when they are paid), net income is not correlated directly to cash left over at year-end. In the long run, however, all revenues should be collected in the form of cash and all expenses should be paid in the form of cash. In the short run, accrual accounting provides a more meaningful measurement of the profitability of the company than do mere cash receipts and expenditures.

Earnings Per Share. The final presentation on the income statement for a publicly held corporation is the amount of earnings per share of stock outstanding. In effect, this is the entire income statement condensed to show the amount of net income that each share of common voting stock earned for the income statement time period. If a stockholder owns 100 shares, the stockholder's investment earned 100 times this amount. This amount should not be confused with *dividends per share.* Dividends per share represents the amount of cash that the board of directors, as representatives of all stockholders, chooses to pay to the stockholders as a return on their investment in the company for the current period. Again, earnings and cash received do not mean the same thing.

OTHER SPECIAL ISSUES

A few other issues deserve some explanation. In the lower portion of many income statements (following operating expenses), there may be a different caption from income before income taxes. The caption income from operations is substituted when a company has experienced gains and losses. Gains and losses usually occur whenever a company sells an asset (other than inventory for which it is in business to sell) for more or less than the value of the asset in its records. The accounting concept here is to separate the disclosure of normal sales activities from the unusual disposal of other assets. (See also the discussion of *extraordinary items* below.)

There may also be up to three unique items that follow income tax expense at the end of the income statement. These items are *discontinued operations, extraordinary items,* and *cumulative effect of accounting changes.*

A company would include discontinued operations if it had disposed of a significant segment of its operations. This event would be of such a magnitude (usually defined in percentage terms) that the information on the income statement would be misleading if it were not separately disclosed from what the reader could consider to be regular recurring operations of the company.

Extraordinary items are major gains or losses that are defined to be both highly unusual in nature and infrequent in occurrence, such as expenses stemming from a natural disaster or the restructuring of long-term debt. These extremely rare gains and losses are disclosed apart

from regular operations, including normal gains and losses as discussed above, so that the user of the income statement can better judge the results of normal recurring operations.

The last item disclosed as part of the income statement before the earnings per share data may be the cumulative effect of accounting changes. This caption is used only when the management of a company has decided that changing from one *generally accepted accounting principle* (as defined by independent standards organizations for the accounting profession) to a different generally accepted accounting principle will better disclose the results of operations for the users of the statements. This change is based on management's judgment, and the accounting firm that audits the company's financial statements reviews this change. Generally, any previous years' accounting data will be restated to use the new accounting rule so that comparisons of current and previous data will be made on the same basis.

COMPREHENSIVE INCOME

A relatively new concept that may be included at the end of the income statement is *comprehensive income.* Comprehensive income results from changes in certain assets and liabilities on the balance sheet (a financial statement of corporate assets and liabilities). These unique gains and losses are not included in calculating net income, but they may be added after net income is shown. They are excluded from net income itself because they would distort the basic purpose of the income statement: to disclose the results of operations. These particular gains and losses result, instead, from two main sources not related to operations. First, comprehensive income results from market value changes of certain investment securities that are reported in the financial statements at their current trading values. Second, these gains and losses also result from foreign exchange rate changes used to report the values of assets and liabilities in foreign subsidiaries. These items may also be shown on other financial statements rather than as an addition to the income statement.

PROBLEMS WITH THE INCOME STATEMENT

Studying a company's income statement can help managers, investors, creditors, and analysts to form an understanding of the business's performance and profitability. Yet the income statement has come under criticism in recent years because the two main figures—income and expenses—are often obscured by accounting adjustments and subjective estimates. In the wake of accounting scandals at several major corporations, many analysts began pushing for expanded reporting standards that would limit companies' ability to overstate revenue or understate

expenses. In any case, rather than relying on the income statement alone, users should examine all three major financial statements to gain further information about a company's results.

SEE ALSO *Balance Sheets; Cash Flow Analysis and Statement; Financial Issues for Managers*

BIBLIOGRAPHY
"Analyzing Company Reports: Understanding Income Statements." *Ameritrade.com.* Available from: http://www.ameritrade.com/educationv2/fhtml/learning/uincomestates.fhtml.

Hinkley, Rachel. "Common Schedule M-1 Adjustments." *The Tax Advisor* 1 October 2005.

"Income Statements." *Inc.com* May 2000. Available from: <http://pf.inc.com/articles/2000/05/18739.html>.

Orr, Jayson. "Making Your Numbers Talk." *CMA Management* November 2000.

Palmiter, Alan. *Corporations: Examples And Explanations.* Aspen: Aspen Publishers, 2006.

Rappaport, Alfred. "Show Me the Cash Flow! The Income Statement Badly Needs an Overhaul. Here's a Way to Fix It." *Fortune* 16 September 2002.

Williams, Jan R., et al. *Financial & Managerial Accounting.* 14th ed. New York: McGraw-Hill, 2006.

INDUSTRIAL RELATIONS

Most definitions of industrial relations acknowledge that industrial relations involves the complex interplay among management, workers and their representatives, and the government. Each of these three players has different needs and goals that determine how they interact with the other two parties. In general, management's goals center upon labor costs, productivity, and profitability. In contrast, workers and their representatives (i.e., unions) are concerned with securing high wages and benefits, safe working conditions, fulfilling work, and a voice in the workplace. Finally, as the representative of the members of the society in which employers and unions reside, the government's objectives include balancing the rights of labor and management. Perhaps even more important, the government has the obligation to protect the rights of the members of society by maintaining relative harmony between workers and employers. In the U.S. private sector, industrial relations are governed by the National Labor Relations Act (1935, as amended).

There is a three-tier structure of industrial relations in the United States. Local unions deal with the daily interaction with employers at the workplace level. Typically, these local unions are affiliated with a national union such as the Service Employees International Union, which, as of 2008, is the largest national union in the United States. Labor federations, like the AFL-CIO, serve as umbrella

organizations for national unions and provide overall direction for the labor movement, as well as services like training and government lobbying. However, the lack of advancement of organized labor in recent years has caused some national unions to leave the AFL-CIO and attempt to form a competing labor federation.

Industrial relations have changed substantially in the United States since 1980; there has been a change in the shared ideology among the three players. Prior to 1980, all three parties acknowledged the legitimacy of the others' roles. Employers kept their relationship with unions at a distance, neither embracing unions nor aggressively seeking to destroy them. This produced some level of stability within the industrial relations system. However, since 1980 employers have moved away from an "arms length" relationship with unions and have either pursued greater collaboration with labor or sought to aggressively suppress unionization, even to the point of intentionally violating U.S. labor law.

The percentage of workers represented by unions (i.e., union density) in the United States decreased from a high of 35 percent in 1945 to 12.5 percent by 2005. By 2007, this number rose again and nearly 16 million workers were registered with a union. According to the U.S. Department of Labor, membership between 2006 and 2007 rose by 311,000. Interestingly, union density is substantially greater in the public sector than in the private sector—nearly five times higher as of 2007. In the public sector, unions represent approximately 37.2 percent of government workers, with the highest density being in local government (41 percent). This level of unionization in the public sector may decline in the future; however, given the trend toward privatizing government services. In the private sector, unions represent only 8 percent of workers, with the transportation industry and utilities maintaining the highest level of union density (25 percent). Union density in the private sector is approximately half of what it was in 1983.

Union membership rates vary considerably by state. New York, Hawaii, Michigan, and Alaska have the highest membership rates—with 25 percent, 24 percent, 22 percent, and 20 percent, respectively—while North Carolina and South Carolina have the lowest rates (approximately 3 percent). As of 2007 full-time wage and salary workers who are represented by a union make more than those workers not represented by a union ($781 versus $612). Workers between the ages of forty-five and fifty-four make up nearly 16 percent of union members, and those between the ages of fifty-five and sixty-four make up a similar 16.1 percent. Interestingly, much younger workers—between sixteen and twenty-four years of age—make up less than 5 percent of union members.

There are many reasons for the long-term decline in union density other than the change in management attitudes toward unions. Employment has moved from manufacturing jobs and other jobs that have traditionally been represented by unions (e.g., railroads and mining) to more service-oriented and high technology jobs. There are more white-collar and part-time jobs now than ever before, which have contributed to the decline in union density, because it is harder for unions to organize people in these jobs. Furthermore, employers have learned that using positive human resource management practices—like installing formal grievance systems, comprehensive benefit plans, and worker involvement programs—suppresses union organizing activity. Finally, in the past several decades the government has increasingly provided for the protection of workers's rights by passing a variety of legislative actions, including the Civil Rights Act (1964), the Occupational Safety and Health Act (1970), the Americans with Disabilities Act (1990), and the Family and Medical Leave Act (1993).

Workers of the twenty-first century may not be as enticed to join a union because they may not see the benefit. With an economy moving toward globalization and the workforce trend moving into home offices, more and more workers are stay-at-home moms, telecommuting professionals, and contracted employees who pay their own taxes. Most likely, these trends will diminish the numbers in union members overall—unless unions change to take these kinds of workers into account more often.

The number of strikes by unions has declined in the last two decades due to the fact that employees have a greater understanding of the impact of globalization on competition. Also, more employees are shareholders now than ever before. Some of these same factors appear to be reducing union density levels in other developed nations, although Canada is an exception; it has twice the union density of the United States.

In 1993 the Dunlop Commission was established by the Clinton Administration to propose ways to reform the labor policies set forth in the National Labor Relations Act. In general, the Commission concluded that labor law needed to be altered to make it easier for workers to seek union representation and to remove the constraints upon worker involvement. However, these recommendations have not been adopted, even though both labor and management acknowledge the need to change the antiquated labor laws that prevent closer, more trusting relations and hamper the flexibility needed by businesses to compete in the global economy. Consequently, there is a continuing need for labor law that reflects the changes that have occurred since the National Labor Relations Act was passed in 1935.

SEE ALSO *Employment Law and Compliance; Human Resource Management*

BIBLIOGRAPHY
Cutcher-Gershenfeld, Joel, and Thomas Kochan. "Taking Stock: Collective Bargaining at the Turn of the Century." *Industrial & Labor Relations Review* 58, no. 3 (2004).

Godard, John. "Do Labor Laws Matter? The Density Decline and Convergence Thesis Revisited." *Industrial Relations* 42, no. 3 (2003).

Katz, Harry, and Kochan, Thomas. "An Introduction to Collective Bargaining & Industrial Relations." New York: McGraw-Hill/Irwin, 2007.

Kreisberg, Steven. "The Future of Public Sector Unionism in the United States." *Journal of Labor Research* 25, no. 2 (2004).

U.S. Department of Labor, Bureau of Labor Statistics. Available from: http://www.bls.gov.

INDUSTRY LIFE CYCLE

SEE *Product Life Cycle and Industry Life Cycle*

INFORMATION ASSURANCE

Defending data and the platforms that house it is quickly becoming one of the most important technical jobs in any major corporation. Information assurance (IA) is the technical discipline of data protection. Keeping information and its warehousing safe are a part of overall information security, but it also includes the practice of forecasting future dangers and preparing offensively for any possible risk factors that are detected. Of all that is accomplished by information assurance, likely the most important factor for most firms is keeping privileged and proprietary information out of the hands of the public. A second high priority of information assurance is keeping information platforms safe from the kind of intrusion that could potentially dismantle warehousing, thus endangering or causing the loss of vital company information.

KEY FUNCTIONS

The purpose and function of information assurance can be broken down into three main categories: keeping information confidential; maintaining the integrity of stored data; and making data readily available to those who need access to it. Of these three major functions, maintaining confidentiality of important data is often deemed the highest priority of information assurance. At its most essential core, information assurance means that only those who have permission will have access to the specific information that they have the authorization to access. Additionally, information assurance is time sensitive, meaning that authorized figures will have access to data only when it is deemed necessary or allowed by the systems in place. This is achieved in a number of ways, but mainly with the use of passwords and login names and other similar "sign in" type methodologies.

Information assurance means protection against those who wish to do harm to information and information storage systems as well as the viruses and other coded programs created by hackers to destroy data and the storage facilities for data. The ways in which information is kept secure must comply with government standards but must also be "smart" and progressive enough to keep up with the ever-changing demands associated with handling the constantly evolving viruses and malware that destroys data that is not properly defended.

Information assurance also means the reconstituting of data and its housing after it has been compromised. This means refurbishing, rehousing, and resecuring data as well as reestablishing the list of those who are authorized to have access to it and assigning new login names and pass codes for all authorized parties.

THE FIVE PILLARS OF INFORMATION ASSURANCE

According to the Central Security Service, successful information assurance can be broken down into five pillars: availability, integrity, authentication, confidentiality, and nonrepudiation. These five pillars make up a specific information assurance strategy that ensures the highest level of success for the corporate entities that apply it to their day-to-day business and operations.

Used by the United States government for their information assurance, the five pillars will each receive different amounts of use depending on the type of threat in play. The same is true for any company that uses the five pillars for the protection of information. Additionally, each firm will have varying needs for security based on the industry they are in as well as their size, reputation, Internet presence, and other factors. Of the tools that fall under the headings of the five pillars, those most widely used involve the education of personnel, the use of encryption, the implementation of the most up-to-date information technologies, and the use of some form of alarm system with the ability to warn personnel of an intrusion.

TOOLS OF THE TRADE

The ways in which data is protected vary based on need and the amount of data as well as the types of risks the particular data is likely to face. For example, the enormous amounts of proprietary information at Wal-Mart headquarters in Bentonville, Arkansas, will need a much higher level of protection than the recipe book for a local

bakery. Not to lessen the importance of the recipes, but the data contained in the Wal-Mart files involves not just insider information about Wal-Mart, but information about its thousands of suppliers, merchandisers, and affiliates, as well as thousands of other entities that interact with the retailer. So, information that is leaked from the Wal-Mart information system could conceivably impact the entire global economy, whereas a leaked cookie recipe, while important, only causes problems for the local baker.

Some of the tools of information assurance are physical, such as combination locks or keyed entries, paid guards, and access controlled by keycards. Other tools of information assurance are logical, meaning they are able to control people's access to information by way of computers and networks. These security tools include login names and passwords as well as firewalls, encryption of information, alarms that sound when they detect intrusions or irregularities in the system, and access control that is monitored and managed by system administrators. Still other information assurance tools are purely procedural, meaning they are tools that are used only by upper management and those with administrative access. These kinds of tools include the rules and regulations of an individual firm, often found in an employee handbook or appendix of company policies. These kinds of regulations determine how both physical and logical security measures will be used, monitored, and controlled; typically, the regulations also outline what kinds of disciplinary actions will be taken in the event that the laws or regulations of the firm are broken or disregarded. Sometimes procedural information assurance tools are the rules and regulations of a particular industry, and not those of an individual company. In these cases, the bending or breaking of rules and what the consequences are will not be determined by a firm, but by the regulating body in charge of that industry or the state or federal governments.

INFORMATION ASSURANCE IN E-COMMERCE

The job of information assurance for Internet retailers and other e-commerce vendors is not only to secure vital company information, but to secure customer data that is used to make purchases or to retrieve data from a Web site. The most important person who will need to be convinced that information security is intact will be the customer. Above all other reasons for information security in the e-commerce setting, security and privacy of customer and company information are the most important factors.

Customer data such as credit card information, address, social security number, date of birth, or any other personal information obtained by an Internet merchant must be secured during transactions. Many Web assurance services will help to secure private information obtained by the customer, and often, putting the well-known logo or

seal of some of these Internet security companies on the home page or bill-of-sale confirmation page of a merchant Web site will help customers feel safer about releasing personal information. WebTrust, BBBOnline, BizRate.com, Secure Site, and the Online Privacy Alliance are all Web assurance service companies that offer extensive transaction security and other online protection for both consumers and online merchants.

Due to the steady rise of Internet sales throughout the 2000s, information assurance in the field of e-commerce will likely be under development for many years to come. The future of successful e-commerce depends heavily on how well it can safely be conducted. This includes security and integrity of online transactions that are controlled by software, the establishment of stronger password and username generation technologies, better software for the detection of intrusion, and ironclad proxy servers. The implementation and consistent use of these logical, physical, and procedural tools will ensure consumer safety, lessen identity theft, and help to eradicate the Internet fraud that plagues e-commerce today.

DEFENSE-IN-DEPTH

According to the National Security Agency, bringing employees trained in information assurance together with the technology and specific company procedural guidelines across all levels of the corporate model will allow for the highest degree of information security. The practice of intentionally bringing the people, procedures, and technology together for the best and safest practice is referred to as *defense-in-depth* and calls for personnel trained in the technologies needed to achieve information security on every single level of the corporate model. Defense-in-depth is also an information assurance philosophy that mandates that regardless of where an enemy may stage his attack, he will encounter some level of security that makes the data he wants inaccessible. Additionally, when and if he is able to break through a specific secured area, the enemy will immediately encounter another form of defense, ideally until the attack is ultimately stopped altogether. This type of defense-in-depth barrier is only successful when the people, tools, and information assurance regulations are present on every level of a corporation's framework.

In addition to the most up-to-date technologies, the best training and education, and the most experienced personnel, many large corporations are now heading up information assurance teams with a chief information officer (CIO) who is responsible for keeping all pertinent company data accessible to authorized users and maintaining the safety and integrity of that information. A CIO should always be asking the questions: If information about my company's brand is compromised, what

will the repercussion to our finances and reputation be? Does the cost of security assurance solutions outweigh the cost of a potential threat? How at risk is our firm to dangers such as hackers and viruses? What types of security assurance measures will work best for our brand and in our industry? CIOs are becoming the mainstay for many IT departments and information safety branches of corporations and likely represent the future of the information assurance industry.

BIBLIOGRAPHY

Boyce, Joseph and Daniel Jennings. *Information Assurance: Managing Organizational IT Security Risks.* Massachusetts: Elsevier Sciences, 2002.

Kim, Dan J. "Dimensions of Web Information Assurance in B2C E-Commerce." Available from: http://www.ccs.msu.edu/workshop/kim.pdf.

National Security Agency's Information Assurance page. Available from: http://www.nsa.gov/ia/index.cfm.

Qian, Yi, David Tipper, Prashant Krishnamurthy, James Joshi. *Information Assurance: Dependability and Security in Networked Systems* Massachusetts: Elsevier Sciences, 2008.

Warkentin, Merrill and Rayford B. Vaughn. *Enterprise Information Systems Assurance and System Security: Managerial and Technical Issues.* Pennsylvania: The Idea Group, 2006.

INITIAL PUBLIC OFFERING

An initial public offering (IPO) is the process through which a privately owned business sells shares of stock to the public for the first time. Also known as *going public*, an IPO provides a growing business with access to public capital markets and increases its credibility and exposure. It has long been considered a rite of passage that marks an important phase in a business's development. At the same time, however, staging an IPO is both time consuming and expensive. It requires companies to navigate a complex Securities and Exchange Commission (SEC) registration process and disclose a great deal of confidential information to potential investors. Furthermore, the success of an IPO is not guaranteed, and depends in part upon industry, economic, and market conditions that are beyond a company's direct control. Overall, the decision to go public is a complicated one that requires careful management consideration and planning.

There is no doubt that becoming a public entity offers a number of advantages to a business. In addition to gaining immediate access to capital to fund expansion, it also makes it easier for the firm to obtain capital in the future. The IPO process provides a company with a great deal of publicity, which may help increase its credibility with suppliers and lenders, attract new customers, and create new business opportunities. Going public also offers an opportunity for the company's founders and venture capitalists to cash out on their early investments, and provides a public valuation of the company to facilitate future mergers and acquisitions.

Some of the major disadvantages associated with going public include the high cost of staging an IPO (which may claim 15 to 20 percent of the proceeds from the stock sale), the demands on the time of managers (the process may take between six months and two years to complete), and the dilution of ownership and associated loss of management flexibility and control. In addition, the process of going public requires a private company to disclose confidential information about its strategy, capital structure, customers, products, competitors, profit margins, and employee compensation. Finally, becoming accountable to shareholders sometimes leads to an increased emphasis on short-term financial performance.

The first step in the IPO process involves applying to the SEC for permission to sell stock and preparing an initial registration statement according to SEC regulations. This statement includes a prospectus of detailed information about the company, financial statements, and a candid management analysis of the risks and benefits of investing in the company. The next step involves selecting an underwriter—usually an investment bank—to act as an intermediary between the company and the capital markets. The underwriter helps determine the valuation of the company and the suggested share price. It also helps assemble an underwriting team, which includes attorneys, accountants, and financial printers.

While the SEC completes its review of the registration statement—a period of time known as the *cooling off* or *quiet* period—the company undergoes an audit by independent accountants, files forms with the states where the stock will be sold, and begins marketing the investment to potential investors through *road shows* featuring top executives. Once the SEC review is complete, the company finalizes the registration statement, files a final amendment with the SEC, and agrees to an asking price for the shares of stock. Then the sale of stock finally takes place, overseen by the underwriter. Afterward, the underwriter meets with all involved parties to distribute funds from the sale, settle expenses, arrange for the transfer of stock, and file final reports with the SEC.

The pace of IPOs peaked in 1999, fueled by investor interest in Internet-related businesses. It declined markedly in 2000, as a drop in the value of technology stocks led to an overall drop in the stock market. Over the next few years, investors largely adopted a more cautious, back-to-basics approach toward IPOs. They increasingly demanded that companies demonstrate a proven business model, solid management team, large customer base, and strong revenue potential if they hoped to stage a successful

IPO. Another factor limiting the number of IPOs was the Sarbanes-Oxley Act (SOA) of 2002. Passed in the wake of several high-profile corporate accounting scandals, the act required the boards of public companies to include independent directors with financial experience. It also required public companies to form auditing committees chaired by an outside director. As a consequence of Sarbanes-Oxley, companies who are "IPO ready" are now larger and more established than in the past.

SEE ALSO *Cash Flow Analysis and Statement; Due Diligence; Entrepreneurship; Financial Issues for Managers; Strategy Implementation*

BIBLIOGRAPHY

Evanson, David R. "Public School: Learning How to Prepare for an IPO." *Entrepreneur* October 1997.

Feldman, Amy. What Does Sarbanes-Oxley Mean for Companies That Want to Go Public? *Inc. Magazine* September 2005.

Feldman, David. *Reverse Mergers: Taking a Company Public Without an IPO.* New York: Bloomberg Press, 2006.

Kleeburg, Richard F. *Initial Public Offerings.* South-Western Publishing, 2005.

Quittner, Jeremy. "Private Matters: IPOs Move Further Out of Reach." *Business Week* 1 November 2004.

Rittenberg, Larry, and Patricia Miller. *Sarbanes-Oxley Section 404 Work: Looking at the Benefits.* Altamonte Springs, FL: Institute of Internal Auditors, 2008.

Vallone, Paul. "IPO Checklist: Preparing Your Company for Public Markets." *San Diego Business Journal* 23 February 2004.

Welch, Ivo. "IPO: The Initial Public Offerings Resource Page." Available from: http://www.iporesources.org/ipopage.html.

INNOVATION

Innovation is the act of developing a new process or product and introducing it to the market. It is essentially an entrepreneurial act, whether it takes place in a start-up firm, a large organization, a not-for-profit, or a public-sector agency. Innovation means change: sometimes radical change, such as the development of the computer, and sometimes incremental change, such as the modification of existing computer software. In either case, managers must develop processes to encourage and guide the changes taking place.

Sources of, and opportunities for, innovation in organizations are described below. Finally, the management principles underlying an innovative organization are identified.

INNOVATION MODELS

Business innovation has certain parameters and can be divided into categories based on company objectives. Three of the most common classifications are industry, revenue, and enterprise. Industry innovation involves pro-

duction methods and products themselves. Some successful companies achieve industry innovation by moving into new markets or producing complementary goods, finding new ways to profit on their existing business and resources. Other companies choose to invent new delivery methods, eliminating intermediaries. Still others create entirely new types of industries to sell in and create new customer bases.

Revenue innovation refers to new methods in pricing and value models that companies can use to improve their profits. This can work many different ways, such as using new legislation, new customer demands, and new resources to raise revenues. Anything that can be used along the production chain to decrease costs and change pricing plans can be considered revenue innovation.

Enterprise innovation is a wide category involving companies venturing into new areas, often involving vertical integration up and down the supply chain, where businesses begin to create their own products or begin plans to supply themselves with necessary resources. Enterprise innovation can also work through methods of concentration, where companies outsource or drop various stages of production to focus on others.

SOURCES OF INNOVATION

Innovation generally stems from the purposeful search for opportunities. Management guru Peter Drucker identified that opportunities for innovation exist both within and outside a company or industry. Opportunities internal to a company include unexpected events, incongruities in processes or between expectations and results, process needs, and changes in the marketplace or industry structure. Opportunities external to a company include demographic changes, changes in perception, and new knowledge.

Incongruities. Incongruities result from a difference between perception and reality. Federal Express was able to capitalize on consumer dissatisfaction with the U.S. Postal Service and demonstrate that individuals and companies were willing to pay a premium for overnight delivery of packages and documents.

Likewise, Southwest Airlines provided a dramatically different approach to airline service. Its low-fare, no-frills, first-come-first-seated approach has garnered devoted customers. Southwest Airlines has remained profitable for thirty-five straight years (as of 2008), even during the economic downturn following the terrorist attacks of 2001, when many airlines struggled to remain in business.

Process Needs. Process needs innovations are those that are created to support some other process or product. The development of the ATM (automatic teller machine) and

now Web-based and Internet banking options allow individuals to do their banking when the bank is closed and without relying on tellers being available. This has freed tellers from performing many routine functions such as cashing checks and has improved both efficiency and profit margins for banks.

Market and Industry Structure Changes. Industry structures change in response to growth and changes in the marketplace. One of the most dramatic changes can be seen in the health care industry. The rise of HMOs (health maintenance organizations) and the decline of the traditional fee-for-service plans have impacted the health-care industry as a whole. The development of the personal computer also had a far-reaching impact on the computer industry as a whole. Until the personal computer, manufacturers of large mainframe computers, terminals, and software developed for specific uses within a firm dominated the computer industry. With the adoption of the personal computer and advent of the laptop computer, the composition of computer sales and marketing changed dramatically.

Demographic Changes. Demographic changes are shifts in the makeup of the population. Increases in the Hispanic and Asian populations in the United States create opportunities for new products and services, such as cable television stations targeting these audiences. Innovations in prepared meals and takeout food are meeting the needs of busy two-income families and single-parent families.

Changes in Perception. Americans have become more health conscious and we have seen the rise in popularity of stores such as GNC which cater to the demand for vitamins and other supplements. Similarly, stores such as Whole Foods provide organic produce, meats, dairy, and fish free from additives to satisfy a growing market demand for chemical-free products.

New Knowledge. New knowledge or technology is one of the strongest forces for innovation. Many companies, of all sizes and levels of sophistication, now have a Web presence on the Internet with the capability of connecting their products with customers nearby or on the other side of the globe. No longer are consumers limited to the daytime hours for their activities; online stock trading, shopping, and banking are examples of services that are accessible at any time of day or night via the Internet. Other opportunities are being explored in the fields of genomics and nanotechnology. These technologies and systems will develop even further as consumers continue to demand new and innovative products and immediate access to information, goods and services.

MANAGING INNOVATION

Innovation must be seen as a process occurring within an organization, not a single event. This process can be managed. In general, the process follows five stages: (1) idea generation, (2) initial screening, (3) review, (4) seeking sponsorship, and (5) sponsorship and commercialization. At each of these stages the organization's culture must be designed to support the innovation process.

Idea Generation. Idea generation requires a supportive organizational culture. Ideas, and the people who develop them, are fragile, and if the organization does not support them, they will not develop. A supportive culture requires that the organization allow for experimentation and failure. In other words, not every idea will be commercially viable, but mistakes are to be learned from and learning should be celebrated. W.L. Gore is a company that celebrates learning and innovation. Each plant is kept small and everyone in the company is allowed to experiment with the products. In addition to the familiar GoreTex polymer coating, the company also manufactures products for the medical industry, NASA, and industrial use. The company operates internationally and holds hundreds of patents.

Initial Screening. The screening process can be made easier by assigning a facilitator from outside the organization who can help guide the initial idea through the organization's systems, as well as act as an advocate for the idea. At this stage, the idea is evaluated and possibly revised before being sent on to a group to review for further development.

Review. At this stage, the idea should be sufficiently developed to present to a group within the organization who will make a decision about funding further development. 3M has a long-standing process such as this. The Post-It notepads are probably the best-known illustration of the effectiveness of the process. Although no uses for the adhesive were initially found, the researcher was allowed to continue to spend time developing the product. The review process did not initially continue direct funding, but by allowing the researcher time, the company indirectly funded the development of a very successful product.

Seeking Sponsorship. In most organizations, an idea needs a sponsor to continue to move forward. The sponsor must be convinced of the value of the idea to the organization. Effective champions frequently are managers who know how to navigate the corporate structure for support and resources. In addition, they are effective at putting together a cross-functional team to help develop all aspects of the new idea. Both 3M and W.L. Gore have instituted systems that facilitate this process.

Sponsorship and Commercialization. At this stage, the champion or sponsor takes the project forward through the final phases of corporate approval to commercialization. Many organizations, including Dow Corning, PepsiCo, 3M, and Black & Decker, spend a great deal of time interacting with customers at this stage. Customer input can help with final design issues, with searching out new uses for a product, and with simplifying processes. According to N. Radjou as quoted in *Industrial Management,* "Customers seek innovations that enhance their life cycle experience with a product—not the product-centric improvements in functionality and reliability that R & D engineers focus on." Utilizing consumer input can help companies focus their creativity on the products and improvements that will most satisfy consumer needs and wants.

DISRUPTIVE INNOVATION

Disruptive innovation is a type of innovation that reinvents a market or creates an entirely new system, product, or business concept. It is disruptive because it causes the entire industry to react, either by making innovations of their own or by copying the first innovation to stay profitable. Some types of disruptive innovation create entirely new industries that force all other industries to react, such as the adoption of a new technology or new product. Recent examples of disruptive technology include:

1. Peer-to-peer networking software
2. Audio and video compression technology
3. Personal computers
4. Steel mini-mills
5. E-commerce
6. Cell phones

Other potential disruptive technologies include renewable energy sources and advances in biochemistry. Disruptive innovation will always have certain identifiable effects on the companies that develop them and the surrounding business. Those looking to foster or create disruptive innovations can depend on several key pieces of advice:

- Expect growth from disruptive innovation. Whatever type of innovation a company attempts, whether it affects the way business is done or produces a new type of business completely, it will place that company ahead of its competitors. In order to fully capitalize on the innovation, the company should create processes to keep their ideas sustainable. Some disruptive innovations are simply vast improvements on older designs, which require excellent marketing and integration into existing processes. Other disruptive innovations are breakthroughs into new

fields that will rocket companies into prominent positions, which they must then learn to maintain by designing ways to steadily produce or use their discovery. A company can enter into an unexplored field and then use more innovations along the way to refine and market their ideas.

- As previously mentioned, disruptive innovations will either create markets that did not exist before or transform the lower ends of existing markets. In the first case, companies have a serious advantage—their competitors will, in the beginning, lack the means to enter the new market. The new company must concentrate on making their product or offering their service and marketing it to the correct people, because a new market means an entirely new set of customers. The second type of disruptive innovation will occur at the lower end of some existing market, transforming a process that has already been in place. This will allow the innovating company to grow within its own industry, pushing it ahead of its old competitors through new ways of doing business.

- Opportunities go through several phases before they become full innovations. Some companies have a system in place to help ideas move through the business until senior management accepts them and forms plans to implement the innovation. Unfortunately, these systems can hamper the development of true disruptive innovation. Disruptive opportunities, once fielded by a company's process, are usually stripped of their unique qualities and made to fit into a preexisting expectation that the company has for useful creativity. To truly create disruptive innovations, a company must learn to accept potential ideas even if they may appear outlandish.

- When forming a new product, businesses should attempt to market it to the proper consumers. This does not necessarily mean trying to appeal to their existing customers, but focusing on locating customers who would profit by their innovation. Innovative products can fail if not marketed to the correct audience. Customers should not be asked to accept completely new products without good reason.

- Innovation requires decisions concerning product integration. Companies can choose to be involved in every part of their new product's creation, or they can choose to specialize in one particular part of the supply chain. Choosing the correct activities to specialize in allows the company to maximize benefits from the innovation process.

- Disruptive innovations cannot be expected to grow into international businesses overnight. Managers

encouraging innovation should aim for profitability before growth. Profitability, though it may take trial and error, will ensure success in the long-term, while growth can easily collapse on itself if not accompanied by sustainability.

Companies can seek disruptive innovation in other areas beside products. Services and supply chain methods can also be subject to disruptive ideas. Companies can attempt transporting their old products in new fashions, as the band Radiohead famously did in 2007 by allowing their fans to download their album *In Rainbows* from their Web site, at whatever price the music-buyer thought was fair. They can also try to reinvent old processes in such ways that they appeal to new customers.

EMPLOYEE INNOVATION

Employees can be a reservoir of potential ideas, innovations, and new ways of thinking; companies just have to find a way to tap into them. Even in companies that encourage employee innovation, employees can feel restricted by the heavy company process involved in developing an idea. Expression should be encouraged by companies looking for internal innovation, but how? GovLeaders has some ideas, in the form of five 2008 suggestions designed to foster employee input:

- Managers should get to know every employee. If managers know their employees, they can know how to encourage each person to develop their own unique ideas. Motivation can often depend on knowledge of what is important to employees.

- Employees should be challenged to improve processes. If employees are asked specifically to look at the operations they are involved in, they will be much more likely to notice areas of possible improvement. Managers can implement plans to ask employees for improvement ideas at regular intervals.

- There is a mechanism that some companies use called "Employee for a Day." This involves employees taking regular turns in running through their business process from the outside, following a product or service naturally from start to completion. This way people can see problems they may not have normally noticed.

- Reward systems can be implemented specifically to award employees who improve the operation process in some way. "Idea" awards can build enthusiasm for new ideas and encourage an atmosphere of creative solutions and healthy competition.

- How will employee ideas make any difference? In order to profit from their employees' ideas, companies need a system to implement employee ideas. The employee who created the innovation process should, as much as

possible, oversee its implementation so that a healthy sense of ownership can be developed. Managers, after all, will usually have enough to deal with without managing someone else's ideas.

SEE ALSO *Futuring; New Product Development*

BIBLIOGRAPHY

Anthony, Scott. "Radiohead's Disruptive Innovation." *Harvard Business Publishing,* 2007. Available from: http://conversationstarter.hbsp.com/2007/10/radioheads_disruptive_innovati.html.

Bate, J.D., and R.E. Johnston, Jr. "Strategic Frontiers: The Starting-Point for Innovative Growth." *Strategy and Leadership* 33, no. 1 (2005): 12–18.

Costin, H., ed. *Readings in Strategy and Strategic Planning.* Fort Worth, TX: The Dryden Press, 1998.

Christiansen, Clayton M, Raynor, Michael E., and Athony, Scott D. "Six Keys to Building New Markets by Unleashing Destructive Innovation." *Harvard Business School,* 2003. Available from: http://hbswk.hbs.edu/item/3374.html.

Francis, D., and J. Bessant. "Targeting Innovation and Implications for Capability Development." *Technovation* 25, no. 3 (2005): 171–183.

Frohman, A.L. "Building A Culture for Innovation." *Research-Technology Management* 41, no. 2 (1998): 9–12.

Henry, J., and D. Walker, eds. *Managing Innovation.* London: Sage Publications, 1991.

"IBM's Three Types of Business Model Innovation Strategies." *Unitedbit.com,* 2008. Available from: http://www.unitedbit.com/ibms-three-types-of-business-model-innovation-strategies/.

Jacobson, Don. "The Link Between Motivation and Innovation." *GovLeaders.org,* 2008. Available from: http://www.govleaders.org/motivation.htm.

McDermott, B., and G. Sexton. *Leading Innovation: Creating Workplaces Where People Excel So Organizations Thrive.* Herentals, Belgium: Nova Vista Publishing, 2004.

Radjou, N. "Networked Innovation Drives Profits." *Industrial Management* 47, no. 1 (2005): 14–21.

Stefik, M., and B. Stefik. *Breakthrough: Stories and Strategies of Radical Innovation.* Cambridge, MA: MIT Press, 2004.

Tidd, J., J. Bessant, and K. Pavitt. *Managing Innovation: Integrating Technological, Market and Organizational Change.* Chichester, UK: John Wiley & Sons, 1997.

Verloop, J., and J.G. Wissema. *Insight in Innovation: Managing Innovation by Understanding the Laws of Innovation.* Boston, MA: Elsevier, 2004.

Von Stamm, B., and N. Nicholson. *Innovation: How to Create and Develop New Business Ideas.* Norwich: Format Publishing, 2005.

Yapp, C. "Innovation, Futures Thinking and Leadership." *Public Money and Management* 25, no. 1 (2005): 57–60.

INSIDER TRADING

Insider trading is the act of buying or selling company stocks and securities based on information not known to the public. An insider is considered any officer, manager,

or executive of the firm in question; in some cases, it can also be a person who was given the proprietary information by a company figurehead. Generally, insider trading is illegal, but there are laws and regulations that some are willing to skirt in order to practice trading that they consider "legal" insider trading.

Insider trading is considered by many people to be no different than outright stealing. U.S. laws concerning insider trading have become increasingly more strict throughout the years and include swift punishment for those who garnered the insider information to make the trades as well as those who do the trading, regardless of their involvement or relationship (or lack thereof) to the firm. Several laws now protect companies and employees from insider trading and its negative impact on stocks and the open market in general. Even firms with highly globalized presences with identities on all the world markets now have the legal protection to combat insider trading.

U.S. LAWS AND REGULATIONS AGAINST INSIDER TRADING

Insider trading laws have evolved with the open market since its onset, but many were born after the devastating crash of the stock market in 1929. The 1934 Securities Exchange Act is the backbone for almost any law or regulation against insider trading as well as other types of securities fraud. Considered an appendage of (or sister to) the 1933 Securities Act, the Securities Exchange Act reaches further to protect stocks, while the Securities Act covers issues more germane to securities. Essentially, sections 16(b) and 10(b) of the Securities Exchange Act outline unlawful trading practices and these sections explain— through various rules of the U.S. Securities and Exchange Commission (SEC)—exactly what fraudulent trades are and who can perpetrate them. The 1934 act also denotes when a trade is considered unlawful.

Insider trading can cause major shifts in what the public chooses to do in terms of buying or selling of a firm's stocks or securities. This is the main reason why stocks and companies, as well as their shareholders, must be protected against trades that are based on information that is unknown to the public. In a 1966 federal court case (*SEC vs. Texas Gulf Sulphur Company*), it was decided that any person who is party to information not yet publicly known about a firm's stocks or securities has a duty to stockholders and to the firm in question. The privy person can either choose not to trade and sit on the information, or share what he or she knows in a public manner so that everyone can benefit. In this way, the shareholders and the company's holdings are not devalued by trades based on the information at hand.

Many of the parameters that determine the difference between legal and illegal insider trading are determined by the SEC. According to the SEC, the two most recent rules (10b5-1 and 10b5-2) further protect both investors and companies by outlining exactly when information is considered public or nonpublic and by determining when exceptions are to be made (for example, when a trade is made but the person trading can prove that it was made on the basis of something other than nonpublic information). Additionally, 10b5-2 explains when a person would be required to pay a penalty for use of insider information and what, exactly, constitutes misappropriated information in regards to information used by parties with no direct ties to the firm in question.

EFFECTS AND FUTURE OF INSIDER TRADING

The rules and regulations established by the acts of 1933 and 1934—as well as various court cases that further tailored the laws against insider trading—were further built upon, reexamined, and revised following the boom of corporate mergers in the 1980s. It was not until this time that it became illegal to sell insider information. The case *United States vs. Newman* made it illegal for the first time for a nonrelated party, not just a company insider, to engage in trades based on nonpublic information.

The laws and regulations against insider trading have become progressively more severe because the potential negative effects that insider trading can have are devastating. With mergers on the rise as they were in the 1980s, and with more money invested in the stock market by more people than ever before, insider trading is again a deadly threat. Businesses moving to a global stage will want to protect assets to the best of their abilities, and a strong policy against insider trading is a crucial aspect of that protection.

The United States has the reputation for the least acceptance and lowest tolerance for insider trading. Other major world players—including China, India, and members of the European Union—have started to adopt many of the same perspectives and laws concerning insider trading of stocks and securities as corporations from every locale move in the multinational direction.

BIBLIOGRAPHY

Ali, Paul U. and Greg N. Gregoriou. *Insider Trading: Global Developments and Analysis.* Boca Raton, Florida: CRC Press, 2008.

Macey, Jonathan R. *Insider Trading: Economics, Politics, and Policy.* Washington, D.C.: AEI Press, 1991.

Newkirk, Thomas, and Melissa A. Robertson. "Speech by SEC Staff: Insider Trading—A U.S. Perspective." Available from: http://www.sec.gov/news/speech/speecharchive/1998/spch221.htm.

"U.S. Securities and Exchange Commission: Insider Trading." Available from: http://www.sec.gov/answers/insider.htm.

INSTANT MESSAGING

Instant messaging (IM) is a general term encompassing a variety of software applications that enable users to have real-time text conversations, play turn-based games, and share pictures, music, and data files over the Internet. IM is quickly replacing e-mail as the preferred method for rapid communication both within and without the corporate community. IM software allows users to maintain a list of contacts—sometimes referred to as a buddy list—which they can use to exchange messages whenever both parties are online. These messages appear in a dialogue box on the computer or mobile device screen that both the sender and the recipient can see. The most popular IM utilities—America Online Instant Messenger (AIM), Microsoft MSN Messenger, Yahoo! Messenger, and Google Chat—offer a number of other features, including chat rooms, voice communication, and streaming content capabilities.

While each different IM utility is proprietary, they all work on a client-server model. Client software resides on the user's computer and connects with a central server. Users open an IM session by logging into their account on the server. The server makes a record of the Internet address of the user's computer, then calls up the user's buddy list and checks to see who else is online. Once this information is provided to all connected clients, the buddies can exchange messages directly in real time.

IM has exploded in popularity since ICQ, the first free, public instant-messaging utility, was introduced in 1996. Many fans of IM took the technology to work with them, downloading IM client software onto corporate computer networks and using it as a tool to facilitate business communications. IM offers both advantages and disadvantages in the workplace. Proponents claim that it boosts employee productivity by allowing them to get immediate answers from co-workers and suppliers. Sales personnel and help desk technicians, in particular, find that it enables them to serve customers more effectively. Businesses can also use IM to conduct virtual meetings and facilitate collaboration on group projects. "Backers say IM, once dismissed as a plaything for the under-twenty set, dramatically speeds up the flow of information in and out of a company," Esther Shein wrote in *CFO*. Google Chat, made available in the Google apps bundle in 2006, offers possibly the most user-friendly model for the workplace.

Most public IM utilities were created for personal use, which can create problems in a business setting. But most importantly, IT managers emphasize that public IM is not a secure form of communication. "When a user carries on a discussion with the person in the cube right next to him, if it's not a corporate IM utility, the message doesn't go from one computer right next door to the other one," network security consultant Dan Wooley explained on InstantMessagingPlanet.com. "It goes out of the corporate network and across different networks and then back to the other person's desk." As a result, anyone with access to the networks in between can intercept message traffic, potentially exposing confidential business information. IT managers also point out that the major public IM clients do not provide monitoring, virus protection, encryption, or other features usually associated with corporate IT applications. Finally, some business managers question whether IM truly increases productivity or instead creates a source of distraction for employees. How productively IM is used varies from one place of work to the next.

Despite such potential problems, however, many businesses are reluctant to block IM for fear of alienating employees who rely upon it. Instead, businesses have increasingly sought to manage its use through enterprise instant messaging (EIM) solutions. One approach involves implementing a software application called an IM gateway, which can intercept, log, and approve communication that takes place through the corporate network using public IM systems. Other companies choose to develop their own in-house IM systems, which can be designed to include such features as user authentication, network security, virus and spam protection, message encryption, and message archiving. Logging and archiving of messages is particularly important in light of Securities and Exchange Commission rules that require companies to retain electronic correspondence that divulges key corporate information.

Some IM applications available on the Internet are moving away from the notion that they have to be engineered with all work and no play in mind. Applications on sites such as Twitter.com and other IM services (like the MySpace.com messenger) are geared more toward simply checking in from time to time. And while some more progressive companies may use a network like Twitter.com to establish regular check-ins, the predominance of messages on these types of networks are purely for entertainment and social value.

With proper management, IM technology is likely to play an important role in future business communications. "Instant messaging is just one of a whole Swiss Army knife set of tools that will be used to conduct business," Nate Root of Forrester Research stated in *CFO*. As one application under an umbrella of collaborative methods that can be used by several people at once (such as company-wide Web accessible calendars, domain management software, and security tools), IM is the method by which all other telecommuting tools are managed by groups and their administrators. The newfound ability to tele-collaborate, or communally manage projects and day-to-day business via multiple locations, is a trend brought on by IM that will shape the new face of business tomorrow.

SEE ALSO *Communication; Handheld Computers*

BIBLIOGRAPHY

Bird, Drew. "Managing IT's Role in Business." *Instant Messaging Planet* July 2003. Available from: http://www.instantmessagingplanet. com/enterprise/article.php/2235591.

Heck, Mike. "A Chat Checklist for IT Managers." *InfoWorld* 26 August 2004.

Lindsell-Roberts, Sheryl. "135 Tips on Email and Instant Messages: Plus Blogs, Chatrooms, and Texting," Boston: Houghton Mifflin, 2008.

Orzech, Dan. "Under IT's Radar, Instant Messaging Invades Corporate Desktops." *Instant Messaging Planet* 14 July 2003. Available from: http://www.instantmessagingplanet.com/ enterprise/article.php/2234871.

Shein, Esther. "Will IM Pay? Backers Say Instant Messaging Will Revolutionize the Way Businesses Work." *CFO* May 2004.

Spanbauer, Scott. "A Grown-Up's Guide to Instant Messaging." *PC World* March 2004.

Tyson, Jeff. "How Instant Messaging Works." *HowStuffWorks.com* Available from: http://computer.howstuffworks.com/instant-messaging.htm.

INTELLECTUAL PROPERTY RIGHTS

Intellectual property is a term used to cover goods and services protected under the laws governing patents, trademarks, copyrights, and trade secrets. Although the legal rights concerning different kinds of intellectual property are similar in a general sense, they differ specifically in what they protect and in how the particular rights are established. Patents protect an inventor's right to exclude others from making, manufacturing, using, or selling an inventor's invention. Trademarks protect words, phrases, symbols, and designs. Copyrights protect original artistic, musical, and literary works, including software. Intellectual property rights can also encompass state trade secrets laws, which protect a company's proprietary and confidential information, such as methods of manufacturing, customer lists, supplier information, and the materials used during the manufacturing process.

PATENT RIGHTS

A patent is a grant of a property right by the United States government, through the Patent and Trademark Office (PTO), to the inventor of an invention. In 1995 U.S. patent law was changed so that it would conform to the World Trade Organization's Agreement on Trade-Related Aspects of International Property Rights as decided in the Uruguay Round. Applications filed on or before June 8, 1995 have a term of twenty years from the earliest filing date. Applications pending on June 8, 1995 and patents that were in force on this date have the longer term of either seventeen years from the issue date or twenty years from the earliest filing date. Design patents, as opposed to

utility patents, have fourteen-year terms. Some patents require the payment of patent fees. A patent is not a grant of the right to make, manufacture, use, or sell the invention, but rather the right to exclude others from making, manufacturing, using, or selling the invention.

The power to grant rights in patents arises from Article I, section 8 of the U.S. Constitution. The first patent law was passed in 1790, and the current law governing patents took effect in 1953. Since the first statute, over 6.5 million patents have been granted. The current statute set forth the subject matters for which patents may be granted and the conditions under which a patent will be issued. It also established the Patent and Trademark Office (PTO).

Under the law, anyone who "invents or discovers any new and useful process, machine, manufacture or composition of matter, or any new and useful improvements thereof, may obtain a patent." Courts have interpreted this language to include nearly anything that could be fabricated. One cannot, however, patent literary works, compilations of data, compositions of music, legal documents, or forms of energy. An invention must meet the test of being "new" under the standards in the law before a patent will be granted. The subject matter of an invention must be sufficiently different from what has been described before in a printed publication of some sort anywhere in the world, or on sale in the United States before the date of the application for the patent. In addition, the invention must not be obvious to a person who has ordinary skill in the relevant technical or scientific area at the time the inventor applies for the patent. Finally, an invention must be determined "useful" before obtaining a patent, although this requirement is interpreted very broadly.

The legal status of business method patents varies from country to country. It is difficult to obtain a patent for methods of doing business in China, India, Mexico, Israel and most of Europe. Under U.S. patent law, business methods are judged according to the same requirements as any other application. Before the 1980s and 1990s, the PTO stated that business methods were not patentable, but it became difficult to differentiate between technological inventions and business methods when judging applications for computer-implemented methods of doing business. Therefore, the PTO decided that business methods were patentable if they used the "technological arts," but this position was overturned in 2005. Currently, the PTO requires that a process produce a useful and concrete result to be eligible for a patent.

Only the inventor may apply for a patent, unless he has died or has been declared insane. An inventor applies for a patent by sending to the Commissioner of Patents and Trademarks a written specification, which is a description of the invention and of the process by which the

invention is made and how it is used. The specification must contain one or more claims about the subject matter that the applicant believes pertains to the invention, and include necessary drawings. The specification must be accompanied by a sworn oath or declaration by the inventor that he or she is the original and first inventor of the subject matter of the application, and the necessary filing fees.

TRADEMARK RIGHTS

A trademark is a word, name, phrase, symbol, or design, or a combination of these elements, which identifies and distinguishes the source of goods or services. The term *trademark* also encompasses service marks, which identify and distinguish the source of a service rather than a product. Trademark rights are used to prevent others from making, promoting, or selling goods or services which have a name, symbol, or design that is confusingly similar to that of an established trademark. It does not, however, prevent others from making or selling the same goods or services, as long as it is under a different, non-confusing mark.

There are two distinct types of rights in a trademark or service mark: the right to use the mark and the right to register the mark. These rights arise from either using the mark in actual commerce, or filing an application for registration of the mark with the PTO.

The Trademark Act of 1946, 15 U.S.C. Section 1051 et seq.; the Trademark Rules, 37 C.F.R. Part 2; and the Trademark Manual of Examining Procedure (2nd ed. 1993) control the registration of marks. The first party who either uses a mark in the course of commerce or business or files an application for registration with the PTO usually has the right to register that mark. A party can use a mark, or establish rights in it, without filing an application for registration. The registration, however, creates a presumption that the party who has registered the mark is the owner of the mark for the goods and services set forth in the registration application, and therefore has the right to use the mark anywhere in the country. This presumption can become important when two parties unintentionally begin using similar marks and become involved in a lawsuit over who has the right solely to use the mark. This is not determined by the PTO, but by a federal court, which has the power to issue an injunction to stop a party from using a mark, and to award damages for a party's improper use of another's mark.

Similarly, the owner of a mark may use the trademark (^{TM}) or service mark (^{SM}) designation with the mark to make it clear that the owner is claiming rights in the product or service so designated. The trademark or service mark designation may be used without the owner having registered the mark with the Patent and Trademark Office. If it is registered, however, the owner may use the registration symbol (®) with the mark.

Rights in a trademark, unlike rights in a copyright or a patent, can last for an indefinite period if the owner of the mark continuously uses the mark for its products or services. Federal registrations last for ten years, but between the fifth and sixth year after the date of the initial registration, the person who registered the mark must file an affidavit with information about the mark and ownership. If the registrant does not file this affidavit, the registration is cancelled. After the initial registration period, the mark can be renewed for successive ten-year terms. Registration of a mark with the PTO provides protection from others using the mark in the United States and its territories, but does not extend to its use in other countries.

COPYRIGHTS

A copyright gives an owner of "original works of authorship" the exclusive right to reproduce the work; prepare derivative works based on the copyrighted work; and distribute, perform, or display the work. Copyrights are registered with the Library of Congress Copyright Office. The first Copyright Act was passed in 1790, and it has been revised many times, most recently in 1976. This act sets forth eight categories of works that can be copyrighted. These are as follows:

1. Literary works
2. Musical works, including lyrics
3. Dramatic works, including music
4. Pantomimes and choreographic works
5. Pictorial, graphic, and sculptural works
6. Motion pictures and other audiovisual works
7. Sound recordings
8. Architectural works

These categories are interpreted broadly, so that, for example, software is considered copyrightable as a literary work. However, the act does not protect an "idea, procedure, process, system, method of operation, concept, principal or discovery regardless of the form in which it is described, explained, illustrated or embodied in such work."

The term of a copyright is for the period of the life of the owner, plus fifty years. An entity or person can become the owner of a copyright in two ways, either by creating the work personally, or through owning a work for hire. Works for hire cover situations where an employee creates a work at the request of an employer (and the employer thereby owns the copyright), or where someone commissions the creation of a work, and the party commissioning the work and the creator have agreed in writing that the commissioning party shall be the owner and that the work shall be a work for hire.

In 1988, the United States became a signatory to the Berne Convention, by enacting the Berne Convention Implementation Act. The Berne Convention provides copyright protection for a copyright owner simultaneously in most countries in the world. To become a signatory country, the United States had to amend the Copyright Act to create a copyright in a work automatically upon completion of the creation. Now, as soon as a composer finishes a work or an author writes the last words of an article, there exists a copyright. However, if an owner wishes to sue for copyright infringement, the owner must register the copyright with the United States Copyright Office by completing an application, and sending it with two copies of the "best edition" of the work and the filing fee.

INTELLECTUAL PROPERTY IN THE INTERNET AGE

Efforts to protect intellectual property became vastly more complicated with the growth of Internet technology in the late 1990s and early 2000s. The global computer network gave people greater access to all kinds of creative works, and in many cases enabled them to copy such works without regard to legal protection. "Virtually all creative content can be digitized, even if it was not initially created on a computer, and the Internet has become the primary distribution channel for every kind of digital material," Jonathan Cohen explained in his article "Copyright and Intellectual Property in the Age of the Internet."

Since the Internet has an international reach, the digital age has also brought to light discrepancies in intellectual property laws between nations. Several attempts have been made to bring the protection granted by developed and developing nations in line. In 2002, for example, the World Intellectual Property Organization Copyright Treaty (WCT) was ratified by the United States, Japan, and the European Union. The WCT updated the Berne Convention to apply to the Internet age, setting international standards for the protection of literary and artistic works in digital form.

Simultaneously, major content providers have taken steps to protect their own intellectual property from unauthorized reproduction through digital rights management (DRM) technology. DRM systems involve antipiracy measures that are built into software, video, and music files sold over the Internet to ensure that the owners of intellectual property are compensated for its use. DRM has proved cumbersome to consumers, however, because different content providers have established their own, usually incompatible, DRM systems—making it difficult for users to access content packaged and distributed with one DRM technology using a device that supports a different technology.

Some legal experts have also expressed concern that content providers will use DRM technology to erode the rights previously granted to the public under the "fair use" doctrine of copyright law. Whether a specific use of copyrighted material is determined to be fair depends on four factors: the purpose and character of the use; the nature of the work; the portion of the work used; and the effect of the use on the market for the work. Fair use protects such activities as videotaping a television program for later viewing, posting a newspaper cartoon on an office bulletin board, and quoting from a book in a report. In view of the rapidly evolving nature of intellectual property protection in the Internet age, business managers should seek legal advice in order to protect their own creative works as well as to avoid infringing on the rights of others.

BIBLIOGRAPHY

Cohen, Jonathan. "Copyright and Intellectual Property in the Age of the Internet." Jonathan Cohen and Associates. Available from: http://www.jcarchitects.com/IntellectualProperty.html.

Dutfield, Graham. "Does One Size Fit All? The International Patent Regime." *Harvard International Review* Summer 2004.

———."Guarding Intellectual Property on the Internet." *PC World* 7 December 2001.

Noble, Steve. "The Internet and Digital Copyright Issues." *Photo Marketing* January 2005.

———."Tide Turns in DRM Wars with Creation of Coral Consortium." *Online Reporter* 9 October 2004.

———.U.S. Code Collection.35 U.S.C. 154.

USPTO white paper. "Automated Financial or Management Data Processing Methods." Available from: http://www.law.cornell.edu/uscode/35/154(a).html

Von Lohmann, Fred. "Fair Use and Digital Rights Management." Electronic Frontier Foundation. Available from: http://www.eff.org/IP/DRM/fair_use_and_drm.html.

INTERNAL AUDITING

The Institute of Internal Auditors (with more than 120,000 members as of 2008) defines internal auditing as ". . .an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes."

One way to distinguish between internal auditors and their more familiar counterparts (external auditors) is the intended audience of their reports. External auditors are hired by a company to audit that firm's financial statements and issue an opinion on the reliability of those financial statements. While external auditors are in a contractual relationship to the firm whose financial statements are being audited, external auditors owe their primary fiduciary responsibility to groups outside of the firm, such as investors and creditors. The external auditor's report or opinion is provided to groups outside of the firm that hired him to

audit by including it in that firm's annual report. In contrast, internal auditors are employed by the organization that they are auditing. Similar to external auditors, the internal auditor might provide a written opinion based on his evaluation. However, in contrast to external auditors, the audience for that opinion will always be corporate management instead of investors and creditors.

Typically, the role of internal auditors is broader than that of external auditors. While a company's external auditors will focus on evaluating the firm's financial statements, internal auditors can provide financial, compliance, and operational auditing.

FINANCIAL AUDITS

The significance of the contribution of internal auditors to financial audits was dramatically increased with the passage of the Sarbanes-Oxley Act of 2002. That act made widespread changes in the responsibility of the parties involved in the financial reporting process.

One change that has enhanced the role of the internal auditor is the requirement in Section 302 of Sarbanes-Oxley that a firm's certifying officers (typically the chief executive officer and chief financial officer) must state that they are responsible for establishing and maintaining internal controls over financial reporting. As part of this certification, they must also indicate that the internal controls were designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with generally accepted accounting principles in the United States. These Section 302 certifications are required to be included with the firm's annual financial statements. Most firms will rely extensively on the work of their internal auditors to provide the justification for the Section 302 certifications.

Section 404 of the Sarbanes-Oxley act also increased the responsibilities of internal auditors. This section requires that management include a report on internal controls in the firm's annual financial statements. The report must indicate that management is responsible for establishing and maintaining internal controls over financial reporting, and management's conclusions regarding the effectiveness of those internal controls. In most companies, the internal auditors will provide the documentation and testing of internal controls that will be necessary for management to make that report.

COMPLIANCE OR OPERATIONAL AUDITS

A compliance audit assures that the company's activities comply with relevant laws and regulations. An operational audit explores the effectiveness and efficiency of the firm's activities, seeking to reduce the risks faced by the specific firm. In performing an operational audit, performance standards may include a variety of criteria other than monetary measures, such as the percentage of late deliveries or idle labor time. It is the responsibility of the internal auditor to determine appropriate measures on the basis of experience and insight into the integrated functions of the company's activities. Typically, performance is measured against prior periods, industry standards, other operational units, or budgeted activity.

ENTERPRISE RISK MANAGEMENT

Internal auditors can provide an enterprise-wide approach to risk management. Enterprise Risk Management, or ERM, is a broader approach to risk management than that taken by a single department within an organization. ERM can identify risks and opportunities affecting the creation or preservation of value within the enterprise. Internal auditing can ensure that ERM processes are effective in managing key risks as well as provide important information to the company's board and senior management.

Internal auditing provides a broad-based, independent, value-adding function that is essential for the effective management of a firm. The value of internal audit has been greatly enhanced by the passage of the Sarbanes-Oxley Act of 2002.

SEE ALSO *Financial Issues for Managers*

BIBLIOGRAPHY

Arens, Alvin A. *Auditing: An Integrated Approach.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 1997.

Burke, Jacqueline, and Anthony N. Dalessio. "Highlights of SAS No. 82 for the Internal Auditor." *Internal Auditing* November/December 1998, 40–44.

Financial Accounting Standards Board. "Facts About FASB-Mission Section." Available from: http://www.rutgers.edu/Accounting/raw/fasb/facts/fasfact1.html.

Gauntt, James E., Jr., and G. William Glezen. "Analytical Auditing Procedures." *Internal Auditor* February 1997, 56–60.

Grand, Bernard. "Theoretic Approaches to Audits." *Internal Auditing* November/December 1998, 14–19.

The Institute of Internal Auditors. Website. Available from: http://www.theiia.org.

Jacka, J. Mike, and Paulette Keller. "The Building's On Fire!" *Internal Auditor* February 1996, 46–50.

The Library of Congress."H.R. 3763 Sarbanes-Oxley Act of 2002." Available from: http://thomas.loc.gov/cgi-bin/query/z?c107:H.R.3763.ENR:.

Ridley, Anthony J. "A Profession for the Twenty-First Century." *Internal Auditor* October 1996, 20–25.

Rittenberg, Larry, and Patricia Miller. *Sarbanes-Oxley Section 404 Work: Looking at the Benefits.* Institute of Internal Auditors, 2008.

Simmons, Mark R. "COSO Based Auditing." *Internal Auditor* December 1997, 68–73.

———. "The Standards and the Framework." *Internal Auditor* April 1997, 50–55.

Swtitzer, Susan M. *Internal Audit Reports Post Sarbanes-Oxley: A Guide to Process-driven Reporting.* New York: Wiley. 2007.

Taylor, Donald H., and G. William Glezen. *Auditing: An Assertions Approach.* 7th ed. New York: John Wiley and Sons, 1997.

Walz, Anthony. "Adding Value." *Internal Auditor* February 1997, 51–54.

INTERNATIONAL BUSINESS

International business is defined as business transactions that take place across national borders. This broad definition includes the very small firm that exports (or imports) a small quantity to only one country, as well as the very large global firm with integrated operations and strategic alliances around the world. Within this broad array, distinctions are often made among different types of international firms, and these distinctions are helpful in understanding a firm's strategy, organization, and functional decisions (for example, its financial, administrative, marketing, human resource, or operations decisions). One distinction that can be helpful is the distinction between multidomestic operations, with independent subsidiaries that act essentially as domestic firms, and global operations, with integrated subsidiaries that are closely related and interconnected. These may be thought of as the two ends of a continuum, with many possibilities in between. Firms are unlikely to be at one end of the continuum, though, as they often combine aspects of multi-domestic operations with aspects of global operations.

International business grew over the last half of the twentieth century and the early twenty-first century partly because of liberalization of both trade and investment, and partly because doing business internationally had become easier. In terms of liberalization, the General Agreement on Tariffs and Trade (GATT) negotiation rounds resulted in trade liberalization, and this was continued with the formation of the World Trade Organization (WTO) in 1995, which is responsible for the regulation of trade on the global level. Other regional trade agreements include the North Atlantic Free Trade Agreement (NAFTA) between The United States, Canada and Mexico and the MERCO-SUR between South American Countries. At the same time, most governments liberalized worldwide capital movements, particularly with the advent of electronic funds transfers. In addition, the introduction of a new European monetary unit, the euro, into circulation in January 2002 has impacted international business economically. The euro is the currency of the European Union, and it has replaced the national currency of many European countries. As of early 2005, the United States dollar continues to struggle against the euro and the impacts are being felt across industries worldwide.

In terms of ease of doing business internationally, two major forces are important: technological developments that make global communication and transportation relatively quick and convenient, and the disappearance of a substantial part of the communist world, opening many of the world's economies to private business.

DOMESTIC VS. INTERNATIONAL BUSINESS

Domestic and international enterprises, in both the public and private sectors, share the business objectives of functioning successfully to continue operations. Private enterprises seek to function profitably as well. Why, then, is international business different from domestic? The answer lies in the differences across borders. Nation-states generally have unique government systems, laws and regulations, currencies, taxes and duties, and so on, as well as different cultures and practices. An individual traveling from his home country to a foreign country needs to have the proper documents, to carry foreign currency, to be able to communicate in the foreign country, to be dressed appropriately, and so on. Doing business in a foreign country involves similar issues and is thus more complex than doing business at home. The following sections will explore some of these issues. Specifically, comparative advantage is introduced, the international business environment is explored, and forms of international entry are outlined.

THEORIES OF INTERNATIONAL TRADE AND INVESTMENT

In order to understand international business, it is necessary to have a broad conceptual understanding of why trade and investment across national borders take place. Trade and investment can be examined in terms of the comparative advantage of nations.

Comparative advantage suggests that each nation is relatively good at producing certain products or services. This comparative advantage is based on the nation's abundant factors of production—land, labor, and capital—and a country will export those products/services that use its abundant factors of production intensively. Simply, consider only two factors of production, labor and capital, and two countries, X and Y. If country X has a relative abundance of labor and country Y a relative abundance of capital, country X should export products/services that use labor intensively, and country Y should export products/services that use capital intensively.

This is a very simplistic explanation, of course. There are many more factors of production, of varying qualities, and there are many additional influences on trade such as government regulations. Nevertheless, it is a starting point for understanding what nations are likely to export or import. The concept of comparative advantage can also

help explain investment flows. Generally, capital is the most mobile of the factors of production and can move relatively easily from one country to another. Other factors of production, such as land and labor, either do not move or are less mobile. The result is that where capital is available in one country it may be used to invest in other countries to take advantage of their abundant land or labor. Firms may develop expertise and firm-specific advantages based initially on abundant resources at home, but as resource needs change, the stage of the product life cycle matures, and home markets become saturated, these firms find it advantageous to invest internationally.

THE INTERNATIONAL BUSINESS ENVIRONMENT

International business is different from domestic business because the environment changes when a firm crosses international borders. Typically, a firm understands its domestic environment quite well, but is less familiar with the environment in other countries and must invest more time and resources into understanding the new environment. The following considers some of the important aspects of the environment that change internationally.

The economic environment can be very different from one nation to another. Countries are often divided into three main categories: the developed countries, the least developed countries, and developing or emerging economies. Within each category there are major variations, but overall the more developed countries are the rich countries, the less developed the poor ones, and the newly industrializing those moving from poorer to richer. These distinctions are usually made on the basis of gross domestic product per capita (GDP/capita). Better education, infrastructure, technology, health care, and so on are also often associated with higher levels of economic development.

When discussing emerging economies, the "BRIC" nations hold a prominent place. The BRIC countries refer to the emerging economies in Brazil, Russia, India and China. The term was used first by Goldman Sachs investment bank in 2003 in a paper that argued that these rapidly developing nations would surpass the richest countries in the world by 2050. Jim O'Neill, head of global economic research at Goldman Sachs, claims that the BRIC countries are moving toward the creation of an economic bloc similar to the European Union. The BRIC Summit that took place in 2008 indicates that these countries are beginning to formalize their association.

In addition to level of economic development, countries can be classified as free-market, centrally planned, or mixed. Free-market economies are those where government intervenes minimally in business activities, and market forces of supply and demand are allowed to determine production and prices. Centrally planned economies are those where the government determines production and prices based on forecasts of demand and desired levels of supply. Mixed economies are those where some activities are left to market forces and some, for national and individual welfare reasons, are government controlled. In the late twentieth century and early twenty-first century there has been a substantial move to free-market economies but most countries maintain some government control of business activities. The People's Republic of China (PRC) has implemented market-based economic reforms since the death of Chairman Mao in 1976, after which the Communist Party's control over citizens was diminished. Now the PRC has a mixed economy that incorporates many aspects of a free-market environment while retaining government control over industries that are considered to be of vital strategic importance to the state.

Clearly the level of economic activity combined with education, infrastructure, and so on, as well as the degree of government control of the economy, affect virtually all facets of doing business, and a firm needs to understand this environment if it is to operate successfully internationally.

The political environment refers to the type of government, the government relationship with business, and the political risk in a country. Doing business internationally thus implies dealing with different types of governments, relationships, and levels of risk.

There are many different types of political systems, for example, multi-party democracies, one-party states, constitutional monarchies, and dictatorships (military and non-military). Also, governments change in different ways, for example, by regular elections, occasional elections, death, coups, and war. Government-business relationships also differ from country to country. Business may be viewed positively as the engine of growth, it may be viewed negatively as the exploiter of the workers, or somewhere in between as providing both benefits and drawbacks. Specific government-business relationships can also vary from positive to negative depending on the type of business operations involved and the relationship between the people of the host country and the people of the home country. To be effective in a foreign location an international firm relies on the goodwill of the foreign government and needs to have a good understanding of all of these aspects of the political environment.

A particular concern of international firms is the degree of political risk in a foreign location. Political risk refers to the likelihood of government activity that has unwanted consequences for the firm. These consequences can be dramatic as in forced divestment, where a government requires the firm to give up its assets, or more moderate, as in unwelcome regulations or interference in operations. In any case the risk occurs because of uncertainty about the likelihood of government activity

occurring. Generally, risk is associated with instability, and a country is thus seen as more risky if the government is likely to change unexpectedly, if there is social unrest, if there are riots, revolutions, war, terrorism, and so on. Firms naturally prefer countries that are stable and that present little political risk, but the returns need to be weighed against the risks, and firms often do business in countries where the risk is relatively high. In these situations, firms seek to manage the perceived risk through insurance, ownership and management choices, supply and market control, financing arrangements, and so on. In addition, the degree of political risk is not solely a function of the country, but depends on the company and its activities as well—a risky country for one company may be relatively safe for another. Additionally, countries that can be said to have little political risk may have a strict regulatory environment. In the United States, regulations make for a stable business environment, but the compliance burden—particularly since the Sarbanes-Oxley code was introduced in 2002—can be so expensive as to deter foreign companies from doing business in the United States.

The cultural environment is one of the critical components of the international business environment and one of the most difficult to understand. This is because the cultural environment is essentially unseen; According to Kluckhohn and Strodtbeck, it can be described as a shared, commonly held body of general beliefs and values that determine what is right for one group. National culture is described as the body of general beliefs and values that are shared by a nation. Beliefs and values are generally seen as formed by factors such as history, language, religion, geographic location, government, and education; thus firms begin a cultural analysis by seeking to understand these factors.

Firms want to understand what beliefs and values they may find in countries where they do business, and a number of models of cultural values have been proposed by scholars. The most well known is that developed by Hofstede in 1980. This model proposes four dimensions of cultural values including individualism, uncertainty avoidance, power distance, and masculinity. Individualism is the degree to which a nation values and encourages individual action and decision making. Uncertainty avoidance is the degree to which a nation is willing to accept and deal with uncertainty. Power distance is the degree to which a nation accepts and sanctions differences in power. And masculinity is the degree to which a nation accepts traditional male values or traditional female values. This model of cultural values has been used extensively because it provides data for a wide array of countries. Many academics and managers found this model helpful in exploring management approaches that would be appropriate in different cultures. For example, in a nation that is high on individualism one expects individual goals, individual tasks, and individual

reward systems to be effective, whereas the reverse would be the case in a nation that is low on individualism. While this model is popular, there have been many attempts to develop more complex and inclusive models of culture.

The competitive environment can also change from country to country. This is partly because of the economic, political, and cultural environments; these environmental factors help determine the type and degree of competition that exists in a given country. Competition can come from a variety of sources. It can be public or private sector, come from large or small organizations, be domestic or global, and stem from traditional or new competitors. For the domestic firm the most likely sources of competition may be well understood. The same is not the case when one moves to compete in a new environment. For example, in the United States most business is privately owned and competition is among private sector companies, while in the People's Republic of China some businesses remain under the direction of the state. Thus, a U.S. company in the PRC could find itself competing with organizations owned by state entities. This could change the nature of competition dramatically.

The nature of competition can also change from place to place as the following illustrate: competition may be encouraged and accepted or discouraged in favor of cooperation; relations between buyers and sellers may be friendly or hostile; barriers to entry and exit may be low or high; regulations may permit or prohibit certain activities. To be effective internationally, firms need to understand these competitive issues and assess their impact. In addition to trade liberalization, there has been an effort to negotiate trade facilitation, which focuses on the cost of trade and customs procedures.

An important aspect of the competitive environment is the level, and acceptance, of technological innovation in different countries. The last decades of the twentieth century saw major advances in technology, and this is continuing in the twenty-first century. Technology often is seen as giving firms a competitive advantage; hence, firms compete for access to the newest in technology, and international firms transfer technology to be globally competitive. It is easier than ever for even small businesses to have a global presence thanks to the Internet, which greatly expands their exposure, their market, and their potential customer base. For economic, political, and cultural reasons, some countries are more accepting of technological innovations, others less accepting.

INTERNATIONAL ENTRY CHOICES

International firms may choose to do business in a variety of ways. Some of the most common include exports, licenses, contracts and turnkey operations, franchises, joint ventures, wholly owned subsidiaries, and strategic alliances.

Exporting is often the first international choice for firms, and many firms rely substantially on exports throughout their history. Exports are seen as relatively simple because the firm is relying on domestic production, can use a variety of intermediaries to assist in the process, and expects its foreign customers to deal with the marketing and sales issues. Many firms begin by exporting reactively; then become proactive when they realize the potential benefits of addressing a market that is much larger than the domestic one. Effective exporting requires attention to detail if the process is to be successful; for example, the exporter needs to decide if and when to use different intermediaries, select an appropriate transportation method, prepare export documentation, prepare the product, arrange acceptable payment terms, and so on. Most importantly, the exporter usually leaves marketing and sales to the foreign customers, and these may not receive the same attention as if the firm itself undertook these activities. Larger exporters often undertake their own marketing and establish sales subsidiaries in important foreign markets.

Licenses are granted from a licensor to a licensee for the rights to some intangible property (e.g. patents, processes, copyrights, trademarks) for agreed on compensation (a royalty payment). Many companies feel that production in a foreign country is desirable but they do not want to undertake this production themselves. In this situation the firm can grant a license to a foreign firm to undertake the production. The licensing agreement gives access to foreign markets through foreign production without the necessity of investing in the foreign location. This is particularly attractive for a company that does not have the financial or managerial capacity to invest and undertake foreign production. The major disadvantage to a licensing agreement is the dependence on the foreign producer for quality, efficiency, and promotion of the product—if the licensee is not effective, this reflects on the licensor. In addition, the licensor risks losing some of its technology and creating a potential competitor. This means the licensor should choose a licensee carefully to be sure the licensee will perform at an acceptable level and is trustworthy. The agreement is important to both parties and should ensure that both parties benefit equitably.

Outsourcing is where a business subcontracts one aspect of its business operations, such as payroll or advertising. Offshoring refers to when a company outsources a business process to a company in another country. Often companies outsource in order to take advantage of lower labor costs. Other motivations for outsourcing include the transfer of risk to a third party.

Contracts are used frequently by firms that provide specialized services, such as management, technical knowledge, engineering, information technology, education, and so on, in a foreign location for a specified time period and fee. Contracts are attractive for firms that have talents not being fully utilized at home and in demand in foreign locations. They are relatively short-term, allowing for flexibility, and the fee is usually fixed so that revenues are known in advance. The major drawback is their short-term nature, which means that the contracting firm needs to develop new business constantly and negotiate new contracts. This negotiation is time consuming, costly, and requires skill at cross-cultural negotiations. Revenues are likely to be uneven and the firm must be able to weather periods when no new contracts materialize.

Turnkey contracts are a specific kind of contract where a firm constructs a facility, starts operations, trains local personnel, then transfers the facility (turns over the keys) to the foreign owner. These contracts are usually for very large infrastructure projects, such as dams, railways, and airports, and involve substantial financing; thus international financial institutions such as the World Bank often finance them. Companies that specialize in these projects can be very profitable, but they require specialized expertise. Further, the investment in obtaining these projects is very high, so only a relatively small number of large firms are involved in these projects, and often they involve a syndicate or collaboration of firms.

Similar to licensing agreements, franchises involve the sale of the right to operate a complete business operation. Well-known examples include independently owned fast-food restaurants like McDonald's and Pizza Hut. A successful franchise requires control over something that others are willing to pay for, such as a name, set of products, or a way of doing things, and the availability of willing and able franchisees. Finding franchisees and maintaining control over franchisable assets in foreign countries can be difficult; to be successful at international franchising, firms need to ensure they can accomplish both of these.

Joint ventures involve shared ownership in a subsidiary company. A joint venture allows a firm to take an investment position in a foreign location without taking on the complete responsibility for the foreign investment. Joint ventures can take many forms. For example, there can be two partners or more, partners can share equally or have varying stakes, partners can come from the private sector or the public, partners can be silent or active, partners can be local or international. The decisions on what to share, how much to share, with whom to share, and how long to share are all important to the success of a joint venture. Joint ventures have been likened to marriages, with the suggestion that the choice of partner is critically important. Many joint ventures fail because partners have not agreed on their objectives and find it difficult to work out conflicts. Joint ventures provide an

effective international entry when partners are complementary, but firms need to be thorough in their preparation for a joint venture.

Wholly owned subsidiaries involve the establishment of businesses in foreign locations which are owned entirely by the investing firm. This entry choice puts the investor parent in full control of operations but also requires the ability to provide the needed capital and management, and to take on all of the risk. Where control is important and the firm is capable of the investment, it is often the preferred choice. Other firms feel the need for local input from local partners, or specialized input from international partners, and opt for joint ventures or strategic alliances, even where they are financially capable of 100 percent ownership.

Strategic alliances are arrangements among companies to cooperate for strategic purposes. Licenses and joint ventures are forms of strategic alliances, but are often differentiated from them. Strategic alliances can involve no joint ownership or specific license agreement, but rather two companies working together to develop a synergy. Firms form strategic alliances for a variety of reasons. Ideally, each partner can bring complementary assets to the table, resulting in a competitive advantage for the participants collectively. Businesses in a strategic alliance can benefit from many aspects of a cooperative relationship: access to unfamiliar or untapped markets, risk sharing, economies of scale, shared technology, and decreased costs. Joint advertising programs are a form of strategic alliance, as are joint research and development programs. Strategic alliances seem to make some firms vulnerable to loss of competitive advantage, especially where small firms ally with larger firms. In spite of this, many smaller firms find that strategic alliances allow them to enter the international arena when they could not do so alone.

International business grew substantially in the second half of the twentieth century, and this growth is likely to continue. The international environment is complex and it is very important for firms to understand this environment and make effective choices in this complex environment. The previous discussion introduced the concept of comparative advantage, explored some of the important aspects of the international business environment, and outlined the major international entry choices available to firms. The topic of international business is itself complex, and this short discussion serves only to introduce a few ideas on international business issues.

BIBLIOGRAPHY

Allen, D., and M.E. Raynor. "Preparing for a New Global Business Environment: Divided and Disorderly or Integrated and Harmonious?" *Journal of Business Strategy* 25, no. 5 (2004): 16–25.

Buckley, P.J., ed. *What is International Business?* Basingstoke, Hampshire; New York, NY: Palgrave Macmillan, 2005.

Campbell, R. Harvey. *West's Encyclopedia of American Law.* The Gale Group, 2008.

Daniels, J.D., and L.H. Radebaugh. *International Business: Environments and Operations.* Reading, MA: Addison-Wesley, 1997.

———."Exploiting Opportunity." *Business Mexico* 15, no. 2 (2005): 54–57.

Hofstede, G. *Culture's Consequences: Individual Differences in Work Related Values.* Beverly Hills, CA: Sage Publications, 1980.

Kauser, S. and V. Shaw. "The Influence of Behavioural and Organisational Characteristics on the Success of International Strategic Alliances." *International Marketing Review* 21, no. 1 (2004): 17–52.

Kluckhohn, F., and F.L. Strodtbeck. *Variations in Value Orientations.* Evanston, IL: Row, Peterson, 1961.

London, T., and S.L. Hart. "Reinventing Strategies for Emerging Markets: Beyond the Transnational Model." *Journal of International Business Studies* 35, no. 5 (2004): 350–370.

O'Neill, Jim. *Dreaming With BRICS.* Goldman Sachs, 2003.

Punnett, B.J., and D. Ricks. *International Business.* Cambridge, MA: Blackwell Publishers, 1997.

The Sarbanes-Oxley Act of 2002. Available from: http://www.sarbanes-oxley.com/.

———."Trade: At Daggers Drawn." *Economist* 351, no. 8118 (1999): 17–20.

Welch, C. and I. Wilkinson. "The Political Embeddedness of International Business Networks." *International Marketing Review* 21, no. 2 (2004): 216–231.

World Trade Organization. "Trade and Investment Statistics". Available from: http://www.wto.org/english/res_e/booksp_e/anrep_e/anre99_e.pdf.

INTERNATIONAL MANAGEMENT

During the 1990s and early 2000s, many companies took advantage of a world market that was increasingly open to international expansion and trade. Obstacles to free trade were eased through the General Agreement on Tariffs and Trade (GATT), the North American Free Trade Agreement (NAFTA), and the Association of South East Asian Nations (ASEAN).

Economies opened, and due to technological developments in communication, transportation, and finance, there were fewer difficulties with the practical issues of conducting business across national borders. Communications technology showed exponential growth, including innovations that facilitated doing business anywhere at anytime, such as remote access and net conferencing.

As shown in Table 1, the number of Internet users in the world grew from 30 million to over 562 million over six years. By 2002 almost 10 percent of the world population used the Internet. As of 2008, more than 21 percent of the world population is online.

Table 1

Internet Users 1996-2002

Year	Internet Users (millions)	Internet Users as a Percentage of World Population
Jan 1996	30	.73
Jan 1997	57	1.41
Jan 1998	102	2.49
Jan 1999	153.5	3.75
Jan 2000	254.29	4.27
Jan 2001	455.55	7.5
Jan 2002	562.47	9.43

Accompanying all of these changes was an increase in need for international management for people who understand business and cultural issues well enough to manage and grow an international business effectively. Among those issues are:

- Business structure
- Competition
- Political and economic environments
- Finance and business issues such as contracts, taxation, intellectual property, and risk
- Employment and leadership
- Cultural norms and values
- Technology

BUSINESS STRUCTURE

An international manager has the task of reopening business in a radically different environment. He or she must determine the overall structure of the business and its workflow. In a functional-based business (i.e., the new location needs to be able to perform standardized tasks that comply with overall corporate practices), skilled labor and ability to perform these tasks is key.

Technological infrastructure could be a crucial factor. For an area-based business, location is key, and detailed knowledge of the country and its culture is critical. Products may have to be adapted to the host market.

A global-based structure may have a varied set of product lines, each of which can be made and marketed across locations. These approaches can be mixed, but choosing the structure of the business should support the firm's primary goals.

Many businesses start by first establishing the new office or facility as an "export division" that falls under the umbrella of Operations or Marketing—which may

eventually become an "International Division." How this new entity best fits within the parent organization's overall structure depends on the purpose for the new location and how much the parent company plans to grow the business.

Other options include opening a wholly owned subsidiary or an overseas joint venture, contracting from an international company (IC) to manufacture products to specification, or purchasing supplies and/or materials from an IC manufacturer.

Other considerations include the additional costs of globalization, such as international freight, insurance, packing (up to 12 percent of manufacturing prices), sales terms, import duties, broker's fees, inventory costs, and international travel.

COMPETITION

Competition in the global marketplace continues to grow, particularly between the United States, the European Union, and Asian nations. For this reason, companies need to evaluate the competitive landscape of the host country. First, it is helpful to understand that the nature of competition varies by region and industry. Some nations support an atmosphere of pure competition; for example, there may be any number of sellers, each with relatively small market share, with competition based solely on price. Others may be more monopolistic. Understanding the type of environment in which a firm will participate in its host country ensures the use of appropriate business practices.

More specific threats to companies comes from existing competitors, new competitors who may also enter the market, and the bargaining power of suppliers and buyers in the host country or region. Also, some countries' business environments make entering the marketplace harder than others. For example, foreign businesses find it hard to compete with industry in Japan, where groups of firms are connected financially and rarely do business outside of that group (called "keiretsu").

When investigating the competitive climate, it is also helpful to understand the power wielded by many of the world's transnational corporations (TNCs). Many of the world's top TNCs earn more in revenues each year than most nations. While this does not mean other companies cannot compete with the products and services offered by these companies, it helps to know that these TNCs are involved in establishing direction, lobbying industry, and other activities that have direct impact on the laws and regulations that affect entire industries and how smaller companies can conduct international business.

Finally, an understanding of international anti-trust laws and when they are enforced is critical to assessing the risks to an international business. The United States is the toughest nation in regard to anti-trust, even trying to

enforce laws outside the country. The European Union is relatively lax on enforcing anti-trust laws, but does use them as a means to levy fines on cartels. In Japan, enforcement of anti-trust legislation, which was enacted only under great pressure from outside the country, is weak at best, and usually nonexistent. Learning how "fair competition" is viewed in foreign business environments better prepares a manager to protect his or her own business.

ENVIRONMENTAL FACTORS

Both the economic and political environments of countries and regions have great impact on the managing of international operations. A few of the economic factors that impact international business are:

- Host nation's economy: free-market vs. centrally planned, or mixed.

- Gross Domestic Product (GDP), Gross National Product (GNP), and per capita income—all are gauges to consumer buying power.

- Spending patterns of the host population.

- Variation in the degree of development or industrialization.

- Infrastructure and technology available to business.

- Differences in available education and health care.

Some economies are less hospitable to job creation than others. For example, in Western Europe high minimum wages, healthy unemployment benefits, and employment protection laws are significant barriers to companies hoping to produce job growth in this part of the world. This and other issues also have an impact on finding employees to help staff and manage international operations.

The political environment plays a large role in determining how international companies will be able to manage business operations. Examples of political forces affecting international corporations include:

- Governments, political parties, and ideological beliefs (communism, capitalism, socialism, liberal, conservative, etc.).

- Nature of government-business relationships.

- Laws and attitude toward business.

- Tariffs and quotas.

- Currency controls (limits on the amount of money entering or leaving a country).

All businesses must abide by the laws, regulations, and bureaucracy in the host nation, including the United States and other capitalist countries. Examples of the obstacles an international corporation may encounter include complying with government restrictions on regulated professions and industries such as law, medicine, banking, insurance, transportation, and utilities. State and local governments may also require specific licenses for business and restrict foreign use of buildings. For all of these, proper compliance takes knowledge, time to learn, and expense.

While all of the above factors have significant impact on multi-national corporations, perhaps the most important factor for an international manager is awareness of the degree of risk associated with various political forces in the host region. In addition to weighing the stability of the established government in the region in which it conducts business, governments can seize property owned by foreigners within its borders. This is known as expropriation in cases where the government follows up with quick, adequate compensation for former owners of the property. However, some governments may confiscate property, meaning former owners do not receive proper compensation.

CONTRACTS

When parties representing different nations enter into a contract, dispute resolution becomes especially complicated. The United Nations (UN) Convention on Contracts for the International Sale of Goods (CISG) established legal rules for international sales contracts, including rights and obligations for both buyer and seller. Unless the parties to the contract expressly exclude the CISG, it applies to all contracts signed by companies from the countries that ratified the Convention. In the European Union (EU), the Rome Convention (1991) also applies to contracts formed between EU residents. Outside of these two agreements, companies must rely on private solutions and arbitration (which is used with increasing frequency).

INTELLECTUAL PROPERTY

Intellectual property is well protected in the United States, with patents, trademarks, and copyrights. But when companies engage in business with other countries, they take risks. For example, product counterfeiting, common in Asia, costs U.S. business between $200 and $250 billion annually, according to the U.S. Federal Bureau of Investigation.

Other risks to business included trade secrets and industrial espionage. Most often, competitive information is obtained from inside the company, from published business materials, customers, competitor employees, and sometimes through direct observation.

Each nation has its own laws to protect intellectual property, but which products those laws protect differs as well. The UN's World Intellectual Property Organization (WIPO) was created to administer international property treaties, as was TRIPS, a World Trade Organization (WTO) agency.

The United States adopted its Foreign Corruption Practices Act (FCPA), which unfortunately acts as a barrier to United States companies. The FCPA was not adopted in Europe, or elsewhere, and compliance with the FCPA means American exporters lose business. Most importantly, international managers need to be aware piracy of and counterfeiting, particularly in certain markets, and take steps to protect proprietary corporate information.

LIABILITY

Product liability is a much bigger issue in the United States than in other countries. For example, the United States is the only country that conducts jury trials or pays punitive damages in cases of product liability. There was a principle of strict liability adopted in Europe, but company defense is strong and some countries cap damages.

The United States places many burdens upon its own companies, which impacts how well American companies can conduct business internationally and what it costs them to do so. Like the FCPA, boycott legislation often applies only to the United States. These become significant obstacles to international competition when other countries do not follow suit.

FINANCE

Financial management of international corporations is particularly challenging, as countries change in value in terms of each other based on currency exchange rates. Companies must comply with financial laws and regulations in the host country. International managers need to:

- Understand how fluctuations in currency value change international business transactions.

- Learn about financial tools such as derivatives, hedges, payment timing, exposure netting, price adjustments, balance-sheet neutralizing, and swaps, and how they affect business performance.

- Meet, network, and cooperate with counterparts in other organizations to protect and/or benefit the organization.

- Learn when and how to pay exporters in forms other than money; buyers frequently prefer payment rendered in the form of goods or services (countertrade).

- Differentiate between two types of currency: hard, convertible currency is accepted around the world at uniform rates; soft, nonconvertible currency is rarely of value outside the host country.

- Use international finance centers as a resource—these accumulate expertise and information to conduct financial transaction for international company units most profitably and at the lowest cost.

For an example of how legislation can affect a nation's financial markets, Americans need to look no further than 2002. The Sarbanes-Oxley Act became United States federal law that year; in part, the legislation was a response to corporate scandals including Enron and WorldCom. The Public Company Accounting Reform and Investor Protection Act (or Sarbox) ramped up the requirements for financial reporting at public companies. The Securities and Exchange Commission is responsible for enforcing these laws, and the newly created Public Company Accounting Oversight Board is responsible for overseeing the accounting firms that audit public companies. Opponents of this legislation argue that Sarbox has resulted in the loss of business from New York to London, where the U.K.'s Financial Services Authority is less strict.

EMPLOYMENT AND LABOR FORCES

Investigation of the available labor force should be performed before a company chooses to expand its business to a given region. Managers should determine whether there are enough people of the right skill level for a company to run the business effectively, and whether or not they will want to work for a foreign employer.

When staffing international operations, managers must be able to fill positions from a pool of labor with the right education and skill to maintain and grow the business. Hiring options include choosing from the parent company, choosing people from the host country, or hiring from a local subsidiary. Refugees are often pulled into operations. However, they may lack the skills, health, or education to work. Guest workers may also provide labor, and are particularly helpful in times of rapid growth—when native workers are not willing or able to fill all positions and they do not feel displaced. However, even in times of growth, bringing in large numbers of guest workers (foreigners) often causes friction with citizens of the host country.

Proper planning also helps a company to recognize other forces that cannot be controlled (but must be managed) and plan accordingly. Managers of international operations need to understand the effects of price and wage controls, labor laws, and currency exchange in the host country. In Europe, the government plays a very active role in legislating wages and working conditions, particularly in Germany and France. In Japan, unions align more with specific companies than with industry, so union members have a stake in how well the company does and how much money it makes. They often work with company management.

Understanding cultural issues is critical to international management in general, but culture plays a particularly important role in building a labor force outside the United States. Though U.S. businesses have come to see

women as part of the employment pool, women are less accepted as part of the workforce in many other countries.

Another consideration is race, which is still a source of conflict and discrimination in many areas, as is social status. Religious, tribal, racial, and other cultural factors have an impact, not just on employment, but on how an international company will be viewed by the host culture (and how many people will buy products made by the company). However, if managers are well informed and handle cultural issues properly, people from different cultures, speaking different languages, and possessing various abilities and levels of experience can strengthen the overall management of an international company.

Many corporations have particular difficulty finding qualified executives to effectively manage international companies. Successful leaders of international companies need to understand motivation, leadership, communication, conflict, and other behavioral issues that arise in cross-national and cross-cultural context. The ability to address these issues depends on an understanding of the host culture's values. Other skills cited as keys to successful international management include the following:

- Technical competence

- Ability to speak, or willingness to learn, the host language

- Tolerance for ambiguity and ability to manage uncertainty

- Nonjudgmental attitude

- Ability to emotionally connect with people from diverse cultures and backgrounds, and to understand differing viewpoints

- Personal integrity

- Strong commitment to personal and company standards.

- Inquisitive mindset/continuous learning

Managers of international operations need to be adaptable and have a high tolerance for change and ambiguity. They are most successful when given autonomy and discretion in the workplace. Overall business savvy on the part of executives helps to ensure an international company will run well.

Thorough understanding of both the company and industry is important, along with an ability to leverage that understanding when planning, organizing, and implementing ideas. On a more practical level, international managers need to be able to manage accounting and auditing, business plans, policies and procedures, information systems, and corporate culture—all of which vary based on the infrastructure and culture of the host country.

CULTURAL ISSUES

Defined as the body of beliefs, norms, and values shared by a group of people, culture presents the biggest challenge to businesses working internationally. It is a key factor in how all other areas of business work together. Culture influences negotiation tactics, decision making, and rewards and recognition programs. For example, when conducting business, members of some cultures sit right down to business after shaking hands. In other countries, it is considered rude to mention business at all until after both parties have spent a significant amount of time establishing a relationship.

As stated by Geert Hofstede, "Culture is more often a source of conflict than of synergy. Cultural differences are a nuisance at best and often a disaster." A summary of Hofstede's major factors impacting international business relationships that also influence the practice of international management are shown in Table 2.

Hofstede's framework is one of the most prominent in international management. He identified four major dimensions of cultural values (individualism-collectivism, power distance, uncertainty avoidance, and masculinity-femininity) along with a fifth dimension subsequently identified as Confucian Dynamism, or long-term orientation. Finally, Trompenaars and Hampden-Turner extended Hofstede's classification with seven dimensions that include universalism versus particularism, collectivism versus individualism, affective versus neutral relationships, specificity versus diffuseness, achievement versus ascription, orientation toward time, and internal versus external control. The different classifications provide different and overlapping approaches to organize the many complex dimensions that make up culture. A major premise underlying the need for organizing different cultural dimensions is a means to avoid costly mistakes in conducting international business.

Managers of international operations should be aware of the importance of context in various countries. Context indicates the level in which communication occurs outside of verbal discussion. High-context communication depends heavily on gestures, body language, and other nonverbal cues. Much of what is communicated is implicit, or unspoken, and assumed to be understood through other cues. Low-context communication is explicit and precise, relying little on nonverbal embellishment for meaning. Many of these, and other cultural practices, are learned through socialization.

Increasing one's ability to work effectively across cultures also provides positive support to address a range of adjustment issues for expatriates who often face culture shock in the acculturation process. Overall, the most important key of cultural intelligence and intercultural competence is the integration of multiple spheres of cross-cultural learning to effectively engage in international

Table 2
Hofstede's 5 Cultural Dimensions

Value Dimension	Value Description	High Score	Low Score
Power Distance Index (PDI)	The degree of equality, or inequality, between people in the country's society.	Indicates that inequalities of power and wealth have been allowed to grow within the society. These societies are more likely to follow a caste system that does not allow significant upward mobility of its citizens.	Indicates the society de-emphasizes the differences between citizen's power and wealth. In these societies equality and opportunity for everyone is stressed.
Individualism (IDV)	Degree to which a society reinforces individual or collective achievement and interpersonal relationships.	Indicates that individuality and individual rights are paramount within the society. Individuals may tend to form a larger number of looser relationships.	Typifies societies of a more collectivist nature with close ties between individuals. Reinforce extended families and collectives where everyone takes responsibility for fellow members of their group.
Masculinity (MAS)	Degree to which a society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control, and power.	Indicates the country experiences a high degree of gender differentiation. Males dominate a significant portion of the society and power structure, with females being controlled by male domination.	Indicates the country has a low level of differentiation and discrimination between genders. Females are treated equally to males in all aspects of the society.
Uncertainty Avoidance Index (UAI)	Level of tolerance for uncertainty and ambiguity within the society - i.e. unstructured situations.	Indicates the country has a low tolerance for uncertainty and ambiguity. Creates a rule-oriented society that institutes laws, rules, regulations, and controls in order to reduce the amount of uncertainty.	Indicates the country has less concern about ambiguity and uncertainty and has more tolerance for a variety of opinions. Reflected in a society that is less rule-oriented, more readily accepts change, and takes more and greater risks.
Long-Term Orientation (LTO)	Degree to which a society embraces, or does not embrace, long-term devotion to traditional, forward thinking values.	Indicates the country prescribes to the values of long-term commitments and respect for tradition. This is thought to support a strong work ethic where long-term rewards are expected as a result of today's hard work. However, business may take longer to develop in this society, particularly for an "outsider".	Indicates the country does not reinforce the concept of long-term, traditional orientation. In this culture, change can occur more rapidly as long-term traditions and commitments do not become impediments to change.

Source: Adapted from Geert Hofstede Cultural Dimensions website, http://www.geert-hofstede.com/

business situations. Effectiveness in reconciling cross-cultural differences often leads to creativity, innovation, and synergy for productive workplace performances.

TECHNOLOGY

Technology is an important factor that can vary significantly, depending on the purpose of foreign investment and how important it is for technology to be standardized across business divisions. While some business leaders may choose to expand internationally to take advantage of cheaper labor or manufacturing costs, particularly in developing nations, they may also need to plan for "intermediate and appropriate technology."

The production processes used may vary from advanced to primitive, depending on the economic, cultural, and political variables of the host nation. Some governments urge investors to consider intermediate technology rather than the highly-automated equipment and processes of industrialized countries, in part because less advanced countries lack the infrastructure to support such technology. Companies may respond by searching for an appropriate technology that matches a country's resources, or it may choose to invest elsewhere.

Technology has also contributed significantly to the spread of globalization and international expansion. Advances in technology enable international businesses to conduct international financial transactions, purchase products, analyze data rapidly, make capital improvements, and streamline communications, transportation, and distribution channels.

The summaries above are brief introductions to broad issues to which entire semesters are devoted in business programs. International management requires a broad knowledge base in many areas, as well as an ability to adapt to working conditions in which the only constants are change and a devotion to continuous learning.

Most critical to international management is the desire and ability to work well with people of various cultures, interests, degrees of education, and intelligence—from employees to colleagues to government officials, with home country and host country, and across national and industrial borders.

SEE ALSO *International Business*

BIBLIOGRAPHY

Ball, Donald, et al. *International Business: The Challenge of Global Competition.* New York, NY: Irwin/McGraw-Hill, 2003.

Deresky, Helen. *International Management: Managing Across Borders and Cultures.* Upper Saddle River, NJ: Prentice-Hall, 2003.

"Geert Hofstede Cultural Dimensions." Available from: http://www.geert-hofstede.com.

Harris, Philip R., and Robert T. Moran. *Managing Cultural Differences.* Houston, TX: Gulf Professional Publishing, 2000.

Hjelt, Paola. "The Fortune Global 500." *Fortune,* 26 July 2004, 159.

Hofstede, Geert H. *Cultures and Organizations: Software of the Mind.* London: McGraw-Hill, 1991.

Holt, David H., and Karen Wiggington. *International Management.* Cincinnati, OH: Thomson South-Western, 2001.

Kim, Pan S., and Joseph Ofori-Dankwa. "Utilizing Cultural Theory as a Basis for Cross-Cultural Training: An Alternative Approach." *Public Administration Quarterly* 18, no. 4 (1995): 478–500.

Punnett, B.J., and D. Ricks. *International Business.* Cambridge, MA: Blackwell Publishers, 1997.

The Sarbanes-Oxley Act of 2002. Available from http://www.sarbanes-oxley.com/.

Trompenaars, Alfons, and Charles Hampden-Turner. *Riding the Waves of Culture: Understanding Cultural Diversity in Global Business. 2nd ed.* New York: McGraw Hill, 1998.

INTERNATIONAL MANAGEMENT SOCIETIES AND ASSOCIATIONS

One of the most noteworthy developments in business in the second half of the twentieth century was the rise of the professional business manager. Whereas previously individuals with a wide range of training, usually including experience in a given business, rose to management positions within corporations, in the present managers are often graduates of general business administration and related programs. Accompanying the rise of business management as a profession has been the development of management societies and associations.

International organizations exist to represent business managers engaged in a multitude of economic enterprises. These organizations serve many purposes, including the coordination of members' activities, facilitating exchange of information and the spread of new findings of interest to business managers, disseminating business information

to members and other interested parties, monitoring trends in specific industries and areas of business management, and gathering and compiling statistics. Thus, business management associations and societies generally seek to encourage the professional advancement of their members, the economic advancement of specific industries or areas of business, and the development of more effective business management practices. In many cases their activities are closely linked to those of management institutes. The following list of some of the leading international management organizations shows both their diversity of scope and the similarity of their activities.

LEADING INTERNATIONAL MANAGEMENT ASSOCIATIONS

Association of Management/International Association of Management (AOM/IAOM). The Association of Management (AoM) and the International Association of Management (IAoM) were founded in 1975 as professional organizations representing business academicians and business management practitioners. The organization was first known as the Association of Human Resources Management and Organizational Behavior (HRMOB), and the name was changed to AoM/IAoM in 1993. According to their mission, both organizations seek to bridge the gap between theory and practice in management, education, technology, and leadership across multiple disciplines. A primary goal is the continuing professional development of individual business managers. In this regard they are closely related to national business management associations worldwide. Together, the associations created a forum called MELT (Management, Education, Leadership, and Technology) to facilitate interdisciplinary discussion about a paradigm shift that is said to be affecting each of the four fields. Both organizations also sponsor regularly scheduled meetings and issue publications to facilitate exchange of information among their members and between members and the wider business community and the public. These publications include: *The International Association of Management Journal, The Journal of Management Systems, The Journal of Information Technology Management, Global Education Management Systems, Computer Science and Information Management,* and *The Journal of Management in Practice.*

American Management Association (AMA). In 1923 the National Personnel Association changed its name to the American Management Association. The AMA's mission is to be "a global, not-for-profit, membership-based association that provides a full range of management development and educational services to individuals, companies, and government agencies worldwide." The organization serves as a forum for information and ideas on management practices and business trends disseminated worldwide

through multiple distribution channels, including seminars, webcasts, podcasts, conferences, business books, and research papers. The AMA seminars are led by executives, managers, authors, and consultants, who cover topics such as communication, finance, human resources, information technology, leadership, management marketing, project management, and sales and strategic planning. The association's flagship publication is *MWorld*.

All India Management Association (AIMA). The All India Management Association (AIMA) claims to be the one Indian body helping to equip Indian managers to make the most of opportunities arising from transition. Begun in 1957 with support from the Indian government and industry, AIMA now has over 30,000 Professional Individual Members and over 3,000 Corporate/Institutional Members. Activities include management education and development, publications, and testing services. Additionally, the association publishes an annual survey on the "Best Business Schools" in India in order to promote management education. AIMA is represented on a number of committees involved with policy making in the Indian government, and is associated with the Asian Association of Management Organizations and the World Management Council, among other groups. AIMA publishes *Indian Management*, which is one of the most widely read management periodicals in India.

European Federation of Management Consulting Associations (FEACO). Founded in 1960, FEACO is an umbrella organization for twenty national associations representing management consultants. In addition to formulating standards of ethics and practice for the field, FEACO conducts industry surveys and compiles statistics on the performance of management consultancy companies in Europe. FEACO also comprises working group and discussion forums concerned with topics such as relations within the European community on procurement-related issues, as well as relations between European institutions and management consultancy companies on free movement of services.

International Project Management Association (IPMA). Initiated in 1965 as an informal discussion group involving managers of international projects, the IPMA held its first official congress in 1967. In 2008 the IPMA represented forty-five national project management associations. The IPMA is the prime international promoter of project management. The IPMA confers professional certification upon qualified individuals, serves as a forum for information exchange within the project management field, conducts research and disseminates information on project management, and sponsors continuing professional education programs for project managers. The

four-level certification program provides a standard for project management performance. The Association publishes *The International Journal of Project Management* as well as posting *PM Practice* and *Project Management Perspectives* on its Web site.

Central and East European Management Development Association (CEEMAN). Originally, CEEMAN was primarily concerned with advancing business and management education in Eastern Europe, and providing for information exchange among members but now, CEEMAN has grown into a global network, which includes 170 institutional and individual members from 42 countries in Europe, North America, Latin America, and Asia. The association is devoted to the development of education, research, consulting, and networking. The organization publishes a quarterly newsletter called the *CEEMAN News*.

Association of International Management Sales Executives (AIMSE). This group represents management sales personnel, pension fund managers, and marketers at money market management firms worldwide. AIMSE seeks to advance the management sales profession and encourages the professional development of its members by conducting educational programs, gathering and disseminating management sales information, and facilitating exchange of information among members at its annual meeting. AIMSE has members in the United States, Canada, the United Kingdom, the Netherlands, Sweden, Denmark, France, Germany, South Africa, Italy, Switzerland, Spain, Greece, and Australia.

Australian Institute of Management (AIM). This is Australia's largest professional body for managers and is well known for providing management training and consulting. AIM maintains a network of bookshop and library facilities dedicated to applied management information. AIM membership is around 25,000 personal members and 6,000 key corporate members; the organization has a staff of 250 people worldwide.

European Association of Personnel Management (EAPM). Founded in 1962 the EAPM represents a specific constituency within business management, namely, personnel managers. The association functions as the European representative of national personnel management organizations, and formulates standards of conduct and practice for personnel managers.

European Women's Management Development Network (EWMD). Founded in 1984 the EWMD represents women in business management in thirty countries regardless of their specific field of endeavor. The network works for the professional advancement of its members,

serves as a forum for the exchange of information regarding women in management, and seeks to ensure gender equity in the business management professions. The EWMD includes 800 members, individual and corporate.

Institute of Management Specialists (IMS). Founded in 1971 the IMS comprises business managers and commercial business and technical professionals. IMS is part of a group that promotes performance excellence, along with the Institute of Manufacturing, the Professional Business and Technical Management, the Academy of Multi-Skills, and the Academy of Executives and Administrators. The institute formulates standards of practice for management specialists, and conducts examinations and bestows professional certification upon qualified individuals.

Institute for Supply Management (ISM). The Institute for Supply Management is the largest supply management organization in the world. Founded in 1915 the institute is a not-for-profit association that provides research, promotional activities, and education to 40,000 supply managers.

International Association for Business and Society (IABS). The IABS is a society concerned with research and teaching about the relationships between business, government, and society. Founded in 1990 the organization has over 300 members from over 100 universities in more than 20 countries, in addition to the membership of corporations and various nonprofit entities. The Association conducts research with regard to corporate social responsibility, business ethics, business and government relations, and business ethics, among others. Additionally, the IABS sponsors the journal, *Business & Society*.

UNIVERSITY MANAGEMENT INSTITUTES

A somewhat related category of organizations concerns university management institutes. These organizations are similar to management societies and associations, but they generally pursue somewhat different goals. Management institutes exist world wide, and although they are primarily engaged in educational activities, they also occasionally work with management associations and industrial groups to gather data on specific industries or areas of economic activity. This information can be useful for companies that wish to benchmark their business operations against other companies in the same industry. The research and knowledge carried out by the International Institute for Management Development (IMD) provides an example of this sort of cooperation between academia, industry, and business management associations.

Among the research centers at the IMD is the World Competitiveness Center, which releases an annual report

on the competitiveness of nations. This report ranks countries according to the degree to which the business environment fosters competitive enterprises. The research centers consolidate information from the IMD faculty, Corporate Learning Network companies, researchers, and outside specialists to provide information about best practice, sustainability, and leadership strategies.

The IMD Manufacturing 2000 Project (M2000), a ten-year project begun in 1990, brought together an operating team comprising researchers, professors, business managers, and corporate board members representing sixteen large manufacturing firms. Each firm participating in the project submitted their plans for managing change and developing best practices for consideration and revision by the entire M2000 operating team. Corporate, managerial, and academic participants in M2000 found that the project facilitated information exchange and had a positive influence on all concerned. Keeping in touch with the realities of everyday business management helped academicians develop more useful research projects, while remaining familiar with academic developments proved useful for managers wishing to make changes in corporate procedure or structure. Thus, although it is essentially an academic program, the International Institute of Management Development fulfills a function similar to that of leading business management associations.

Similarly, the Decision Analysis Society (DAS), operated by the Fuqua School of Business at Duke University, is an organization comprising business academicians and researchers, managers, and other corporate representatives. DAS seeks to promote and develop the use of logical methods for the improvement of the decision-making process in both public and private enterprises. The society develops model procedures, risk analysis and assessment techniques, and expert systems for decision support.

Another example of a university management institute, the Federation for Enterprise Knowledge Development (FEND), is a collaborative effort involving representatives of leading corporations and business academics. FEND serves as a think tank, analyzing business management tools and methods, and researching new management strategies. The federation also develops business management software applications, conducts educational programs for business managers, and provides assistance to businesses wishing to improve their management practices.

Other international university management institutes include the European Foundation for Management Development, through which academicians, corporations, managers, and educational institutions in forty-five countries work to address current issues in management development; the Institute for Administrative Management, an organization of professional managers and business management students united to identify and disseminate new trends

and techniques in administrative management; and the Strategic Planning Society, through which educational institutions, government officials, business executives, and corporations of all sizes work to improve public policies regulating the practice of business management.

In a somewhat separate category is the International Academy of Management (IAM), an organization comprising fellows elected for their contributions to the field of management. The IAM is in large measure an educational organization whose main goal is to identify and objectively evaluate new hypotheses in the study and practice of business management.

THE ROLE OF MANAGEMENT ASSOCIATIONS AND SOCIETIES

As the above examples suggest, management associations, as distinct from university management institutes, exist primarily to advance their members' interests, or to advance a particular class or type of business manager. They can be active in the formulation of professional standards of ethics and practice, the development of national and international public policies pertaining to business and trade, business and management education, and the gathering and dissemination of information on the entire spectrum of business and management topics. They may also serve as certification bodies and sources of ethical and practice standards within a particular business management field. International management associations and societies all share one common function: facilitating the exchange of information among professionals from different countries. As such, they play a vital role in stimulating global trade and promoting the advancement of business management as a profession.

SEE ALSO *Domestic Management Societies and Associations*

BIBLIOGRAPHY
All India Management Association. Available from: http://www.aima-ind.org.
Australian Institute of Management. Available from: http://www.aim.com.au/about/about.html.
———."Corporate Governance Confab Set." *BusinessWorld,* 11 March 2005, 1.
Institute for Supply Management. Available from: http://www.ism.ws/.
International Association for Business and Society. Available from: http://www.iabs.nets/.
International Association of Management. Available from:http;//www.aom-iaom.org.
Pina, Michael. "Helping Members Shine Overseas." *Association Management* 57, no. 3 (2005): 61.
Stimpson, Jeff. "Strengths of Associations, Networks and Alliances." *The Practical Accountant* 38, no. 2 (2005): 26–32.
Stone, Florence. "AMA Building Management Excellence for 80 Years." *MWorld,* Fall 2003.
Sugerman, Dale S. "Encouraging the "I" in ICMA." *Public Management* 87, no. 2 (2005): 34–36.
Wagner, R. "Contemporary Marketing Practices in Russia." *European Journal of Marketing* 39 (2005): 199–215.

INTERNATIONAL MONETARY FUND

Headquartered in Washington, D.C., the International Monetary Fund (widely known as the IMF) is an international cooperative institution whose main mission is to promote and assist in international monetary stability. With its initial organization coming at the end of World War II, for many years the main goal of the IMF was to oversee a system of stable, fixed exchange rates among the currencies of member nations. Since 1971, the exchange rates of the world's currencies have been allowed to float, with supply and demand market forces determining their value. In 2008, the IMF consisted of 185 member countries, which pay an initial quota subscription to become members. The organization works to achieve and enhance a stable world economy through the promotion of open financial disclosure among member nations, the provision of loans during periods of economic crises, and technical assistance provided through educational and promotional means.

The IMF has come under criticism from some sources for its role in high-profile assistance offered to the Mexican, South Korean, and Russian economies, among others. The member nations, however, continue to support the organization in its efforts to sustain international economic stability and promote international trade.

HISTORY

The events that ultimately led to the creation of the IMF had their origins in the conclusion of World War I. The economic terms of surrender were negotiated at the 1919 peace conference in Paris. As part of the peace treaty, known as the Treaty of Versailles, England and France demanded large amounts of war reparation payments from Austria and Germany to help rebuild their war-torn economies. However, the Austrian and German economies were depleted, too. This forced them to rely on foreign imports for goods and services unable to be produced locally. When a country imports more than it exports, it runs a balance of payments deficit. Together with other factors, the result may be a devaluation of the currency, since foreign sellers often demand to be repaid in their own currencies. The addition of war reparations on top of a large balance of payments deficit exacerbated the economic crisis, resulting in hyperinflation and political instability in Germany.

The great British economist John Maynard Keynes had participated in the peace conference following World War I and foresaw the scenario described above. Indeed, his book *The Economic Consequences of the Peace* predicted a second world war as an inevitable consequence of the severe penalties and lack of political and economic cooperation following the conclusion of World War I.

THE CREATION OF THE IMF

Keynes was determined to avoid repeating the mistakes made in the Treaty of Versailles. As World War II came to a close in 1944, an international conference was held at the resort community of Bretton Woods, New Hampshire. Forty-four nations were represented at the conference, with the chief negotiators being Keynes from Great Britain and Harry Dexter White from the United States. The result of their deliberations was the creation of the International Monetary Fund. The original goals of the fund were to aid members needing foreign exchange to conduct international trade and to promote a system of fixed exchange rates.

The original plan called for the U.S. dollar to be pegged to gold at a rate of $35 per ounce. Other currencies were set at fixed exchange rates to the dollar, and thus indirectly tied to gold. Countries participating agreed to set a "par" value for their currency based on this fixed exchange rate, allowing for a 1 percent fluctuation band. Should a country experience problems maintaining its par value, the IMF stood ready to lend foreign exchange to aid the cause. Member nations made an initial deposit into the fund known as a quota subscription. These deposits formed a pool from which the IMF could extend loans to members. As a special provision, if a member nation experienced chronic problems maintaining its par value, it would be allowed a one-time devaluation of its currency of up to 10 percent.

SPECIAL DRAWING RIGHTS

In 1969 the IMF created a new hybrid asset to serve as a reserve currency. The new financial asset was named a special drawing right, or SDR. The value of an SDR is a function of the current value of five different currencies from which it is comprised. They include the U.S. dollar, the Japanese yen, the United Kingdom pound sterling, and the respective euro values of Germany and France. The respective weights of the currencies, which constitute SDRs value, are revised every five years.

Member nations may use SDRs in a variety of ways. These include exchanging SDRs for other monetary assets or for maintaining operations, and exchanging SDRs directly with other members in exchange for foreign currencies to address a balance of payments problem. Since part of the mission of the IMF is to promote and enhance international trade, the board of governors has the option to decide on periodic special allocations of SDRs to augment members' existing reserve accounts.

THE IMF AND THE WORLD BANK

In addition to the IMF, the Bretton Woods Agreement resulted in the formation of the World Bank. Formally known as the International Bank for Reconstruction and Development, the World Bank's primary goal is to promote economic growth among the world's developing nations. It does so by effectively serving an investment-banking role, issuing bonds and notes to raise new investment capital, which it in turn lends to poor nations to finance specific projects. Typical projects include those associated with enhanced transportation routes, electric power development, and increased agricultural production.

As they share the ancestry of the Bretton Woods conference plus related economic roles, confusion between the IMF and the World Bank is common among the general public. They remain, however, two distinct organizations with their own individual goals and agendas aimed at promoting economic health and development among the world's nations.

THE END OF BRETTON WOODS

The system of fixed exchange rates created by the Bretton Woods Agreement and overseen by the IMF lasted from 1946 until 1971. For much of that period, the system worked very well. The U.S. dollar was pegged to gold and most other currencies were pegged to the dollar. During much of this period the United States ran a trade surplus, exporting more goods and services than it imported. Thus, the amount of U.S. dollars held domestically on net increased, causing little strain on the international monetary system.

This scenario changed during the 1960s. As the United States expanded its level of imports and increased industrial output during the Vietnam War, the amount of dollars held overseas expanded greatly. These dollars were deposited in foreign banks, allowing the banks to extend U.S. dollar denominated loans. The supply of U.S. dollars outstanding expanded significantly. At the same time, as more dollars were presented for redemption, the U.S. gold supply was being depleted. By the end of the decade, there were more dollars outstanding than there was gold to back them. In August 1971 the Nixon administration acknowledged the situation by closing the gold window, refusing to allow foreign central banks to exchange U.S. dollars for gold.

The Smithsonian Agreement of that year began the process of ending the Bretton Woods system of fixed foreign exchange rates. The initial agreement called for expanded fluctuation of exchange rates from 1 percent to 2.25 percent; subsequent economic activity made these bands unfeasible. Governments then decided to let their

respective currencies float relative to each other, and the world moved to a floating exchange rate system.

THE ROLE OF THE IMF EVOLVES

In 1978, the IMF formally amended its constitution to alter its role in the world economy. It now plays a number of roles in its overall mission of promoting international stability and growth. These roles fall generally under three areas: surveillance, technical assistance, and financial assistance.

In its surveillance function, the IMF serves as a watchdog over member nations' economic policies. In 2007, the IMF dramatically revised its policies on surveillance with its Decision on Bilateral Surveillance of Members' Policies. Some important points from the Decision include:

- Focus on external stability. Country surveillance is focused on exchange rate and monetary, fiscal, and financial strategies, along with assessment of risk and vulnerabilities

- Definite guidelines are set out for countries about how they run their exchange rate policies

- Surveillance is deemed a collaborative process that "has a multilateral, medium-term perspective."

IMF surveillance is an open process, and currently nearly all member nations publish a Public Information Notice, which creates a transparent oversight environment.

Technical assistance to member nations takes up a large amount of daily operations at the fund. The IMF provides expertise and consultation on matters involving the implementation of both fiscal and monetary policy, trade laws and tariff measures, and programs aimed at strengthening and stabilizing local currency values. The organization has also implemented a regional model for technical assistance, and has six regional technical assistance centers. In addition, it offers training for member countries' officials through a network of seven different regional training institutes. Other forms of technical assistance include placement of experts and resident advisors, online support, and diagnostic studies.

Perhaps the one area that has brought the IMF the most attention and raised its image among the general public has been its role of providing financial assistance to nations experiencing economic crises. This involves providing credits or arranging loans for nations experiencing such problems as severe balance of payments deficits or a sudden devaluation of their currency.

The 1990s saw the IMF make global headlines with several widely publicized financial assistance programs. The first occurred in 1995 with the crisis in Mexico. Faced with a severe devaluation of its currency due to a rapid loss of confidence in its policies, the Mexican government turned to the IMF for what was then a record $17.8 billion financial assistance package. While attempting to move towards a market-oriented economy, Russia required financial assistance several times during the 1990s. Included were large loans in both 1996 and 1998. And, in 1997, an extended crisis throughout much of east Asia resulted in the IMF arranging financial assistance for South Korea, Indonesia, and Thailand.

These financial assistance programs, which have grown successively larger in amount, have met with severe criticism from some sources. The IMF has been labeled a "bailout" source for poorly run economies, serving as a safety net for policymakers unable or unwilling to make difficult decisions which market discipline demanded. In addition, critics claim that IMF policies encourage poor nations to carry huge amounts of international debt, forcing them to use a large proportion of their annual revenues to make interest payments. The IMF has responded to its critics by actively working with both the public and private sectors to promote better information flow and legislation designed to prevent additional financial crises from taking place. The organization continues to develop systems and procedures designed to limit such crises from spreading to other countries and enveloping entire geographical regions.

The modern International Monetary Fund remains a major player on the global economic stage. The fund continues to grow and expand in its new roles within a world of floating exchange rates and rapid capital flows. The modern IMF wears a number of hats, including overseer and communicator of national policies and legislation, consultant and educator on numerous fiscal and monetary issues, and intermediary and lender for nations whose currencies come under pressure.

Critics continue to denounce the IMF for forcing nations in need to adopt its policy recommendations as a condition of assistance. In addition, the fund raises concerns among those who claim it acts as a safety net to alleviate poor or ineffective domestic monetary and trade policies. The IMF is also frequently charged with favoring bankers and elite classes, obstructing debt reduction for the world's poorest countries, and ignoring human rights violations. "Street protesters have it exactly right, for example, when they argue that the economic policies imposed on developing nations by the International Monetary Fund and World Bank have hammered the poor," Eric Pooley wrote in *Time*. "Using loans and the threat of default as levers, the IMF has pushed more than 90 countries to accept its brand of free-market shock therapy: lowering trade barriers, raising interest rates, devaluating currencies, privatizing state-owned industries, eliminating subsidies and cutting health, education, and welfare spending." In a 2007 article in *Global Politician*, Carol Welch,

coordinator of the U.S. efforts for the United Nations' Millennium Campaign, criticized the dominant role the United States plays in the global economy to "impose SAPs [structural adjustment policies] on developing countries," and opening "their markets to competition from U.S. economies." In the article, Welch stated that she believes SAPs are "based on a narrow economic model that perpetuates poverty, inequality, and environmental degradation."

Such criticisms are not likely to dissipate soon. Nevertheless, the 185 member nations continue to support the IMF in the belief that open communication and coordinated policies will lead to greater stability and promote a climate which fosters growth in international trade and development.

BIBLIOGRAPHY

Cheeseman, Gina-Marie. "International Monetary Fund's Financial Assistance Policies: Pros and Cons." *Global Politician* 7 July 2007. Available from: http://www.globalpolitician.com/23066-imf.

International Monetary Fund. "Common Criticisms of the IMF." Available from: http://www.imf.org/external/np/exr/ccrit/eng/cri.htm.

International Monetary Fund. "The IMF at a Glance." Available from: http://www.imf.org/external/np/exr/facts/glance.htm.

Pooley, Eric. "The IMF: Dr. Death? A Case Study of How the Global Banker's Shock Therapy Helps Economies but Hammers the Poor." *Time* 24 April 2000.

Robertson, David. *International Economics and Confusing Politics.* London: Edward Elgar, 2006.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

The International Organization for Standardization (ISO) is a non-governmental organization based in Geneva, Switzerland, that works to develop technical standards for products and services sold around the world. The steady rise in international trade began in the mid-nineteenth century and has persisted until the present day providing impetus for the global standardization of goods and services. Companies with overseas operations must know that products or services they contract for outside their home country will conform to their needs, and the only way to ensure this is for both parties in the transaction to meet a single set of standards. Thus, as economic interdependence increased among nations on all continents, the need for an authoritative international standards body became increasingly apparent. To address this need, the International Organization for Standardization (ISO) was founded in 1947.

The ISO comprises national standards bodies representing 15,748 countries and serves a variety of functions. It facilitates communication and cooperation among its members, eases the distribution of scientific and technical information on standards and standardization, and maintains online databases covering international standards and other organizational activities. The ISO also seeks to ensure that standards are not used as a non-tariff barrier to international trade by formulating international standards applicable to the full scope of commercial activity in any locale worldwide.

The ISO has a relationship with the World Trade Organization (WTO) because the organizations have the mutual goal of reducing technical barriers to trade. Additionally, the ISO collaborates with various UN agencies and commissions including CODEX Alimentarius, (on food safety), the UN Economic Commission for Europe, (on the safety of vehicles and the transportation of goods), the World Health Organization, (regarding health technology), and the World Tourism Organization (concerning the quality of tourism-related services). The ISO is also involved in international development organizations, including the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization, and the International Trade Center.

Although the majority of standards promulgated by the ISO are the result of the internal activities of its technical committees and working groups, ISO standards are not necessarily handed down to companies from the central organization. Companies often send their own internal standards to the ISO for consideration as international standards. Similarly, national standards organizations work with the ISO to make accepted national standards internationally applicable.

Adherence to standards formulated by ISO is completely voluntary, but many standards set by the organization are incorporated into treaties and national laws. Companies that do conform to them have a distinct advantage over those that do not, particularly when trading overseas. ISO standards cover the entire spectrum of scientific, industrial, and commercial activities, including computer operating systems, manufacturing processes, product quality, safety, management technique, and environmental protection.

The ISO is not the only organization seeking to set global standards. The ISO and the International Electrotechnical Commission (IEC) formed a joint committee to set standards related to information technology. The ISO and the IEC are also partnered with the International Telecommunication Union (ITU). Together, the three committees form the World Standards Cooperation.

In addition to its specific quality standards, the ISO has issued two sets of general standards, the ISO 9000 and ISO 14000 families, to govern manufacturing and organizational processes and environmental protection, respectively.

THE ISO 9000 QUALITY STANDARDS SERIES

Released in 1987 and updated in 2000, the ISO 9000:2000 standards series governs general international quality assurance for products and services. A new edition of ISO 9001 will be submitted for approval by the ISO membership in the fall of 2008, but no new requirements will be added to the 2000 version. ISO 9000 is divided into five specific areas. ISO 9000 is an overview, which includes guidelines for the selection, and use of quality management and quality assurance standards, provides definitions of quality concepts, and serves as a guide for the selection of ISO quality models applicable to specific industries. ISO 9001 provides a model for quality assurance in design and development, production, installation, and services. ISO 9002 provides a model for quality assurance in production and installation. ISO 9003 provides a model for quality assurance in final inspection and testing of products. Finally, ISO 9004 sets forth guidelines for developing and implementing internal corporate quality management programs and quality systems.

Each facet of the ISO 9000 standards series is general and can be applied to any industrial activity. In fact, the series' lack of specificity has led critics to note that two companies complying with ISO 9000 could conceivably produce goods that were radically different in terms of quality. The U.S. Department of Defense holds this view, stating that the ISO 9000 standards "are not adequate for use without significant supplementation." Despite these limitations, many corporations worldwide choose to adhere to the ISO 9000 standards. ISO 9000 is the most widely implemented quality management system standard. Under the General Agreement on Tariffs and Trade (GATT), companies may demand that their suppliers or other trading partners achieve ISO 9000 certification, and this demand will not be considered an illegal restraint of trade under GATT. Regardless of corporate opinions regarding ISO 9000, many countries are mandating that the foreign companies with which they trade achieve certification. For example, overseas producers of computer switches and pacemakers must be certified under ISO 9000 to trade with the European Union, as must computer software producers wishing to sell their goods in Japan.

Companies wishing to attain ISO 9000 certification must first register with the ISO. Prior to registration, a third-party registrar must be found to audit and evaluate the company's operations and recommend changes that must be made to ensure conformation. Prior to this audit, companies must prepare a quality assurance program; define, document, and implement new procedures; and compile a corporate quality manual and pre-assess the manual with the selected auditor.

Many adherents to the ISO 9000 standards have found that several components are necessary to ensure certification. First, companies must carefully evaluate their trading relationships to determine whether adherence to the ISO 9000 standards will result in increased profitability. If this is judged to be the case, management must be completely committed to achieving certification and a competent registrar must be secured. Staff must be carefully educated regarding the changes in processes and products required for conformation, and a core cadre of employees must be trained to constantly audit procedures following certification and conduct the periodic audits required to ensure that standards are being maintained. Additionally, some organizations have a third party independently verify that they have fully complied with the ISO 9000 standards in order to substantiate their assurance of quality.

In its early years, the ISO 9000 series of standards was not adopted as readily as had been anticipated, but by the early 1990s the standards were beginning to receive more widespread use. The U.S. Commerce Department finally endorsed global acceptance of ISO 9000 in 1994, and the formation of the International Accreditation Forum during the same year also provided an impetus to ISO 9000 certification. By 2005 more than half a million organizations in over sixty countries had either implemented or were in the process of implementing the quality management framework outlined in ISO 9000.

Although the ISO 9000 series eventually caught on and began to fulfill its role in regulating international industrial, commercial, and management activity, even its staunchest adherents found that the series did not account for environmental protection. This oversight allowed too much latitude for differences in process between companies in different countries, particularly those in the chemical industries. The Global Environmental Initiative held in Rio de Janeiro, Brazil, in 1992 further established the need for an internationally recognized set of standards governing industrial and commercial environmental protection policies and processes. In response to this need, ISO began work on a new series of standards designed to govern environmental protection.

THE ISO 14000 SERIES OF STANDARDS

Released in 1996 and updated in 2004, the ISO 14000 series of standards is designed to supplement the ISO 9000 series. The ISO 14000 standards provide generic requirements for maintaining a sustainable environment management system at any organization. The standards do not define specific levels of environmental performance, but they do require that organizations conform to all environmental legislation applicable to their activities and commit

to striving for "continual improvement." Adherence to ISO 14000 assures customers, regulators, and the general public that a company has sound environmental protection policies and processes. ISO 14000 is divided into ten separate areas of standardization:

1. ISO 14001 provides a model framework for the establishment of an environmental management system.

2. ISO 14004 offers a checklist for companies wishing to implement ISO 14001, and is not mandatory for ISO 14000 certification.

3. ISO 14010 is also voluntary and establishes guidelines for corporate environmental auditing procedures, including definition of quality audit evidence.

4. ISO 14011 provides guidance for the voluntary formation of corporate environmental auditing procedures, including a general outline of an effective environmental audit.

5. ISO 14012 delineates qualification criteria for environmental auditors.

6. ISO 14020 establishes standards for scientific evidence presented in corporate environmental management audits

7. ISO 14021 allows companies to self-declare environmental claims under certain circumstances.

8. ISO 14024 provides guidelines for verifying corporate environmental management claims and delineates the criteria which must be met for companies to use ISO-recognized labels advertising their compliance with ISO 14000 environmental standards.

9. ISO 14031 establishes standards for corporate review of existing environmental management systems.

10. ISO 14040 provides guidelines and criteria for long-range environmental assessments, which are required to determine whether or not certain commercial activities can be considered environmentally sustainable.

Although the ISO 9000 standards are currently viewed favorably in the corporate world, ISO 14000 has proven more controversial. ISO 14000 does not stipulate standards of corporate environmental performance, but rather governs only the means a company must employ to make its production activities environmentally sustainable. National standards for compliance with ISO 14000 also differ widely, as the third-party audits required to attain certification are conducted differently in different countries and with differing criteria for compliance. Finally, while the GATT agreements allow companies to stop doing business with trading partners that fail to achieve ISO 9000 certification, refusing to do business with a company that failed to achieve ISO 14000 certif-

ication could be considered an illegal restraint of trade under the GATT provisions. Companies based in the United States have been particularly unwilling to secure ISO 14000 certification, given the amount of time, money, and effort they already expend in meeting the standards of environmental performance and practice set by the federal Environmental Protection Agency (EPA). Not only do U.S. firms feel that the addition of ISO 14000 makes the regulatory burden too great, many corporations object to public disclosure of environmental information, which may damage their reputation as well as expose them to the possibility of litigation.

Although widespread corporate compliance with ISO 14000 did not occur in the series initial years, increased awareness of environmental concerns among both government agencies and the public worldwide will provide an impetus for ISO 14000 certification in the future. For instance, the rigorous European Union Eco-Management and Audit Scheme (EMAS) has proven difficult for many companies to implement, yet compliance with EMAS may become essential for firms wishing to trade in Europe. Companies have been participating in EMAS since 1995 and the scheme has been open to all economic sectors since 2001. In 2008 the European Commission proposed to decrease the burden and cost of implementing EMAS in order to encourage participation. Compliance with ISO 14000 standards will automatically make a company also eligible for EMAS certification. Similarly, compliance with ISO 14000 will provide a powerful marketing tool for companies wishing to sell products to environmentally conscious consumers. Compliance with ISO 14000 also provides legal evidence of due diligence, which would mitigate in favor of any ISO 14000-certified company which is sued for creating environmental damage or hazards. Finally, ISO 14000 certification removes barriers to international trade in the same manner as does ISO 9000 compliance.

THE FUTURE

Since its founding in 1947, the ISO has published more than 17,000 international standards, covering everything from dimensions of freight containers to symbols that provide danger warnings. ISO has addressed the standardization of protocols to allow different types of computers to communicate with one another, as well as the standardization of interfaces and connections to ensure the interoperability of various technologies. Although the majority of ISO standards are specific to individual products, materials, or processes, the ISO 9000 and 14000 series provide generic management system standards that can be applied to any product or service, by any type of organization.

ISO standards are not without their critics in the business world. Critics claim that the standards can be costly and time-consuming to implement, for example. But proponents

point out that ISO certification enables businesses to increase knowledge of their capabilities, improve their processes and performance, ensure consumer and stockholder confidence, and gain a source of competitive advantage. As a result, the ISO seems likely to play an increasingly important role in international trade in the future. The general lowering of tariff barriers worldwide in recent years has led to a contradictory rise in the use of standards to exclude products of certain countries or regions, a practice that global adoption of ISO standards would eradicate. Furthermore, in the case of the ISO 14000 series, increased public environmental consciousness will provide a powerful incentive for corporate compliance and in the long run will also result in the passage of public policies mandating environmental sustainability such as the EMAS.

BIBLIOGRAPHY

Babicz, Gillian. "Implementing ISO Isn't Easy." *Quality,* July 2000.

Bracke, Roeland, and Johan Albrecht. "Environment and Planning C: Government and Policy 2007. " Available from: http://www.envplan.com/epc/fulltext/c25/c0602j.pdf.

Hasek, Glenn. "ISO's Green Standard Takes Root." *Industry Week,* 16 February 1998.

International Organization for Standardization. "ISO: Introduction." Available from: http://www.iso.org/iso/en/aboutiso/introduction.

"Introducing EMAS." *Institute of Environmental Management* & *Assessment.* Available from: http://www.iema.net/ems/emas.

Lally, Amy Pesapane. "ISO 14000 and Environmental Cost Accounting." *Law and Policy in International Business,* Summer 1998.

McLoughlin, Bill. "Just What Is ISO?" *HFN,* 20 October 1997.

Petry, Corinna C. "U.S. Seen Ill Prepared for Global Standards." *American Metal Market,* 3 April 1997.

Showalter, Kathy. "Trading in Green." *Business First-Columbus,* 21 February 1997.

Spearin, John. "An ISO Primer." *Detroiter,* December 2002.

THE INTERNET

The Internet is the world's largest computer network. It is a global information infrastructure comprising millions of computers organized into hundreds of thousands of smaller, local networks. The term "information superhighway" is sometimes used to describe the function that the Internet provides: an international, high-speed telecommunications network that offers open access to the general public.

The Internet provides a variety of services, including electronic mail (e-mail), the World Wide Web (WWW), Intranets, File Transfer Protocol (FTP), Telnet (for remote login to host computers), and various file-location services.

HISTORY OF THE INTERNET

The idea for the Internet began in the early 1960s as a military network developed by the U.S. Department of Defense's Advanced Research Project Agency (DARPA). At first, it was a small network called ARPANET, which promoted the sharing of super-computers amongst military researchers in the United States. A few years later, DARPA began to sponsor research into a cooperative network of academic time-sharing computers. By 1969, the first ARPANET hosts were constructed at Stanford Research Institute, University of California, Los Angeles (UCLA), University of California Santa Barbara, and the University of Utah.

A second factor in growth was the National Science Foundation's NSFNET, built in 1986 for the purpose of connecting university computer science departments. NSFNET combined with ARPANET to form a huge backbone of network hosts. This backbone became what we now think of as the Internet (although the term "Internet" was used as early as 1982).

The explosive growth of the Internet came with major problems, particularly related to privacy and security in the digital world. Computer crime and malicious destruction became a paramount concern. One dramatic incident occurred in 1988 when a program called the "Morris worm" temporarily disabled approximately 10 percent of all Internet hosts across the country. The Computer Emergency Response Team (CERT) was formed in 1988 to address such security concerns.

In 1990, as the number of hosts approached 300,000, the ARPANET was decommissioned, leaving only the Internet with NSFNET as its sole backbone. The 1990s saw the commercialization of the Internet, made possible when the NSF lifted its restriction on commercial use and cleared the way for the age of electronic commerce.

Electronic commerce was further enhanced by new applications being introduced to the Internet. For example, programmers at the University of Minnesota developed the first point-and-click method of navigating Internet files in 1991. This program, which was freely distributed on the Internet, was called Gopher, and gave rise to similar applications such as Archie and Veronica.

An even more influential development, also started in the early 1990s, was Tim Berners-Lee's work on the World Wide Web, in which hypertext-formatted pages of words, pictures, and sounds promised to become an advertiser's dream come true. At the same time, Marc Andreessen and colleagues at the National Center for Supercomputing Applications (NCSA), located on the campus of University of Illinois at Urbana-Champaign, were developing a graphical browser for the World Wide Web called Mosaic (released in 1993), which would eventually evolve into Netscape.

By 1995, the Internet had become so commercialized that most access to the Internet was handled through Internet service providers (ISPs), such as America Online and Netcom. At that time, NSF relinquished control of the Internet, which was now dominated by Web traffic.

Partly motivated by the increased commercial interest in the Internet, Sun Microsystems released an Internet programming language called Java, which promised to radically alter the way applications and information can be retrieved, displayed, and used over the Internet.

By 1996, the Internet's twenty-fifth anniversary, there were 40 million Internet users; by 2002, that number had increased to 531 million, and by 2006 the number of Web users was roughly 750 million. Internet-based electronic commerce has reached major proportions as well, totalling roughly $140 million in revenue in the United States alone in 2007. This number continues to rise steadily throughout the 2000s.

BANDWIDTH

Bandwidth is the capacity of a particular pathway to transmit information for online purposes. It is bandwidth that controls how fast Web sites download. In analog settings (such as dial-up), bandwidth is measured by frequency, the difference between the highest and lowest frequencies, expressed in Hertz. Digital lines measure bandwidth in bits/bytes per second (the amount of information transferred every second). Companies often determine and set the amount of bandwidth allowed for certain activities, an activity called bandwidth allocation.

INTERNET CONNECTIONS

There are many types of Internet connections, which have changed in sophistication and speed throughout the Internet's history. The first kind is the analog connection, or dial-up, one of the cheapest and slowest ways to connect. The computer dials a phone number to access the network and the modem can convert the data to either format, as required. This analog format is the slowest connection, and the one most subject to quality issues. ISDN, or integrated services digital network, is the international format for normal phone-related Internet connections. B-ISDN is a more recent format for other phone connections, such as fiber optics.

DSL is a constant connection that will take up the phone line the way an analog connection does. There are two main types of DSL—ADSL, which is used most commonly in America, and SDSL, which can transmit a larger amount of information and is more often found in Europe.

Others receive Internet through cable, a broadband connection that operates through TV lines. Certain TV channels are used to take and receive Internet information, and since these coaxial cable connections can handle a much higher rate of data than phone lines, cable Internet service tends to be faster.

Wireless Internet is also becoming popular—connecting computers to the Internet through radio-wave transmissions. This requires a wireless hub or router that transmits information into radio waves, but the connection can be accessed from anywhere in the radius of the broadcast.

E-MAIL

Electronic mail, or e-mail, is the most widely used function used on the Internet today. Millions of messages are passed via Internet lines every day throughout the world. Compared to postal service, overnight delivery companies, and telephone conversations, e-mail via the Internet is extremely cost-effective and fast. E-mail facilities include sending and receiving messages, the ability to broadcast messages to several recipients at once, storing and organizing messages, forwarding messages to other interested parties, maintaining address books of e-mail partners, and even transmitting files (called "attachments") along with messages.

Internet e-mail messages are sent to an e-mail address. The structure of an e-mail address is as follows: PersonalID@DomainName

The personal identifier could be a person's name or some other way to uniquely identify an individual. The domain is an indicator of the location of that individual, and appears to the right of the "at" (@) sign. A domain name is the unique name of a collection of computers that are connected to the Internet, usually owned by or operated on behalf of a single organization (company, school, or agency) that owns the domain name. The domain name consists of two or more sections, each separated by a period.

From right-to-left, the portions of the domain name are more general to more specific in terms of location. In the United States, the rightmost portion of a domain is typically one of the following:

- com—indicating a commercial enterprise
- edu—indicating an educational institution
- gov—indicating a governmental body
- mil—indicating a military installation
- net—indicating a network resource
- org—indicating a nonprofit organization

In non-U.S. countries, the rightmost portion of a domain name is an indicator of the geographic origin of the domain. For example, Canadian e-mail addresses end with the abbreviation "ca."

WORLD WIDE WEB

The World Wide Web (WWW) is a system and a set of standards for providing a graphic user interface (GUI) to Internet communications. The Web is the single most important factor in the popularity of the Internet, because it makes the technology easy to use and gives attractive and entertaining presentation to users.

Graphics, text, audio, animation, and video can be combined on Web pages to create dynamic and highly interactive access to information. In addition, Web pages can be connected to each other via hyperlinks. These hyperlinks are visible to the user as highlighted text, underlined text, or images that the user can click to access another Web page.

Browsers. Web pages are available to users via Web browsers, such as Mozilla/Firefox, Apple's Safari, Opera, or Microsoft's Internet Explorer. Browsers are programs that run on the user's computer and provide the interface that displays the graphics, text, and hyperlinks to the user. Browsers recognize and interpret the programming language called Hypertext Markup Language (HTML). HTML includes the ability to format and display text; size and position graphics images for display; invoke and present animation or video clips; and run small programs, called applets, for more complex interactive operations. Browsers also implement the hyperlinks and allow users to connect to any Web page they want.

Search Engines. Sometimes a user knows what information she needs, but does not know the precise Web page that she wants to view. A subject-oriented search can be accomplished with the aid of search engines, which are tools that can locate Web pages based on a search criterion established by the user. By far, Google is the most commonly used search engine.

Blogs. The ease with which users can publish their own information using the World Wide Web has created an opportunity for everyone to be a publisher. An outcome from this is that every topic, hobby, niche, and fetish now has a thriving community of like-minded people. The ease of publishing information on the Web became easier with the advent of Web logs or "blogs," online diaries that opened the floodgates to an even greater level of individual participation in information sharing and community.

UNIFORM RESOURCE LOCATORS (URL)

A Uniform Resource Locator (URL) is a networked extension of the standard filename concept. It allows the user to point to a file in a directory on any machine on the Internet. In addition to files, URLs can point to queries, documents stored deep within databases, and many other entities. Primarily, however, URLs are used to identify and locate Web pages.

A URL is composed of three parts:

Protocol. This is the first part of the address. In a Web address, the letters "http" stand for Hypertext Transfer Protocol, signifying how this request should be dealt with. The protocol information is followed by a colon. URL protocols usually take one of the following types:

- http—for accessing a Web page
- ftp—for transferring a file via FTP
- file—for locating a file on the client's own machine
- gopher—for locating a Gopher server
- mail—for submitting e-mail across the Internet
- news—for locating a Usenet newsgroup

Resource Name. This is the name of the server/machine at which the query should be directed. For an "http" request, the colon is followed by two forward slashes, and this indicates that the request should be sent to a machine.

Path and File Name. The rest of a URL specifies the particular computer name, any directory tree information, and a file name, with the latter two pieces of information being optional for Web pages. The computer name is the domain name or a variation on it (on the Web, the domain is most commonly preceded by a machine prefix "www" to identify the computer that is functioning as the organization's Web server, as opposed to its e-mail server, etc.).

If a particular file isn't located at the top level of the directory structure (as organized and defined by whoever sets up the Web site), there may be one or more strings of text separated by slashes, representing the directory hierarchy.

Finally, the last string of text to the right of the right-most slash is the individual file name; on the Web, this often ends with the extension "htm" or "html" to signify it's an HTML document. When no directory path or file name is specified (e.g., the URL http://www.domain.com), the browser is typically pointed automatically to an unnamed (at least from the user's perspective) default or index page, which often constitutes an organization's home or start page.

Thus, a full URL with a directory path and file name may look something like this:

http://www.mycompany.com/files/myfile.html

Lastly, a Web URL might also contain, somewhere to the right of the domain name, a long string of characters that does not correspond to a traditional directory path or file name, but rather is a set of commands or instructions to a server program or database application. The syntax of these URLs depends on the underlying software program being used. Sometimes these can function as reusable URLs (e.g., they can be bookmarked and retrieved repeatedly), but other times they must be generated by the site's server at the time of use, and thus can't be retrieved directly from a bookmark or by typing them in manually.

Spam. Commercial abuse of e-mail continues to be problematic as companies attempt to e-mail millions of online users in bulk. This technique is called "spam," (so named after a skit by the comedy troupe Monty Python that involved the continuous repetition of the word). Online users are deluged with a massive amount of unwanted e-mail selling a wide array of products and services. Spam has become a network-wide problem as it impacts information transfer time and overall network load. Several organizations and governments are attempting to solve the spam problem through legislation or regulation.

Viruses. Computer viruses spread by e-mail have also grown as the Internet has grown. The widespread use of e-mail and the growing numbers of new, uninformed computer users has made it very easy to spread malicious viruses across the network. Security issues for both personal computers and for network servers will continue to be a crucial aspect of the ongoing development of the Internet and World Wide Web.

INTRANET

Intranets are private systems, contained within servers owned by companies. They are based on the same principles that govern the Internet but are not widely available; instead, they are used only for communicating and transferring company information between employees. Companies utilize intranets to protect valuable information from outside access, creating them with layers of protection in place. Because intranet systems are private, they do not suffer from some of the problems the Internet faces, such as speed-related performance issues from too many users trying to access the same sites. Companies can place multimedia presentations on their systems more easily, showing presentations and running training programs for employees.

Company uses for intranet systems are varied, including procedural manuals, employee benefit resources, orientation programs, software and hardware instructions, and even company social networks or e-zine postings. Intranets can also be constructed for a company's specific needs, tailored in functions and appearance. They can include simple files of information, such as spreadsheets or word documents. They can also incorporate search engines that employees can use to find particular components or analyze sets of data. Many also provide links to the Internet and relevant Web sites.

VOIP

VoIP, or Voice over Internet Protocol, is a developing technology allowing users to access audio communication through their Internet settings. The Internet line sends voice transmissions in the form of data packets, like all other types of information stored in servers, which are then changed in audio on a receiving phone system. Users of VoIP benefit by not having to pay for separate phone and Internet services. Beyond the software and hardware required to set up VoIP, companies usually do not need to pay for more than their normal Internet service.

The most important factors in VoIP service are audio quality and accessibility. VoIP can be provided by many different companies, including CoolTalk, Vonage, and Phone Power, but companies should always be sure to conduct tests of the audio quality to ensure it is as good as normal phone service. Also, some companies may prefer to have a back-up system installed in case of emergencies, such as Internet shut-downs or power outages.

SOCIAL NETWORKING

Social networks have become increasingly popular in the past few years with the rise of such Web sites as MySpace and Facebook, where Internet users can create their own profiles and structure personal Web sites in online communities. Thanks to the ease of Internet communication, participants can form friendships and spread information at a high speed across a vast area. Businesses can make use of these social networks in several ways.

Many social networks employ widgets, or embedded advertisements, often in the form of rich media. These interactive advertisements can be posted along the edges of the Web sites and can serve as both marketing and analyzing tools. By making an animated advertisement that can be clicked on or interacted with, a business can judge how attractive the advertisement is through programs designed to collect widget data. Because social networks spread information so quickly, businesses can also use them as platforms to propagate their messages and brand. Some companies have their own MySpace sites to use for marketing purposes, trying a more personal form of promotion that many social network users find honest. Other organizations are beginning to view social networks as an effective way to recruit new employees.

SMARTPHONES AND PDAS

Mobile, handheld computer devices are very common in today's business world. PDAs, which offer online interaction and note-taking abilities, are being increasingly replaced by smartphones, which are phones configured to offer the same services, including connection to the Internet, e-mail, and document programs. While many companies are eager to offer these mobile devices to their employees as a communication tool, only some are currently taking advantage of handhelds as a marketing tool. Websites can be configured to the mini-browsers smartphones rely on, giving those using handheld devices easier access to online information and advertisements. The primary problem cited with smartphones and PDAs is security, since they are not affected by companies' intranet or Internet protections.

E-COMMERCE

E-commerce can take many different forms. Some companies use a "click and mortar" system where they operate stores or factories in physical locations while also offering their products in an online store where orders can be made. Other companies have a central, physical hub and warehouses from which they conduct a large amount of business over the Internet without other bases, such as Amazon.com. Some companies exist by offering purely online services with only a central office, such as eBay.

A company's online store can be constructed to help customers personally, by keeping track of what they view, what they order, and offering similar products that they may be interested in. This is called *personalization*, and the ability to offer each customer their own experience every time they access the company Web site is a powerful marketing tool. It is also important for companies to consistently update their online stores to reflect their changing services or merchandise, including deals and discounts. The interface companies use is also important—how the Web site looks and reacts to customers, especially in response to searches and guided navigation.

WEB CAMS

The current quality of web cams allows companies to transfer video images in real time, letting them use the Internet to video-conference. Some companies are beginning to use video-messaging, a service that often accompanies instant messaging. This technology works for one-on-one meetings and conferences involving multiple attendees.

SEE ALSO *Computer Networks; Computer Security; Electronic Commerce; Electronic Data Interchange and Electronic Funds Transfer*

BIBLIOGRAPHY

"Bandwidth Shaping." *Webopedia.* Jupiter Media Corporation, 2008.

Berners-Lee, Tim. *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web.* New York: HarperBusiness, 2000.

Chung, Joe. "The Red Queen of E-commerce." *Ecommerce Times,* 2008.

"The Difference Between VoIP and PSTN Systems." *Webopedia.* Jupiter Media Corporation, 2008.

Grauer, Robert, and Gretchen Marx. *Essentials of the Internet.* Upper Saddle River, NJ: Prentice Hall, 1997.

Hafner, Katie. *Where Wizards Stay Up Late: The Origin of the Internet.* New York: Simon & Schuster, 1998.

"Intranet Corner." *Intranet Journal,* 2008. Available from: http://www.intranetjournal.com/articles/200107/ic_07_18_01a.html.

Kalakota, Ravi, and Andrew B. Whinston. *Electronic Commerce: A Manager's Guide.* Reading, MA: Addison-Wesley, 1996.

"Types of Internet Connections." *Webopedia.* Jupiter Media Corporation, 2008.

INTRAPRENEURSHIP

Intrapreneurship describes the process of developing new products, services, and lines of business within an existing company. It is perhaps best understood as a form of internal entrepreneurship that takes place with the encouragement and support of management. An employee who takes responsibility for developing an innovative idea into a marketable product is known as an intrapreneur. Management consultants Gifford and Elizabeth Pinchot coined the term in 1976 and helped popularize the concept of intracorporate entrepreneurship in their pioneering book *Intrapreneuring: Why You Don't Have to Leave the Corporation to Become an Entrepreneur.*

The Pinchots and other experts recognized that entrepreneurial ventures often lost their innovative edge as they grew into established companies. In order to help organizations remain creative and competitive as they grew, the consultants came up with guidelines and models to foster this entrepreneurial spirit among employees. "There are many advantages in working with intrapreneurs in any organization. Given the business environment in this day, any organization needs people who can bring in new ideas and see them through," Emily Hwengere wrote in the Financial Gazette in 2002. "Without intrapreneurs who can identify and exploit new opportunities, organizations will naturally die."

One of the most commonly cited intrapreneurship success stories is 3M Corporation, which has a policy that allows employees to spend 15 percent of their working hours developing their own business or product ideas. This policy led to the creation of Post-It-Notes by an

employee that was looking for something to mark pages in his prayer book.

Intrapreneurship is particularly valued in the information technology industry because product innovation is highly competitive. Employees at large tech companies invented many of the well-established products used today. Steve Jobs and twenty other employees at Apple Computers engineered the Macintosh computer to compete with the Apple II. A former employee of Oracle designed Business Objects, a world leader in business intelligence software.

Experts recommend that business organizations create a culture that provides employees with both freedom and encouragement to develop new ideas. They emphasize that support for intrapreneurship must start with top executives and work its way down in the form of policies, programs, and reward systems. "The real challenge for any company trying to unleash new businesses is that people have to believe that this is not an unnatural act," Gary Hamel told *Inc.* in 2000. "This is what's going to have to happen in companies-bringing ideas, capital, and talent together from all across the corporate entities. Companies have to learn how to leverage the competencies and the assets that they already have within." Some companies foster intrapreneurship by encouraging employees to form competing teams that function like small businesses or internal vendors. Other companies create formal innovation programs to ensure that every new idea receives a fair hearing. In some companies, upper management behaves like a venture capital firm, evaluating and providing financial support for promising new ideas.

Employees who succeed as intrapreneurs tend to possess many of the same talents and traits as traditional entrepreneurs as well as a commitment to the organization and its goals. Working within an existing company—rather than launching an independent start-up business—offers a number of advantages to such individuals. Access to the company's resources increases their chances of success, for example, while maintaining a salaried position provides them with added security in case of failure. Intrapreneurs also gain experience that they can apply to future entrepreneurial ventures, as well as a stimulating work environment. In this way, supporting intrapreneurship can help companies retain valuable employees. "One of the most wonderful things organizations have going for them is that people already have an intrinsic desire to go beyond—to learn, to grow, and to aspire to possibilities within themselves," according to Jacqueline Byrd and Paul Lockwood Brown, authors of the 2002 book *The Innovation Equation*.

Melih Oztalay, author of 2007's *Business Growth: Taking A Look At Innovating For Cash*, cautions companies against being taken in by the innovation myth. Oztalay cites studies that found between 50 percent and 90 percent of new products are financial failures. She points out that the top twelve of Proctor & Gamble's 250 brands make half of the company's sales and more than half of its net profits. Oztalay argues that the "innovation spree" of the 1990s, where companies encouraged intrapreneurs and venture capitalists and invested in countless start-ups, did not generate returns. She concludes that "there's an important difference between being innovative and being an innovative enterprise: The former generates lots of ideas; the later generates lots of cash."

Numerous books, articles, Web sites, and workshops exist to provide advice for companies and employees hoping to take advantage of the opportunities presented by intrapreneurship. In general, such sources recommend that intrapreneurs be willing to take risks, find an internal champion from senior management, negotiate measures of success for their project, ensure that the project is given adequate time to succeed, and select fellow employees who can contribute needed skills. Some of the major factors that inhibit intrapreneurship include resistance to change in organizations, a corporate bureaucracy that slows down project approval, a refusal to allocate resources to new ideas, a lack of training and support for employees, low rewards for success coupled with high costs of failure, and performance evaluation based solely on job descriptions. "When you set up a new unit, be careful that you steer a line between two paths," Hamel explained. "Totally isolating it, which is fine if it isn't at all related to what you're doing, and giving it a bear hug, where you hold on to it so tight that it can never escape the gravitational pull of old beliefs."

SEE ALSO *Entrepreneurship*

BIBLIOGRAPHY

Byrd, Jacqueline, and Paul Lockwood Brown. *The Innovation Equation: Building Creativity and Risk-Taking in Your Organization.* Pfeiffer, 2002.

Fattal, Tony. "Intrapreneurship at Work: Championing Projects to Push Innovation in Your Company." *CMA Management* November 2003.

Hwengere, Emily. "Factors that Inhibit Intrapreneurship." *Financial Gazette* 30 May 2002.

"Intrapreneurship: Spinning Off a New Company." *Inc.* September 2000. Available from: http://pf.inc.com/articles/2000/09/20222.html.

King, Carla. "Intrapreneurship: Heady Business." Sun Microsystems. Available from: http://developers.sun.com/toolkits/articles/intrapreneur.html.

Ozlatay, Melih. "Business Growth: Taking a Look at Innovating For Cash." *Contentdig.com* 20, March 2007.

Pinchot, Gifford, and Ron Pellman. *Intrapreneuring in Action.* Berrett-Kohler, 2000.

"Small Business Notes: Intrapreneurship." *SmallBusinessNotes.* Available from: http://www.smallbusinessnotes.com/choosing/intrapreneurship.html.

INVENTORY MANAGEMENT

Inventory management, or inventory control, is an attempt to balance inventory needs and requirements with the need to minimize costs resulting from obtaining and holding inventory. There are several schools of thought that view inventory and its function differently. These will be addressed later, but first we present a foundation to facilitate the reader's understanding of inventory and its function.

WHAT IS INVENTORY?

Inventory is a quantity or store of goods that is held for some purpose or use (the term may also be used as a verb, meaning to take inventory or to count all goods held in inventory). Inventory may be kept "in-house," meaning on the premises or nearby for immediate use; or it may be held in a distant warehouse or distribution center for future use. With the exception of firms utilizing just-in-time methods, the term "inventory" typically implies a stored quantity of goods that exceeds what is needed for the firm to function at the current time (e.g., within the next few hours).

WHY KEEP INVENTORY?

Why would a firm hold more inventory than is currently necessary to ensure the firm's operation? The following is a list of reasons for maintaining what would appear to be "excess" inventory.

Meet Demand. In order for a retailer to stay in business, it must have the products that the customer wants on hand when the customer wants them. If not, the retailer will have to back-order the product. If the customer can get the good from some other source, he or she may choose to do so rather than electing to allow the original retailer to meet demand later (through back-order). Hence, in many instances, if a good is not in inventory, a sale is lost forever.

Keep Operations Running. A manufacturer must have certain purchased items (raw materials, components, or subassemblies) in order to manufacture its product. Running out of only one item can prevent a manufacturer from completing the production of its finished goods.

Inventory between successive dependent operations also serves to decouple the dependency of the operations. A machine or workcenter is often dependent upon the previous operation to provide it with parts to work on. If work ceases at a workcenter, then all subsequent centers will shut down for lack of work. If a supply of work-in-process inventory is kept between each workcenter, then each machine can maintain its operations for a limited time, hopefully until operations resume at the original center.

Lead Time. Lead time is the time that elapses between the placing of an order (either a purchase order or a production order issued to the shop or the factory floor) and actually receiving the goods ordered.

If a supplier (an external firm or an internal department or plant) cannot supply the required goods on demand, then the client firm must keep an inventory of the needed goods. The longer the lead time, the larger the quantity of goods the firm must carry in inventory.

A just-in-time (JIT) manufacturing firm, such as Nissan in Smyrna, Tennessee, can maintain extremely low levels of inventory. Nissan takes delivery on truck seats as many as 18 times per day. However, steel mills may have a lead time of up to three months. That means that a firm that uses steel produced at the mill must place orders at least three months in advance of their need. In order to keep their operations running in the meantime, an on-hand inventory of three months' steel requirements would be necessary.

Hedge. Inventory can also be used as a hedge against price increases and inflation. Salesmen routinely call purchasing agents shortly before a price increase goes into effect. This gives the buyer a chance to purchase material, in excess of current need, at a price that is lower than it would be if the buyer waited until after the price increase occurs.

Quantity Discount. Often firms are given a price discount when purchasing large quantities of a good. This also frequently results in inventory in excess of what is currently needed to meet demand. However, if the discount is sufficient to offset the extra holding cost incurred as a result of the excess inventory, the decision to buy the large quantity is justified.

Smoothing Requirements. Sometimes inventory is used to smooth demand requirements in a market where demand is somewhat erratic. Consider the demand forecast and production schedule outlined in Table 1.

Notice how the use of inventory has allowed the firm to maintain a steady rate of output (thus avoiding the cost of hiring and training new personnel), while building up inventory in anticipation of an increase in demand. In fact, this is often called anticipation inventory. In essence, the use of inventory has allowed the firm to move demand requirements to earlier periods, thus smoothing the demand.

CONTROLLING INVENTORY

Firms that carry hundreds or even thousands of different part numbers can be faced with the impossible task of monitoring the inventory levels of each part number. In order to facilitate this, many firms use an ABC approach. ABC analysis is based on Pareto Analysis, also known as the "80/20" rule. The 80/20 comes from Pareto's finding

Table 1

	January	February	March	April	May	June
Demand	50	50	0	100	200	200
Produce	100	100	100	100	100	100
Month-end inventory	50	100	200	200	100	0

that 20 percent of the populace possessed 80 percent of the wealth. From an inventory perspective it can be restated thusly: approximately 20 percent of all inventory items represent 80 percent of inventory costs. Therefore, a firm can control 80 percent of its inventory costs by monitoring and controlling 20 percent of its inventory. But, it has to be the correct 20 percent.

The top 20 percent of the firm's most costly items are termed "A" items (this should approximately represent 80 percent of total inventory costs). Items that are extremely inexpensive or have low demand are termed "C" items, with "B" items falling in between A and C items. The percentages may vary with each firm, but B items usually represent about 30 percent of the total inventory items and 15 percent of the costs. C items generally constitute 50 percent of all inventory items but only around 5 percent of the costs.

By classifying each inventory item as an A, B, or C, the firm can determine the resources (time, effort, and money) to dedicate to each item. Usually this means that the firm monitors A items very closely but can check on B and C items on a periodic basis (for example, monthly for B items and quarterly for C items).

Another control method related to the ABC concept is cycle counting. Cycle counting is used instead of the traditional "once-a-year" inventory count where firms shut down for a short period of time and physically count all inventory assets in an attempt to reconcile any possible discrepancies in their inventory records. When cycle counting is used the firm is continually taking a physical count but not of total inventory.

A firm may physically count a certain section of the plant or warehouse, moving on to other sections upon completion, until the entire facility is counted. Then the process starts all over again.

The firm may also choose to count all the A items, then the B items, and finally the C items. Certainly, the counting frequency will vary with the classification of each item. In other words, A items may be counted monthly, B items quarterly, and C items yearly. In addition, the required accuracy of inventory records may vary according to classification, with A items requiring the most accurate record keeping.

BALANCING INVENTORY AND COSTS

As stated earlier, inventory management is an attempt to maintain an adequate supply of goods while minimizing inventory costs. We saw a variety of reasons companies hold inventory and these reasons dictate what is deemed to be an adequate supply of inventory. Now, how do we balance this supply with its costs? First let's look at what kind of costs we are talking about.

There are three types of costs that together constitute total inventory costs: holding costs, set-up costs, and purchasing costs.

Holding costs. Holding costs, also called carrying costs, are the costs that result from maintaining the inventory. Inventory in excess of current demand frequently means that its holder must provide a place for its storage when not in use. This could range from a small storage area near the production line to a huge warehouse or distribution center. A storage facility requires personnel to move the inventory when needed and to keep track of what is stored and where it is stored. If the inventory is heavy or bulky, forklifts may be necessary to move it around.

Storage facilities also require heating, cooling, lighting, and water. The firm must pay taxes on the inventory, and opportunity costs occur from the lost use of the funds that were spent on the inventory. Also, obsolescence, pilferage (theft), and shrinkage are problems. All of these things add cost to holding or carrying inventory.

If the firm can determine the cost of holding one unit of inventory for one year (H) it can determine its annual holding cost by multiplying the cost of holding one unit by the average inventory held for a one-year period. Average inventory can be computed by dividing the amount of goods that are ordered every time an order is placed (Q) by two. Thus, average inventory is expressed as $Q/2$. Annual holding cost, then, can be expressed as $H(Q/2)$.

Set-up costs. Set-up costs are the costs incurred from getting a machine ready to produce the desired good. In a manufacturing setting this would require the use of a skilled technician (a cost) who disassembles the tooling that is currently in use on the machine. The disassembled tooling is then taken to a tool room or tool shop for

maintenance or possible repair (another cost). The technician then takes the currently needed tooling from the tool room (where it has been maintained; another cost) and brings it to the machine in question.

There the technician has to assemble the tooling on the machine in the manner required for the good to be produced. (This is known as a "set-up.") Then the technician has to calibrate the machine and probably will run a number of parts, that will have to be scrapped (a cost), in order to get the machine correctly calibrated and running. All the while the machine has been idle and not producing any parts (opportunity cost). As one can see, there is considerable cost involved in set-up.

If the firm purchases the part or raw material, then an order cost, rather than a set-up cost, is incurred. Ordering costs include the purchasing agent's salary and travel/entertainment budget, administrative and secretarial support, office space, copiers and office supplies, forms and documents, long-distance telephone bills, and computer systems and support. Also, some firms include the cost of shipping the purchased goods in the order cost.

If the firm can determine the cost of one set-up (S) or one order, it can determine its annual setup/order cost by multiplying the cost of one set-up by the number of set-ups made or orders placed annually. Suppose a firm has an annual demand (D) of 1,000 units. If the firm orders 100 units (Q) every time it places an order, the firm will obviously place 10 orders per year (D/Q). Hence, annual set-up/order cost can be expressed as $S(D/Q)$.

Purchasing cost. Purchasing cost is simply the cost of the purchased item itself. If the firm purchases a part that goes into its finished product, the firm can determine its annual purchasing cost by multiplying the cost of one purchased unit (P) by the number of finished products demanded in a year (D). Hence, purchasing cost is expressed as PD.

Now total inventory cost can be expressed as:

Total = Holding cost + Set-up/Order cost + Purchasing cost
or
Total = $H(Q/2) + S(D/Q) + PD$

If holding costs and set-up costs were plotted as lines on a graph, the point at which they intersect (that is, the point at which they are equal) would indicate the lowest total inventory cost. Therefore, if we want to minimize total inventory cost, every time we place an order, we should order the quantity (Q) that corresponds to the point where the two values are equal. If we set the two costs equal and solve for Q we get:

$$H(Q/2) = S(D/Q)$$
$$Q = 2\,DS/H$$

The quantity Q is known as the economic order quantity (EOQ). In order to minimize total inventory cost, the firm will order Q every time it places an order. For example, a firm with an annual demand of 12,000 units (at a purchase price of $25 each), annual holding cost of $10 per unit and an order cost of $150 per order (with orders placed once a month) could save $800 annually by utilizing the EOQ. First, we determine the total costs without using the EOQ method:

$$Q = \$10(1000/2) + \$150(12,000/1,000) + \$25(12,000) = \$306,800$$

Then we calculate EOQ:

$$EOQ = 2(12,000)(\$150)/\$10 = 600$$

And we calculate total costs at the EOQ of 600:

$$Q = \$10(600/2) + \$150(12,000/600) + \$25(12,000) = \$306,000$$

Finally, we subtract the total cost of Q from Q to determine the savings:

$$\$306,800 - 306,000 = \$800$$

Notice that if you remove purchasing cost from the equation, the savings is still $800. We might assume this means that purchasing cost is not relevant to our order decision and can be eliminated from the equation. It must be noted that this is true only as long as no quantity discount exists. If a quantity discount is available, the firm must determine whether the savings of the quantity discount are sufficient to offset the loss of the savings resulting from the use of the EOQ.

There are a number of assumptions that must be made with the use of the EOQ. These include:

- Only one product is involved.
- Demand is deterministic (known with certainty).
- Demand is constant (stable throughout the year).
- There are no quantity discounts.
- Costs are constant (no price increases or inflation).

While these assumptions would seem to make EOQ irrelevant for use in a realistic situation, it is relevant for

items that have independent demand. This means that the demand for the item is not derived from the demand for something else (usually a parent item for which the unit in question is a component). For example, the demand for steering wheels would be derived from the demand for automobiles (dependent demand) but the demand for purses is not derived from anything else; purses have independent demand.

OTHER LOT-SIZING TECHNIQUES

There are a number of other lot-sizing techniques available in addition to EOQ. These include the fixed-order quantity, fixed-order-interval model, the single-period model, and part-period balancing.

Fixed-Order-Quantity Model. EOQ is an example of the fixed-order-quantity model since the same quantity is ordered every time an order is placed. A firm might also use a fixed-order quantity when it is captive to packaging situations. If you were to walk into an office supply store and ask to buy twenty-two paper clips, chances are you would walk out with one hundred paper clips. You were captive to the packaging requirements of paper clips, i.e., they come one hundred to a box and you cannot purchase a partial box. It works the same way for other purchasing situations. A supplier may package their goods in certain quantities so that their customers must buy that quantity or a multiple of that quantity.

Fixed-Order-Interval Model. The fixed-order-interval model is used when orders have to be placed at fixed time intervals such as weekly, biweekly, or monthly. The lot size is dependent upon how much inventory is needed from the time of order until the next order must be placed (order cycle). This system requires periodic checks of inventory levels and is used by many retail firms such as drug stores and small grocery stores.

Single-Period Model. The single-period model is used in ordering perishables, such as food and flowers, and items with a limited life, such as newspapers. Unsold or unused goods are not typically carried over from one period to another and there may even be some disposal costs involved. This model tries to balance the cost of lost customer goodwill and opportunity cost that is incurred from not having enough inventory, with the cost of having excess inventory left at the end of a period.

Part-Period Balancing. Part-period balancing attempts to select the number of periods covered by the inventory order that will make total carrying costs as close as possible to the set-up/order cost.

When a proper lot size has been determined, utilizing one of the above techniques, the reorder point, or point at which an order should be placed, can be determined by the rate of demand and the lead time. If safety stock is necessary it would be added to the reorder point quantity.

Reorder point =
  Expected demand during lead time +
  Safety stock

Thus, an inventory item with a demand of 100 per month, a two-month lead time and a desired safety stock of two weeks would have a reorder point of 250. In other words, an order would be placed whenever the inventory level for that good reached 250 units.

Reorder point =
  100/month × 2 months + 2 weeks'
  safety stock = 250

OTHER SCHOOLS OF THOUGHT IN INVENTORY MANAGEMENT

There are a number of techniques and philosophies that view inventory management from different perspectives.

MRP and MRP II. MRP and MRP II are computer-based resource management systems designed for items that have dependent demand. MRP and MRP II look at order quantities period by period and, as such, allow discrete ordering (ordering only what is currently needed). In this way inventory levels can be kept at a very low level; a necessity for a complex item with dependent demand.

Just-In-Time (JIT). Just-in-time (JIT) is a philosophy that advocates the lowest possible levels of inventory. JIT espouses that firms need only keep inventory in the right quantity at the right time with the right quality. The ideal lot size for JIT is one, even though one hears the term "zero inventory" used.

Theory of Constraints (TOC). Theory of constraints (TOC) is a philosophy which emphasizes that all management actions should center around the firm's constraints. While it agrees with JIT that inventory should be at the lowest level possible in most instances, it advocates that there be some buffer inventory around any capacity constraint (e.g., the slowest machine) and before finished goods.

THE FUTURE OF INVENTORY MANAGEMENT

The advent, through altruism or legislation, of environmental management has added a new dimension to inventory management-reverse supply chain logistics. Environmental

management has expanded the number of inventory types that firms have to coordinate. In addition to raw materials, work-in-process, finished goods, and MRO goods, firms now have to deal with post-consumer items such as scrap, returned goods, reusable or recyclable containers, and any number of items that require repair, reuse, recycling, or secondary use in another product. Retailers have the same type of problems dealing with inventory that has been returned due to defective material or manufacture, poor fit, finish, or color, or outright "I changed my mind" responses from customers.

Finally, supply chain management has had a considerable impact on inventory management. Instead of managing one's inventory to maximize profit and minimize cost for the individual firm, today's firm has to make inventory decisions that benefit the entire supply chain. Through the use of real-time and end-to-end supplier chain reporting technologies, buyers can know exactly where their products are in the supply chain, how much they have in stock, and even how much their supplier can provide.

Management consultants from McKinsey & Company said in late 2007 that emerging technologies have increased and will continue to increase automation for managing capital and assets. Carrefour, Metro, Wal-Mart Stores, and other large retailers have adopted (and asked suppliers to adopt) digital-tagging technologies, such as radio frequency identification (RFID). These stores are further automating their supply chain and inventory management by integrated digital tag technologies with other supply chain systems. As the price of these digital tags falls, they will reduce the costs of managing distribution and increase revenues by helping companies to manage supply more effectively.

SEE ALSO *Aggregate Planning; Inventory Types; Lean Manufacturing and Just-in-Time Production; Manufacturing Resources Planning; Reverse Supply Chain Logistics; Supply Chain Management*

BIBLIOGRAPHY
Biederman, David. "Reversing Inventory Management." *Traffic World* 12 December 2004: 1.

"Eight Business Technology Trends to Watch." *CNET News.com* 26 December 2007. Available from: http://news.cnet.com/Eight-business-technology-trends-to-watch/2030-1069_3-6223397.html.

Stevenson, William J. *Production Operations Management.* Boston, MA: Irwin/McGraw-Hill, 2005.

Sucky, Eric. "Inventory Management in Supply Chains: A Bargaining Problem." *International Journal of Production Economics* 93/94, no. 1 (2005): 253–262.

Varmazis, Maria. "Inventory Management: Software Shines Light on Savings." *Purchasing* 17 January 2008. Available from: http://www.purchasing.com/article/CA6518764.html.

INVENTORY TYPES

Inventory is defined as a stock or store of goods. These goods are maintained on hand at or near a business's location so that the firm may meet demand and fulfill its reason for existence. If the firm is a retail establishment, a customer may look elsewhere to have his or her needs satisfied if the firm does not have the required item in stock when the customer arrives. If the firm is a manufacturer, it must maintain some inventory of raw materials and work-in-process in order to keep the factory running. In addition, it must maintain some supply of finished goods in order to meet demand.

Sometimes, a firm may keep larger inventory than is necessary to meet demand and keep the factory running under current conditions of demand. If the firm exists in a volatile environment where demand is dynamic (i.e., rises and falls quickly), an on-hand inventory could be maintained as a buffer against unexpected changes in demand. This buffer inventory also can serve to protect the firm if a supplier fails to deliver at the required time, or if the supplier's quality is found to be substandard upon inspection, either of which would otherwise leave the firm without the necessary raw materials. Other reasons for maintaining an unnecessarily large inventory include buying to take advantage of quantity discounts (i.e., the firm saves by buying in bulk), or ordering more in advance of an impending price increase.

In theory, the higher the level of finished goods inventory on hand, the higher the achievable customer service level, as long as the inventory includes the right goods in the right location. Also, with increased levels of finished goods inventory, companies are able to promise customers shorter order-to-delivery lead times. They also enable companies to accept longer inbound lead times from both internal and external suppliers.

Generally, inventory types can be grouped into four classifications: raw material, work-in-process, finished goods, and MRO goods.

RAW MATERIALS

Raw materials are inventory items that are used in the manufacturer's conversion process to produce components, subassemblies, or finished products. These inventory items may be commodities or extracted materials that the firm or its subsidiary has produced or extracted. They also may be objects or elements that the firm has purchased from outside the organization. Even if the item is partially assembled or is considered a finished good to the supplier, the purchaser may classify it as a raw material if his or her firm had no input into its production. Typically, raw materials are commodities such as ore, grain, minerals, petroleum, chemicals, paper, wood, paint, steel, and food items. However, items such as nuts and bolts, ball bearings, key stock, casters, seats,

Figure 1

Cart

Top — Leg Assembly — Frame

sheet steel — bars (4)

legs (4) — casters (4)

wheel — ball bearing — axle — caster frame
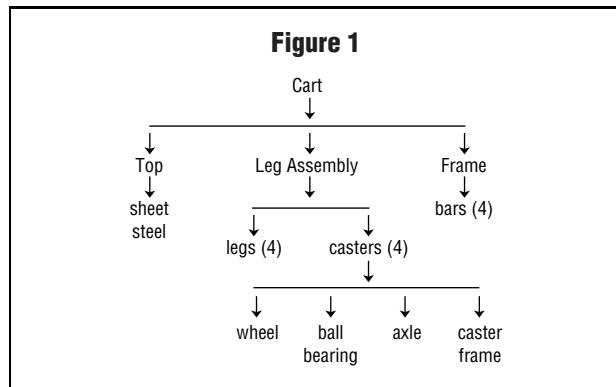
wheels, and even engines may be regarded as raw materials if they are purchased from outside the firm.

The bill-of-materials file in a material requirements planning system (MRP) or a manufacturing resource planning (MRP II) system utilizes a tool known as a product structure tree to clarify the relationship among its inventory items and provide a basis for filling out, or "exploding," the master production schedule. Consider an example of a rolling cart. This cart consists of a top that is pressed from a sheet of steel, a frame formed from four steel bars, and a leg assembly consisting of four legs, rolled from sheet steel, each with a caster attached. An example of this cart's product structure tree is presented in Figure 1.

Generally, raw materials are used in the manufacture of components. These components are then incorporated into the final product or become part of a subassembly. Subassemblies are then used to manufacture or assemble the final product. A part that goes into making another part is known as a component, while the part it goes into is known as its parent. Any item that does not have a component is regarded as a raw material or purchased item. From the product structure tree it is apparent that the rolling cart's raw materials are steel, bars, wheels, ball bearings, axles, and caster frames.

Order-to-delivery lead times for getting finished goods to end customers are affected by the raw material inventory because of their affect on production capacity requirements. For example, a U.S. paint manufacturer discovered that its plant was stalled waiting for raw materials to arrive from suppliers or simply to be found in its own warehouse. This manufacturer was able to compensate because the manufacturing and labor capacity of the plant made up for the poor inbound supply chain; the company could still ensure on-time delivery to customers. However, additional costs were incurred due to these plant inefficiencies.

WORK-IN-PROCESS

Work-in-process (WIP) is made up of all the materials, parts (components), assemblies, and subassemblies that are being processed or are waiting to be processed within the system. This generally includes all material—from raw material that has been released for initial processing up to material that has been completely processed and is awaiting final inspection and acceptance before inclusion in finished goods.

Any item that has a parent but is not a raw material is considered to be work-in-process. A glance at the rolling cart product structure tree example reveals that work-in-process in this situation consists of tops, leg assemblies, frames, legs, and casters. Actually, the leg assembly and casters are labeled as subassemblies because the leg assembly consists of legs and casters, and the casters are assembled from wheels, ball bearings, axles, and caster frames.

FINISHED GOODS

A finished good is a completed part that is ready for a customer order. Therefore, finished goods inventory is the stock of completed products. These goods have been inspected and have passed final inspection requirements so that they can be transferred out of work-in-process and into finished goods inventory. From this point, finished goods can be sold directly to their final user, sold to retailers, sold to wholesalers, sent to distribution centers, or held in anticipation of a customer order.

Any item that does not have a parent can be classified as a finished good. By looking at the rolling cart product structure tree example one can determine that the finished good in this case is a cart.

Inventories can be further classified according to the purpose they serve. These types include transit inventory, buffer inventory, anticipation inventory, decoupling inventory, cycle inventory, and MRO goods inventory. Some of these also are known by other names, such as speculative inventory, safety inventory, and seasonal inventory. We already have briefly discussed some of the implications of a few of these inventory types, but will now discuss each in more detail.

TRANSIT INVENTORY

Transit inventories result from the need to transport items or material from one location to another, and from the fact that there is some transportation time involved in getting from one location to another. Sometimes this is referred to as pipeline inventory. Merchandise shipped by truck or rail can sometimes take days or even weeks to go from a regional warehouse to a retail facility. Some large firms, such as automobile manufacturers, employ freight consolidators to pool their transit inventories coming from various locations into one shipping source in order to take advantage of economies of scale. Of course, this can greatly increase the transit time for these inventories, hence an increase in the size of the inventory in transit.

BUFFER INVENTORY

As previously stated, inventory is sometimes used to protect against the uncertainties of supply and demand, as well as unpredictable events such as poor delivery reliability or poor quality of a supplier's products. These inventory cushions are often referred to as safety stock. Safety stock or buffer inventory is any amount held on hand that is over and above that currently needed to meet demand. Generally, the higher the level of buffer inventory, the better the firm's customer service. This occurs because the firm suffers fewer "stock-outs" (when a customer's order cannot be immediately filled from existing inventory) and has less need to backorder the item, make the customer wait until the next order cycle, or even worse, cause the customer to leave empty-handed to find another supplier. Obviously, the better the customer service the greater the likelihood of customer satisfaction.

ANTICIPATION INVENTORY

Oftentimes, firms will purchase and hold inventory that is in excess of their current need in anticipation of a possible future event. Such events may include a price increase, a seasonal increase in demand, or even an impending labor strike. This tactic is commonly used by retailers, who routinely build up inventory months before the demand for their products will be unusually high (i.e., at Halloween, Christmas, or the back-to-school season). For manufacturers, anticipation inventory allows them to build up inventory when demand is low (also keeping workers busy during slack times) so that when demand picks up the increased inventory will be slowly depleted and the firm does not have to react by increasing production time (along with the subsequent increase in hiring, training, and other associated labor costs). Therefore, the firm has avoided both excessive overtime due to increased demand and hiring costs due to increased demand. It also has avoided layoff costs associated with production cut-backs, or worse, the idling or shutting down of facilities. This process is sometimes called "smoothing" because it smoothes the peaks and valleys in demand, allowing the firm to maintain a constant level of output and a stable workforce.

DECOUPLING INVENTORY

Very rarely, if ever, will one see a production facility where every machine in the process produces at exactly the same rate. In fact, one machine may process parts several times faster than the machines in front of or behind it. Yet, if one walks through the plant it may seem that all machines are running smoothly at the same time. It also could be possible that while passing through the plant, one notices several machines are under repair or are undergoing some form of preventive maintenance. Even

so, this does not seem to interrupt the flow of work-in-process through the system. The reason for this is the existence of an inventory of parts between machines, a decoupling inventory that serves as a shock absorber, cushioning the system against production irregularities. As such it "decouples" or disengages the plant's dependence upon the sequential requirements of the system (i.e., one machine feeds parts to the next machine).

The more inventory a firm carries as a decoupling inventory between the various stages in its manufacturing system (or even distribution system), the less coordination is needed to keep the system running smoothly. Naturally, logic would dictate that an infinite amount of decoupling inventory would not keep the system running in peak form. A balance can be reached that will allow the plant to run relatively smoothly without maintaining an absurd level of inventory. The cost of efficiency must be weighed against the cost of carrying excess inventory so that there is an optimum balance between inventory level and coordination within the system.

CYCLE INVENTORY

Those who are familiar with the concept of economic order quantity (EOQ) know that the EOQ is an attempt to balance inventory holding or carrying costs with the costs incurred from ordering or setting up machinery. When large quantities are ordered or produced, inventory holding costs are increased, but ordering/setup costs decrease. Conversely, when lot sizes decrease, inventory holding/carrying costs decrease, but the cost of ordering/setup increases since more orders/setups are required to meet demand. When the two costs are equal (holding/carrying costs and ordering/setup costs) the total cost (the sum of the two costs) is minimized. Cycle inventories, sometimes called lot-size inventories, result from this process. Usually, excess material is ordered and, consequently, held in inventory in an effort to reach this minimization point. Hence, cycle inventory results from ordering in batches or lot sizes rather than ordering material strictly as needed.

MRO GOODS INVENTORY

Maintenance, repair, and operating supplies, or MRO goods, are items that are used to support and maintain the production process and its infrastructure. These goods are usually consumed as a result of the production process but are not directly a part of the finished product. Examples of MRO goods include oils, lubricants, coolants, janitorial supplies, uniforms, gloves, packing material, tools, nuts, bolts, screws, shim stock, and key stock. Even office supplies such as staples, pens and pencils, copier paper, and toner are considered part of MRO goods inventory.

THEORETICAL INVENTORY

In their book, *Managing Business Process Flows: Principles of Operations Management*, Anupindi, Chopra, Deshmukh, Van Mieghem, and Zemel discuss a final type of inventory known as theoretical inventory. They describe theoretical inventory as the average inventory for a given throughput assuming that no WIP item had to wait in a buffer. This would obviously be an ideal situation where inflow, processing, and outflow rates were all equal at any point in time. Unless one has a single process system, there always will be some inventory within the system. Theoretical inventory is a measure of this inventory (i.e., it represents the minimum inventory needed for goods to flow through the system without waiting). The authors formally define it as the minimum amount of inventory necessary to maintain a process throughput of R, expressed as:

$$\text{Theoretical Inventory} = \text{Throughput} \times \text{Theoretical Flow Time}$$
$$I_{th} = R \times T_{th}$$

In this equation, theoretical flow time equals the sum of all activity times (not wait time) required to process one unit. Therefore, WIP will equal theoretical inventory whenever actual process flow time equals theoretical flow time.

In a 2006 survey conducted by the Aberdeen Group, supply chain professionals identified four supply chain technologies that will enhance inventory practices. These include:

- Multi-tier management solutions that optimize inventory by determining how much and where to hold inventory across multiple supply chain tiers.

- Supply chain visibility, which enables users to quickly respond to changes (or anticipated changes) by taking actions such as reshaping demand and/or redirecting supply.

- Precision demand management technology, which supports specific product, customer, and channel forecasts.

- Supplier/contract manufacturer collaboration technology, which are platforms that enable customers to collaborate with overseas suppliers and contract manufacturers on forecasts, inventory planning, replenishment, and shipping activity.

Again in 2007, the Aberdeen Group found inventory optimization to be the number one focus for companies, demonstrating a corporate trend toward being more responsive to customers and reducing cost.

Inventory exists in various categories as a result of its position in the production process (raw material, work-in-process, and finished goods) and according to the function it serves within the system (transit inventory, buffer inventory, anticipation inventory, decoupling inventory, cycle inventory, and MRO goods inventory). As such, the purpose of each seems to be that of maintaining a high level of customer service or part of an attempt to minimize overall costs.

SEE ALSO *Inventory Management; Theory of Constraints*

BIBLIOGRAPHY

Anupindi, Ravi, et al. *Managing Business Process Flows: Principles of Operations Management.* 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Atkinson, William. "The Big Trends in Sourcing and Procurement." *Supply Chain Management Review* 1 May 2008. Available from: http://www.scmr.com/article/CA6558641.html.

Cox, James F., III, and John H. Blackstone, Jr. *APICS Dictionary.* 9th ed. Falls Church VA: American Production and Inventory Control Society, 1998.

Mehltretter, Steve, and Vadim Kapustin. "Demand Management Trends." *Supply and Demand Chain Executive* 29 May 2008. Available from: http://www.sdcexec.com/web/online/Demand-Management-Trends/The-Three-Things-You-Need-to-Get-Right-in-Your-Extended-Value-Chain/22$10053.

Meredith, Jack R., and Scott M. Shafer. *Operations Management for MBAs.* 2nd ed. New York: John Wiley & Sons Inc., 2002.

Stevenson, William J. *Production/Operations Management.* 8th ed. Boston: Irwin/McGraw-Hill, 2005.

IPO

SEE *Initial Public Offering*

J

JAPANESE MANAGEMENT

The Japanese have had a phenomenal impact on world markets. Many industries, such as electronics, cameras, watches, motorcycles, machine tools, automotive products, shipbuilding, and even some aspects of aerospace are either dominated by Japanese firms or are heavily impacted by them.

Many people mistakenly attribute this phenomenon strictly to cultural differences. The vision of dedicated Japanese workers giving their life to the company for substandard wages surely accounts for the difference, they reason. Of course, this view doesn't always square with reality. First, Japanese factories have some of the highest wage structures seen outside the United States. Second, this "Japanese miracle" is also happening outside Japan. Most Japanese automobile manufacturers have successful plants located within the United States—all of them manufacturing quality automobiles utilizing American workers. When Matsushita bought a U.S. television plant in Chicago, they managed to maintain the one thousand hourly employees while trimming the indirect labor by half. Utilizing the same workers employed by the U.S. firm, Matsushita doubled daily production while improving quality forty-fold. Outside warranty costs fell from $16 million per year to $2 million per year while selling twice as many sets.

Word of these success stories soon aroused considerable interest from U.S. firms. Interest in Japanese management was first generated in the U.S. with the appearance of a book by William Ouchi entitled *Theory Z*, and later a book by Richard J. Schonberger entitled *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity*, and the broadcast of an NBC television white paper titled *If Japan Can...Why Can't We?*

William Ouchi's book *Theory Z* detailed much of the success being realized by the Japanese manufacturing firms. The Japanese style of management (as opposed to McGregor's Theory X and Theory Y) mystified many U.S. businesspersons with its talk of cultural differences and notions such as lifetime employment.

In his book *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity*, Richard Schonberger presented nine "lessons" the world could learn from the Japanese. These lessons included:

1. Management technology is a highly transportable technology.

2. Just-in-time production exposes problems otherwise hidden by excess inventories and staff.

3. Quality begins with production and requires a company-wide "habit of improvement."

4. Culture is no obstacle; techniques can change behavior.

5. Simplify, and goods will flow like water.

6. Flexibility opens doors.

7. Travel light and make numerous trips, like the water beetle.

8. More self-improvement, fewer programs, less specialist intervention.

9. Simplicity is the natural state.

For many American business executives, this was their first encounter with the concepts (and even just the terms) of just-in-time, *kanban*, Total Quality Management, and quality circles.

The NBC documentary *If Japan Can...Why Can't We?* introduced Americans to the progress made in Japanese manufacturing and served as a "wake-up call" for American businesses that manufacturing had entered a new generation. For many viewers, this was their first introduction to W. Edwards Deming, statistical process control (SPC), and quality circles.

By the early 1980s it was evident that Japan was well on its way to a position as a worldwide dominant force in manufacturing. Japan's rise to economic dominance sent ripples throughout the industrialized world. Since the early 1960s, Japan has systematically increased its share of world trade in industrial and consumer goods, although persistent economic problems during the 1990s have arrested its rapid growth.

A number of reasons have been tendered to explain the success of the Japanese. When Japanese automobile manufacturers' market position began to strengthen in the 1970s, it was easy to suppose that the 1973 Arab oil embargo and subsequent escalation in gas prices was the antecedent. Customers went searching for small, fuel-efficient vehicles. Since the Japanese were already entrenched in the small car market, they had a considerable natural competitive advantage. However, it was expected that this advantage would wane as the Big Three automakers had time to react by incorporating small cars into their product line and as oil prices began to decrease.

However, as the Big Three were able to produce smaller cars and gas prices fell, the Japanese market share of the automobile industry continued to increase. This reasoning did not account for the simultaneous surge in Japanese market share in areas such as steel, consumer electronics, copiers, and heavy equipment. After all, if the oil embargo was responsible for the increase in Japanese market share, why didn't other traditional small car manufacturers (such as Renault and Volkswagen) have comparable success? Manufacturers began to realize that the Japanese success story was more than simply a matter of timing.

HISTORY

When Japanese industry was in its infancy stage, the Japanese market was too small to absorb the increasing domestic production. Japan needed a global market in order to further develop. By creating an export market, Japan was able to structurally transform its economy, thereby granting it access to the technology it needed to develop.

The Japanese goal became one of full employment through industrialization. This called for dominating the market in very select product areas. They carefully chose areas in which they had the confidence to dominate and concentrated on them rather than diluting their efforts over many areas.

A number of tactics were utilized to support this strategy. First of all, the Japanese imported their technology, thus avoiding the risks involved with major R&D expenditures. Instead, they negotiated license agreements to make workable new products. Then the best engineering talent was directed to the plant floor rather than to the product design department, thereby concentrating their ingenuity on high productivity and low cost rather than innovative design. Finally, they strove continuously to improve quality and reliability to the highest possible levels and then beyond, to levels competitors could not or would not supply. Implementation of these tactics was guided by a solid respect for people and the belief that waste must be eliminated (these two areas are discussed in depth below).

The Japanese example of success shows that neither massive research and development investment nor abundant natural resources is necessary for sustainable industrial development. For years Japan was well known as an imitator, not an innovator; they copied, borrowed, and licensed technology from other countries. By building competence in adapting existing product designs and speeding up the processes, the Japanese were able to manufacture superior quality at competitive prices, giving them a distinct advantage in world markets.

Japan showed the world that efficient production and quality control methods could overcome transportation cost disadvantages and tariff costs. They proved that cultural differences could be overcome and that the critical cultural points necessary for successful production could be transferred across national boundaries.

Japan's success as an economic superpower strongly implied that the West might lose its world dominance as the leader in technology. Emboldened by the success of the Japanese, other Pacific Rim countries began to follow their example, thus accelerating the diffusion of innovative technology throughout the industrial world. Eventually, new centers of industrial superiority were created as a result.

Japan's success is also an indicator of the importance of quality as a strategic variable. When it looked like Japan could only hope to carve out a niche as a producer of outdated Western goods for the Asian market, Japanese leadership came to the conclusion that it could play a leading role in global industry by changing its quality image; a change made by producing quality goods for a sustained period of time. The Japanese learned from the

price they paid for their reputation for inferior-quality products. They learned that quality reputations are built by producing quality products with a painstaking attention to detail and craftsmanship. They were also willing to make the necessary investment in human resources and technology needed to improve their quality image.

In the early 1960s North American, British, and German motorcycle manufacturers lead the market. Today, Harley-Davidson is the only serious competitor for Japanese-made motorcycles. In fact, Harley-Davidson teetered on the brink of nonexistence until wholeheartedly adopting Japanese manufacturing techniques, most notably just-in-time and Total Quality Management. Another example, Xerox, suffered embarrassing market share losses to Japanese manufacturers Canon, Sharp, and Minolta.

The emphasis placed on quality by Japanese manufacturers has been continuous since the inspiration derived from the first visit of Dr. W. Edwards Deming. Today, Japan is certainly seen as the worldwide symbol of quality. While Western firms measure quality in parts per thousand (the acceptable quality level or AQL), the leading Japanese manufacturers are achieving defects that are barely measurable, perhaps 3.4 defective parts per million. The Japanese turnaround in quality can clearly be attributed to such variables as worker training, employee involvement, and firm-wide delegation of authority and responsibility for quality. A change in attitude and vision on the part of Japanese top management brought quality to the forefront as a strategic mission, one that allowed them to liberate the creative talent and resources necessary for long-term improvement and the eventual mastery of the quality concept.

In the last two decades, however, managers have been less successful in convincing young Japanese citizens to continue in the manufacturing field. This problem threatening the future of Japan's manufacturing business is the *rikei banare* or "flight from science." According to Japanese educators and executives, Japanese students are choosing better-paying or more creative fields rather than following ancestors into manufacturing, which could lower the number of knowledgeable managers for that industry. One ministry of internal affairs estimate shows that Japan's digital technology industry was already short almost half a million engineers in 2008. The shortage is causing anxiety about Japan's competitiveness, particularly with China, a country that produces about 400,000 engineers every year and is hoping to replace Japan as Asia's greatest economic power.

RESPECT FOR PEOPLE

There are a number of facets to the Japanese respect for and treatment of workers. One of the most prominent is lifetime employment, which gained notoriety from William Ouchi's book *Theory Z*. When many Japanese workers are hired for permanent positions in major industrial firms, they can generally consider it a job for life. However, this kind of benefit applies only to permanent workers, about one-third of the Japanese workforce. It is felt that if workers can stay with one firm for life, they more easily identify with the firm's goals and objectives.

Unlike the case for American labor unions, workers who are members of Japanese labor unions identify more with the company than the type of work they are doing. Also, Japanese unions tend to share the management's view. The better the company performs, the more the worker benefits. As a result, Japanese management believes in giving the workers more opportunity to expand their job boundaries rather than waiting until the worker proves himself. The Japanese also spend more on education and training, for all levels, than any other industrial nation. Also, because the Japanese believe that robots free people for more important tasks, they have invested heavily in robotics and automated equipment, making theirs perhaps the most automated manufacturing sector in the world.

Another area in which Japanese management has successfully tapped into worker potential is in the use of small group improvement activities (SGIA). One example is quality circles, a small group of volunteer employees who meet once a week, on a scheduled basis, to discuss their functions and the problems they are encountering. They then propose solutions and make a sincere attempt to implement real change.

Finally, the Japanese believe in what they call "bottom round" management. This concept, sometimes called consensus management or committee management, is an innate part of Japanese culture. It involves a slow decision-making process that attempts to reach a true consensus rather than a compromise. While the decision-making process is slow, the implementation process is quite fast.

Throughout the examples used in literature to describe Japanese management practices, researchers often attribute three essential features: people orientation, long-term view, and process culture. Process culture refers to how the work gets done, rather than the end result. As a result of this focus, Japanese managers expect and reward effort even though it may not immediately result in short-term gain.

ELIMINATION OF WASTE

When the Japanese say "elimination of waste" they mean anything other than the absolutely essential minimum amount of workers, equipment, and materials necessary to meet demand. This means no safety stock, no inventory stored for use in smoothing production requirements, and so forth. If it can't be used right now, it is considered waste.

A number of concepts are central to this idea of waste elimination. Instead of building a large manufacturing plant that does everything, the Japanese tend to build small plants that are highly specialized and form them into focused factory networks. It is difficult to manage a large facility; the bigger it is, the more bureaucratic it tends to be. Bureaucracy is not conducive to the Japanese style of management. Also, a specialized plant can be more economically constructed and operated.

Along with the idea of smaller plants, the Japanese make considerable use of group technology. Japanese engineers examine each operation required to make a part and attempt to group dissimilar machines into clusters designed to be work centers for a given part or family of parts, thus eliminating or at least greatly shortening the time necessary for set-up and changeover.

Just-in-time (JIT) production is an important part of waste elimination. In fact, JIT has often been defined as the elimination of waste. JIT is the production of precisely the necessary unit in the correct quantity at the correct time in order to maintain perfect performance to schedule. Over-producing is considered just as bad as under-producing since unnecessary inventory would be wasteful.

For JIT to work effectively, production must flow smoothly. Any changes can cause disturbances in the flow, which can be amplified throughout the supply chain, causing disruptions and delays. In order to ensure a more uniform flow, the Japanese adopt a uniform plant load. This means that they simply plan to build the same mix of products each day. If you run some of everything you need each day, it only takes one day before you have more (as opposed to large lot sizes which tie up capacity for lengthy periods, causing delays in shipping).

Uniform plant loading requires that everything be produced in small lot sizes, implying that the number of set-ups required will increase. The principle of economic order quantity (EOQ) states that as lot sizes increase set-up costs decrease but as lot sizes decrease set-up costs increase. Therefore, this emphasis on small lots requires that set-up times be minimized. Instead of taking established set-up times as a given, the Japanese have managed to reduce set-up times tremendously, often to the point of single digits (i.e., less than ten minutes).

The Japanese also use a self-regulating system for production control known as *kanban*. It uses dedicated containers and recycles traveling requisitions/cards (often known as *kanbans* themselves) to regulate the system. It is also referred to as a "pull" system since the authority to produce or supply comes from downstream operations.

Finally, the Japanese utilize a number of quality control techniques to ensure maximized quality and minimized waste. Among these are *jidoka*, *bakayoke*, and poka-yoke.

Jidoka is a quality concept that means "stop everything" whenever an error occurs. It is controlling quality at the source. Instead of using inspectors to find problems someone else created, the Japanese worker is his own inspector, responsible for his/her own quality. When an error or defect is discovered, the worker has the authority and the responsibility to halt the production process. Usually, this is controlled by some mechanism such as push buttons. When the line stops, lights flash, bell ring, and flags wave as all attention is directed at the problem.

The Japanese also believe that, whenever possible, inspection should be performed by a machine, for the sake of speed and accuracy. A technique known as *bakayoke* is used for this purpose. *Bakayokes* are devices that are attached to machines to automatically check for abnormalities in the process, such as malfunction or tool wear, as well as measuring dimensions and warning when tolerances are close to being exceeded. For manual assembly, the Japanese utilize *poka-yoke* or "mistake proofing."

Today, all these Japanese techniques have been repackaged and are now know as "lean" management techniques. With the introduction of the lean label has also come a broader application of these principles to where they are now being used in the service sector and in the front office, with the same high degree of success.

JAPANESE *KEIRETSU*

A *keiretsu* is an organizational structure unique to Japanese major corporations. While not all major Japanese businesses are keiretsu, most of Japan's major corporate entities are. Moreover, the influence of the keiretsu on the Japanese business world is important even to non-keiretsu organizations. There are two types of keiretsu: the classical keiretsu and the vertically integrated keiretsu.

The so-called Big Six Japanese business groups are all examples of classical keiretsu. These are the Fuyo/Fuji Group, Sumitomo, Sanwa, Mitsui, Mitsubishi, and Daiichi-Kangyo Ginko. Classical keiretsu are bank-centered with no specific central industry.

While not considered classic keiretsu, many major single-industry companies in Japan are increasingly becoming viewed as vertical keiretsu. These include Hitachi, Toyota, Nissan, Toshiba, and Matsushita. These keiretsu are more pyramid-shaped, with a single industry or company at the pinnacle of the pyramid and the member companies collected beneath.

KEIRETSU DEFINED

Japan's keiretsu are not single entities. Each keiretsu is formed of an interdependent collection of individual firms woven into a common enterprise. In this, the keiretsu are similar to the Korean *chaebol*, but there the similarities stop.

The keiretsu form a type of family of member companies, each connected to the others through cross-shareholdership. In other words, each company within the keiretsu holds significant shares of stock in each of the other keiretsu members. The companies remain independent of each other, and are not subsidiaries of holding companies, as holding companies were outlawed after World War II.

Additionally, the size of the keiretsu corporate families can be deceptive. Most keiretsu have well over one hundred members, while many far exceed that amount. While shareholder control is coordinated, technically the stock of each member firm in the keiretsu can be traded independently.

CLASSICAL KEIRETSU

In the classical keiretsu, member firms share in the compositions of their boards of directors or council of presidents. While legally independent of each other, the boards of directors for each member firm are largely made up of the same members. Although a coordinating role may be given to the head of the central bank around which the keiretsu is formed, there is no central president in a classical keiretsu. In any case, it is the coordination of shareholderships and directorships that allows the members of the classical keiretsu to act in concert financially, since members use the keiretsu's select bank and insurance companies. The banks, in turn, give favored treatment to keiretsu members, enabling comparatively easy access to financing of keiretsu projects.

Classical keiretsu often have no single industry on which they focus their output. Yet is their goal to create what is called a "one-set" principle. In the "one-set" principle, keiretsu members attempt to create a situation in which they would never have to rely on non-keiretsu firms to produce an end-product.

VERTICALLY INTEGRATED KEIRETSU

More common than the classical keiretsu is the vertically integrated corporate giant that focuses on a single industry. Technically these giant companies may not be viewed as keiretsu, since they have no central bank and do tend to have a specific company with a single leader as their chairperson. Yet these corporate giants are increasingly beginning to resemble keiretsu in most other respects. As a result, it is unclear as to what is and is not an actual keiretsu.

Giant Japanese companies such as Toyota have begun to control enough subsidiary companies to attain a "one-set" principle. These large companies have become a sort of vertically organized keiretsu that have grown out of a central manufacturing company. Thus companies like Toyota can be viewed as a single-industry keiretsu.

For example, beneath the central Toyota Motor Corporation are several direct group companies each tied only to a specialized function in the production of Toyota automobiles. These include Toyota Central R&D Laboratories, Kanto Auto Works (car assembly), Toyota Auto Body, Aichi Steel, Toyoda Gosei (resin and rubber products), Toyoda Boshoku (air filters), Toyota Tsusho Corporation (the keiretsu's wholesaler), Towa Real Estate, Aisin Seiki (auto parts), and the giant Denso (electronics).

Many of these direct group companies, in turn, control several of their own subsidiaries. Thus, Denso (also called Nippondenso) controls Nippon Wiperblade, Asmo, Tsuda Industries, and Anjo Denki, and so on. Similarly, Aisin Seiki controls Aichi Giken, Aisin Takaoka, and Aisin-AW.

In this way, Toyota's orientation is vertical and spreads downward in a pyramid of related companies. Like the classical keiretsu, Toyota also has many closely affiliated companies it does not control directly. Thus several companies are part of the greater Toyota Group without formally being part of its actual structure. These are controlled not by bank loans, as in the classical keiretsu, but by supplier dependence.

RELATIVE INDEPENDENCE OF MEMBER FIRMS

Most keiretsu member firms act with considerably greater independence than subsidiary firms of large U.S., Canadian, or European companies. The Japanese firm that is a keiretsu member is highly specialized, and thus less self-sufficient than its non-Japanese counterparts. Yet while this dependence in effect coordinates their actions with the keiretsu as a whole, the leaders of the keiretsu member firms make agreements and arrangements separate from their central bank or parent company.

Indeed, several vertically organized keiretsu members, far from acting in the subservient role of the Western corporation's subsidiary, have grown to be the dominant members of their keiretsu. Toyota Motor Corporation, for instance, grew from a dependent member of the Toyoda Automatic Loom keiretsu in 1937 to become the dominant member of today's Toyota keiretsu, under whose umbrella its former parent company now stands.

ORIGINS OF THE KEIRETSU

Whatever the direction of the classical and vertically integrated keiretsu, it is in the past that the keiretsu as an organizational structure has its source. The keiretsu have a long history in Japanese society. The keiretsu evolved directly from Japan's pre-World War II industrial groups called *zaibatsu*. These zaibatsu were family-dominated,

and resembled the chaebol structures that dominate South Korea industry today. Most of the leading zaibatsu families came to power during Japan's rapid industrialization following the Meiji Restoration in 1868; however, the companies' corporate organization and even some of the key families had their roots in Japan's feudal period. By 1945, four zaibatsu (Mitsui, Mitsubishi, Sumitomo, and Yasuda) controlled fully one-fourth of all Japanese business.

After World War II, U.S. occupation forces dismantled the four main zaibatsu as well as six smaller ones, blaming them for Japan's militarism. The zaibatsu members, in turn, simply came together again to form new entities centered on common business needs and relationships. The keiretsu that took their place were essentially identically to the pre-war zaibatsu with one main difference: the keiretsu centered on a bank and common financial resources in place of the earlier kinship ties of key individuals. Ironically, when reformed as keiretsu, the former zaibatsu members were given an excuse to drop the less profitable member firms, thus making the punitive measures imposed by the American occupation forces a sort of blessing in disguise. Three of the four leading pre-war zaibatsu reformed under the same name. The last of the four great pre-war zaibatsu, Yasuda, joined with many firms from the smaller dismantled zaibatsu (such as the Asano and Nezu zaibatsu) to form the Fuyo Group centered around Fuji Bank.

NEGATIVES OF JAPANESE MANAGEMENT

Despite the success of Japanese management techniques, some do not see them the panacea others credit them as being. Even though research has shown that management techniques developed in Japan can be successfully applied in other countries with remarkable results, critics claim that their success comes not from catering to intrinsic values but to an array of stifling constraints unlikely to be tolerated in the West. Rather than a carefully nurtured atmosphere of trust and common enterprise, they see a restrictive system of internal controls. Much of this criticism has come from labor unions. It has been noted that workers in JIT systems have more stress than their counterparts in more traditional systems. Stress is seen to originate not only from additional authority and responsibility, but also from the fast-paced system where there is little slack and a continual push to improve. Apparently, some see the authority and responsibility delegated to the worker as a way for management to further burden the worker without a comparable increase in take-home pay. Constant improvement through use of *kaizen*, just-in-time, and Total Quality Management is felt to be within the purview of management, not the worker.

There is really no mystery to the success attributed to Japanese management. The Japanese were convinced that a shift, caused by natural competitive forces, was taking place worldwide. They then rode this change, which was international in scope, to financial success by becoming the premier producer of products known for quality. They were prepared to sacrifice short-term financial results in order to invest for the long-term in superior quality, a variable consumers would soon demand.

Consumers are still showing their confidence in Japanese goods by purchasing what they see as commensurate quality at a fair price. Japanese-produced television sets, for example, have an average life span that is twice that of similar sets produced in North America. Any country that can manage to achieve this kind of quality and parlay it into a strategic weapon should continue to have a competitive position within the markets in which it competes.

BIBLIOGRAPHY

Bazargan, Darius. "Is Japanese Management Technique Best for Africa?" *African Business* May 1997, 18–19.

Clark, Rodney. *The Japanese Company.* New Haven, CT: Yale University Press, 1979.

Crawford, Robert J. "Reinterpreting the Japanese Economic Miracle." *Harvard Business Review* January/February 1998, 179–184.

Entienne-Hamilton, E.C. *Operations Strategies for Competitive Advantage: Text and Cases.* Fort Worth: The Dryden Press, 1994.

Fackler, Martin. "High-Tech Japanese, Running Out of Engineers." *New York Times* 17 May 2008. Available from: http://www.nytimes.com/2008/05/17/business/ worldbusiness/17engineers.html?n=Top/News/World/ Countries%20and%20Territories/Japan.

Ghinato, Paulo. "Quality Control Methods: Towards Modern Approaches Through Well Established Principles." *Total Quality Management* 9, no. 6 (1998).

———. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

"Just What Is Japanese Management Style?" Available from: http://www.winadvisorygroup.com/MysteryofJapanese Management.html.

Khol, Ronald. "Maybe We Can Learn Something from Japanese Managers After All." *Machine Design* 70, no. 8 (1998).

Murdoch, Adrian. "Eastern Promise." *Accountancy* 122, no. 1262 (1998): 43–44.

Ohsono, Tomokazu. *Charting Japanese Industry: A Graphical Guide to Corporate and Market Structures.* London: Cassell, 1995.

Plenert, Gerhard. *The eManager: Value Chain Management in an eCommerce World.* Dublin, Ireland: Blackhall Publishing, 2001.

Schonberger, Richard J. *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity.* New York: The Free Press, 1982.

Stevenson, William J. *Production Operations Management.* 6th ed. Boston: Irwin/McGraw-Hill, 1999.

JOB ANALYSIS

A job analysis is a step-by-step specification of an employment position's requirements, functions, and procedures. Just as a seed cannot blossom into a flower unless the ground is properly prepared, many human resource management (HRM) practices cannot blossom into competitive advantage unless grounded on an adequate job analysis.

Successful HRM practices can lead to outcomes that create competitive advantage. Job analyses, properly performed, enhance the success of these HRM practices by laying the foundation. Job analysis information can be applied to a variety of HRM practices. We now take a brief look at some of them.

ESTABLISHING FAIR AND EFFECTIVE HIRING PRACTICES

An employer's recruitment and selection practices seek to identify and hire the most suitable applicants. Job analysis information helps employers achieve this aim by identifying selection criteria, such as the knowledge, skills, and abilities (KSAs) needed to perform a job successfully. A firm's managers and human resource (HR) professionals can then use this information to choose or develop the appropriate selection devices (e.g., interview questions, tests). This approach to selection is legally required.

An employer facing discrimination charges must demonstrate to the courts that its selection criteria are job-related. To support this type of claim-relatedness, a firm must demonstrate that the challenged selection practice was developed on the basis of job analysis information. As one judge noted during a discrimination hearing, without a job analysis on which to base selection practices, an employer "is aiming in the dark and can only hope to achieve job-relatedness by blind luck."

In the 1990s, the need for firms to base selection criteria on job analysis information became even more important due to the passage of the Americans with Disabilities Act. This law states that employment decisions concerning disabled candidates must be based on their ability to perform the essential functions of the job. For instance, if report reading were an essential job function, then applicants whose disabilities prevented them from reading could be lawfully denied employment (assuming there was no way to accommodate them). If, however, report reading were not an essential function, the inability to read could not lawfully serve as a basis for denial. The determination of which job functions are essential is made during a job analysis.

DEVELOPING TRAINING AND APPRAISAL PROGRAMS

Firms can also use job analysis information to assess training needs and to develop and evaluate training programs.

Job analyses can identify tasks a worker must perform. Then, through the performance appraisal process, supervisors can identify which tasks are being performed properly or improperly. The supervisor can next determine whether improperly performed work can be corrected through training.

HR professionals also use job analysis information to develop relevant training programs. The job analysis specifies how each job is performed, step by step, allowing HR professionals to develop training materials to teach trainees how to perform each task. To evaluate the effectiveness of a training program, the organization must first specify training objectives or the level of performance expected of trainees when they finish the program. The success of a training program is judged on the basis of the extent to which those performance levels have been reached. Expected performance levels are often specified during a job analysis.

Information obtained from a job analysis can be used to develop performance appraisal forms. An example of a job analysis-based form would be one that lists the job's tasks or behaviors and specifies the expected performance level for each. The role of job analysis is crucial here. Without job analysis information, organizations typically use a single, generalized form in which all workers are appraised on the basis of a common set of characteristics or traits that are presumed to be needed for all jobs (e.g., cooperation, dependability, leadership).

Job analysis-based appraisal forms are superior to the generalized forms because they do a better job of communicating performance expectations and because they provide a better basis for giving feedback and for making HRM decisions.

Most companies base pay rates, in part, on the relative worth or importance of each job to the organization. Job worth is typically determined by evaluating or rating jobs based on important factors such as skill level, effort, responsibility, and working conditions. The information provided by a job analysis serves as the basis for job worth evaluations.

Job analysis also plays an important role in the development of productivity improvement programs. Various pay-for-performance programs provide rewards to employees who perform their jobs at or above some desired level. Job analysis is used to identify that level of performance.

REMEDIAL USES

Managers must sometimes discipline employees for their failure to properly carry out their job responsibilities. For instance, workers may be disciplined for refusing to perform tasks that they believe are not part of their jobs. If the responsibilities and limits of authority of a job are

delineated in a job analysis, this information may be used to help resolve such problems.

Job analysis information can also be useful from a safety and health point of view. While conducting a job analysis, an employer may uncover potential dangers or hazards of a job. The job analysis may also identify unsafe practices, such as tasks that are performed in a way that could cause injury.

DETERMINING THE TYPE OF INFORMATION TO BE COLLECTED

A wealth of information may be gathered during a job analysis. Job analysis information may be divided into three categories: job content, job context, and worker requirements. Job content refers to workers' job activities or what workers actually do on the job. Job context refers to the conditions under which the work is performed and the demands such jobs impose on the worker. Worker requirements refer to the worker qualifications needed to perform the job successfully. The specific information falling within each category is described next.

Content. When gathering information about tasks, the job analyst seeks to determine what the worker does, the purpose of the action, and the tools, equipment, or machinery used in the process. The analyst may also gather additional information about tasks, such as their relative importance, the expected performance levels, and the type of training needed by a new worker to perform tasks satisfactorily. Job content can be described in a number of ways, depending on how specific one wants (or needs) to be. The different types of job content information are described in Exhibit 1.

Context. Job context refers to the conditions under which work is performed and the demands such work imposes on employees. Specific types of job context information typically identified during a job analysis include reporting relationships, supervision received, judgment, authority, personal contacts, working conditions, and the physical and mental demands on the worker.

Requirements. Worker requirements refer to the knowledge, skill, ability, personal characteristics, and credentials needed for effective job performance. These terms are defined as:

- *Knowledge*—the body of information one needs to perform the job.

- *Skill*—the capability to perform a learned motor task, such as forklift operating skills and word-processing skills.

- *Ability*—the capability needed to perform a nonmotor task, such as communication abilities,

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Exhibit 1

The Different Types of Job Content Information

Broad Level

Function or Duty
- Definition: The major areas of the job-holder's responsibility.
- Example: A professor's functions are teaching, research, and service to the university/community.

Intermediate Level

Task
- Definition: What a worker does when carrying out a function of the job; it is an activity that results in a specific product or service.
- Example: The function of teaching requires a professor to perform several tasks like lecturing, giving/grading exams, and meeting with students.

Work Behavior
- Definition: An important activity that is not task specific; such behavior is engaged in when performing a variety of tasks.
- Example: "Communicating"—a professor engages in this behavior when performing several tasks, such as lecturing and meeting with students.

Specific Level

Subtasks
- Definition: The steps carried out in the completion of a task.
- Example: The task of providing lectures consists of several subtasks, such as reading the text and other relevant materials, deciding on what information to convey, and determining how this information can be communicated in a clear and interesting manner.

Critical Incidents
- Definition: Specific activities that distinguish effective from ineffective job performance.
- Example: "The professor uses several examples when explaining difficult concepts."

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mathematical abilities, and reasoning or problem-solving abilities.

- *Personal characteristics*—an individual's traits (e.g., tact, assertiveness, concern for others, objectivity, work ethic) or their willingness/ability to adapt to the circumstances in the environment (e.g., ability to withstand boredom, willingness to work overtime, willingness to treat others cordially).

- *Credentials*—proof or documentation that an individual possesses certain competencies, such as diplomas, certifications, and licenses.

The sheer amount of information that can be uncovered during a job analysis may be overwhelming, but it is usually unnecessary to gather all possible data. The purpose or intended use of the job analysis dictates the particular information to be gathered. Therefore, the analyst must decide how the job analysis will be used before deciding what information to seek.

For instance, if a job analysis were to be used to develop a technical training program for new employees,

the analyst should focus on information about subtasks (a step-by-step description of how the job is carried out) and the specific KSAs one would need to do well on that job. If the purpose were to develop a written employment test to assess applicants' knowledge of the job, the analyst should target information about the specific tasks of the job and the knowledge required to perform each task (i.e., the facts, theories, principles, etc., one must know to be able to perform tasks satisfactorily).

DETERMINING HOW TO COLLECT THE INFORMATION

HR professionals often gather job analysis information. However, because these individuals lack sufficient expertise in the jobs being analyzed, they must enlist the actual job incumbents and their supervisors to gather and interpret the pertinent information. Job analysis information may be gathered by interviewing these individuals, observing them at work, and/or having them complete job analysis questionnaires. The appropriateness of each approach depends, in part, on the type of information sought.

Interviews. Job analysis interviews are structured conversations between the job analyst and one or more subject-matter experts. Interviews are typically held with both job incumbents and their supervisors. Interviews with incumbents tend to focus on job content and job context information. That is, incumbents are asked to describe what they do, how they do it, and the conditions under which they perform their jobs.

The typical role of the supervisor is to review and verify the accuracy of the incumbents' responses, and to provide further information concerning task importance, expected performance levels, training needs of new workers, and worker requirements.

As the most frequently used job analysis method, interviews provide a potential wealth of information. However, one-on-one interviews can be quite time-consuming. An interview usually takes between one and eight hours, depending on the amount and depth of information sought. Thus, interviewing can take a great deal of time, especially when the analyst must interview several people. When time constraints pose a problem, the best alternative is to conduct a group interview, where several subject-matter experts are interviewed simultaneously.

Observations. Sometimes a job analyst will supplement interviews with job analysis observations. As the name suggests, observation means watching the incumbent perform the job. Observation is most useful when jobs are complex and difficult to accurately describe. When analyzing such jobs, the analyst observes or videotapes the job and then interviews the worker for clarification or explanation. The observation allows the analyst to gain a better understanding of how the work is done and the KSAs needed to perform it.

While observation is usually used as a supplement to the interview, HR professionals sometimes base job analysis solely on observation. Whether or not observation yields sufficient data for the analysis depends on the type of information being collected.

For instance, it is an excellent method for identifying subtasks performed in routine/repetitive types of jobs, such as assembly-line work. When using this approach, however, analysts should be alert to the possibility that some workers may behave atypically when observed. For instance, they may increase their speed to impress the observer, or slow down in an effort to demonstrate how difficult their jobs are.

Questionnaires. Job analysis questionnaires ask subject-matter experts—workers and/or supervisors—to record job information in writing. Job analysis questionnaires contain either open-ended or closed-ended questions. Open-ended questions ask respondents to provide their own answers to the questions. Closed-ended questions ask respondents to select an answer from a list provided on the questionnaire. Closed-ended questions are more commonly used because they provide greater uniformity of responses and are more easily scored.

A job analysis questionnaire containing only closed-ended questions is called a job analysis inventory. An inventory containing a list of task statements is called a task inventory; one containing a list of worker ability requirements is called an ability inventory. Job analysis inventories ask respondents to rate each item in terms of its importance to the job. Task inventories also request information regarding the frequency or time spent performing each task.

Companies use job analysis inventories when information is needed from several people (e.g., when many people hold the same job title). Compared to interviews, information can be collected much more quickly using this approach. Companies also use inventories as a means of grouping jobs. Grouping refers to categorizing jobs based on the similarity of tasks performed or skills needed; a group would consist of jobs in which all workers performed similar tasks or needed similar skills.

Once groups are established, the organization can determine selection criteria, training needs, and evaluation criteria applicable to all jobs within a group. Job analysis inventories are also used to determine workers' training needs. Workers are presented with a list of tasks or abilities and are asked to indicate those for which they

need training. A five-point rating scale, ranging from "great need" to "no need," is typically used.

DETERMINING HOW JOB ANALYSIS INFORMATION WILL BE RECORDED

Once HR professionals have collected job analysis information, it must be recorded in some systematic way to produce a job description (i.e., a summary of job analysis findings). The format of job descriptions may be general purpose or special purpose.

General Purpose Job Description. A general purpose job description is one that contains a variety of information that can be used for several purposes, such as communicating job responsibilities to employees and specifying minimum job requirements. For instance, a manager would pull out a job description to review essential functions and worker requirements prior to developing interview questions for a job applicant.

The particular information contained in the job description varies depending on company preference and the intended use of the instrument. A typical general purpose job description contains the following sections: job identification, job summary, essential functions, and worker requirements.

General purpose job descriptions used by most companies provide only a brief summary of job analysis information, and thus lack sufficient detail for some HRM applications. For instance, many fail to indicate subtasks, performance standards, and job context. Subtask information may serve as a basis for developing training programs, performance standards may serve as a basis for developing certain types of performance appraisal forms, and job context information may serve as a basis for making job evaluation ratings that are needed to establish pay rates.

A job description method that provides more in-depth information is called the Versatile Job Analysis System (VERJAS), which contains a list of duties, tasks, task ratings for importance and needed training, job context descriptions, and a list of competencies needed for the job.

Special Purpose Job Descriptions. Several special purpose job descriptions have been developed by a variety of HRM experts during the past thirty years. A key difference between general and special purpose job descriptions lies in the amount of detail they include. Special purpose formats cover fewer topics, but the topics covered are analyzed in more depth. Some of the more commonly used special purpose approaches are described next.

Functional job analysis (FJA) focuses primarily on recording job content information. Each task is analyzed separately on a worksheet that contains a task statement (specifying what the worker does, how it is done, and the results or final product of the worker's actions), the performance standards and training needs associated with the task, and seven rating scales. Three of the scales are known as worker function scales, indicating the level of worker involvement with data, people, and things. The other four scales indicate the level of ability needed in the areas of reasoning, mathematics, language, and following instructions.

Another special purpose method of job analysis is called the critical incident technique (CIT). It originated in the military during World War II and was used to identify critical factors in human performance in a variety of military situations. Critical factors are those that have been demonstrated to make the difference between success and failure in performing a job.

The critical incident technique requires the job analyst to collect critical incidents from people familiar with the job. The incidents are usually collected in the form of stories or anecdotes that depict successful and unsuccessful job behaviors. The stories are then condensed to a single statement that captures the essence of the story. The CIT has several useful HRM applications. For instance, it is a good tool for identifying selection criteria and training needs and for developing performance appraisal forms.

Almost all human resources policies can be linked to job analysis. For example, each time a job function is changed, the competencies have the potential to change. This impacts skills required for new hires, as well as the training required, and how the organization will reward and recognize the competencies. Ultimately, this ties into performance management, which impacts job analysis. The impact of one simple change in the job analysis has a domino effect on many subprocesses within HRM. In fact, most HR policies identify the frequency with which job analysis must be completed.

HR professionals are challenged to keep abreast of changes in their workforce. They must make complex decisions using job data and facilitate communication across jobs, job families, or departments in their organization. In the twenty-first century, new technology had been introduced that offers easier ways to collect, store, analyze, and configure data. Metrics applied to that job data can aid decision making in areas such as recruitment, selection, transferability, promotion, training, and development—all things that link to the job analysis.

It's easy to see that job analysis is a key component of the HRM process. While the performance of comprehensive job analyses can be time consuming, ultimately employers will benefit from the many uses that a thorough job analysis can provide. From hiring and training to salary justification to remedial uses, job analysis will

make the HR manager's job easier, protect an organization from claims of discrimination, and can give the overall organization a competitive advantage.

SEE ALSO *Employee Recruitment Planning; Employee Screening and Selection; Employment Law and Compliance; Occupational Information Network*

BIBLIOGRAPHY

Brannick, Michael T., and Edward. L. Levine. *Job Analysis: Methods, Research, and Applications for Human Resource Management in the New Millennium.* Thousand Oaks, CA: Sage Publications, 2002.

Cooper, Kenneth C. *Effective Competency Modeling and Reporting: A Step-by-Step Guide for Improving Individual and Organizational Performance.* New York, NY: AMACOM, 2000.

Fine, Sidney A., and Steven F. Cronshaw. *Functional Job Analysis: A Foundation for Human Resources Management.* Mahwah, NJ: Lawrence Erlbaum Associates, 1999.

Gatewood, Robert D., and Hubert S. Field. *Human Resource Selection.* Fort Worth, TX: Harcourt College Publishers, 2001.

Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* Cincinnati, OH: Atomic Dog Publishing, 2004.

McEntire, Lauren E., et al. "Innovations in Job Analysis: Development and Application of Metrics to Analyze Job Data." *Human Resource Management Review* 16, no. 3, (2006); 310–323.

Ramachandran, Sunder. "Understanding HR Management" *Hindu Business Daily* 26 May 2008. Available from: http://www.thehindubusinessline.com/manager/2008/05/26/stories/2008052650551100.htm.

Schippmann, Jeffrey S. *Strategic Job Modeling: Working at the Core of Integrated Human Resources.* Mahwah, NJ: Lawrence Erlbaum Associates, 1999.

JOINT VENTURES AND STRATEGIC ALLIANCES

As economies become more globalized, more and more firms are participating in foreign markets. The most popular participation strategies include exporting, licensing, outsourcing, strategic alliances, joint ventures, and direct foreign investment. Each of these involves different levels of risk, capital, and returns.

The use of strategic alliances and joint ventures is rapidly becoming popular with a growing number of multinational firms. According to Cullen in his 1999 book, an international strategic alliance is an "agreement between two or more firms from different countries to cooperate in any value-chain activity from R&D to sales". A strategic alliance, as differentiated from a joint venture, is a collaboration designed to achieve an isolated objective and involves no equity stake from the partners. Hitt, Ireland, and Hoskisson offered this definition: "joint venture is when an independent firm is created by at least

two other firms." A strategic alliance is a less rigid agreement than a joint venture. These cooperative strategies offer many potential advantages to the participant, but they are also pitted with special problems.

ADVANTAGES

Firms may have many motivations to form strategic alliances, and most of these reasons are based on the logic that each partner can bring complementary strengths to the table, resulting in a competitive advantage for the participants collectively. Partners in a strategic alliance can benefit from many aspects of a cooperative relationship: access to unfamiliar or untapped markets, risk sharing, economies of scale, shared technology, and decreased costs.

A partner's knowledge of the local market can be invaluable to a firm if it wants to get its services and products into a new market. This advantage is most easily achieved when the local firm is in a related industry with related products. The local partner knows the buying habits and preferences of the local buyers and suppliers, and he should also have knowledge of the existing channels of distribution. These relationships with others in the value chain may be otherwise unobtainable to an outside firm.

Consider a company that is contemplating entering foreign markets. Local governments often require, as a condition of entry, that entering companies allow some local ownership. This stipulation is found more often in developing countries than in more developed nations because the developing countries are trying to avoid being exploited for their resources. Through a joint venture the outside company can meet this requirement; in fact, the government of a developing country is often the partner in a joint venture.

Joint ventures and strategic alliances force companies to share revenues and profits, but they also share the risk of loss and failure. Thus, the popularity of the cooperative strategies increases as projected risk increases, because joint ventures allow firms to take on projects that are otherwise too risky or too costly.

Economies of scale can be achieved when two or more firms pool their resources together, maximizing efficiency based on the project's needs. Cooperative strategies also allow small companies to join together to compete against an industry giant. Companies of different sizes may also benefit from joining together. The large company offers its capital and resources in exchange for the efficiencies or innovations found at the smaller company. An article by Shafer describes how Abrakadoodle—a company that offers creative art classes for children in schools, day care centers, and community programs—established a strategic alliance with Binney and Smith, known for its Crayola brand art products. Abrakadoodle founder Mary Rogers was seeking products of high quality that would be safe for children and that would be available

nationally, so all locations could use the same materials in their classes. Since she was already using Crayola products in her classes, she states, "We realized that once we started franchising, the number of Crayola products used in Abrakadoodle classes would grow enormously." After months of negotiation, agreement was reached between the two companies. Crayola products will be featured exclusively in Abrakadoodle classes, Abrakadoodle will be allowed to use the Crayola trademark for advertising purposes and will be eligible for discounts on Crayola products. Both companies are benefiting from their shared vision for encouraging children's artistic creativity.

In cases where firms do not have the same strengths, creating alliances can allow them to share technology. This, in turn, can help firms produce more efficiently or at a higher quality. Firms must learn to recognize which other companies can offer complementary skills or technology.

When companies from developed countries cooperate with companies in less developed countries, they usually realize huge cost savings by seeking cheaper labor and untapped reserves of material. The company from the less-developed country benefits from advanced technology and increased access to capital. Both companies benefit from the cooperative alliance. Many U.S. firms have been attacked for taking their manufacturing plants "south of the border" to Mexico and thereby harming American workers. The firms are criticized because they join with governments in developing nations so that they can obtain cheaper labor in less-developed countries, thus lowering their production costs. Many argue that it harms American workers, but opponents often overlook the advantages that the developing country receives. Often, the large American company provides jobs to areas with alarmingly high unemployment rates and offers them infrastructure and support that they never had before.

SELECTING AN ALLIANCE PARTNER

In order to realize such benefits, many considerations must go into choosing a partner for a joint venture or a strategic alliance. Choosing a strategic alliance or joint venture partner is very important and can prove to be very difficult. Inherent in partner selection is the understanding of potential partners' goals. For one thing, a potential partner must have complementary strategic objectives. A venture will not succeed if the objectives are in conflict, but the objectives do not need to be identical. For example, the alliance between Yahoo and eBay provides Yahoo with an advertising client and gives eBay (as well as its subsidiaries, like PayPal and Skype) access to Yahoo's large customer base. Together, the two companies possess a market share to rival Google's domination of the Internet advertising market. The strategic alliance is mutually beneficial for both parties. It is important that each partner understand and accept the other's objectives.

Potential partners should also possess complementary skills. Each partner must contribute more than capital to the project, bringing other competencies into the venture. One firm may bring technical skills and another may bring knowledge of the market. There are many skills that a firm can bring into the relationship: managerial expertise, production facilities, or access to limited resources. Skills are most easily meshed when partners have similar, but not identical, products. If both produce an identical product it may be difficult for them to work together. Even if skills are complementary, competition may drive them apart and cause the venture to fail.

While the partners must offer complementary objectives and skills, both partners must believe that they can trust each other and that mutual commitment is a reality. As Cullen explained, "A common theme among managers from both failed and successful strategic alliances is the importance of building mutual trust and commitment among partners. No matter how mutually beneficial and logical the venture may seem . . . without trust and commitment the alliance will fail entirely, or it will fail to reach its strategic potential." There are a variety of ways that a company can attain and sustain commitment and trust in cooperative ventures. Goal and intent revelation is a crucial step toward building trust. The partners in a joint venture will outline their duties and goals. Both parties share in the right to manage the enterprise, the right to the profits and the duty to share the losses. The contract also determines when the joint venture will be terminated.

MANAGEMENT STRUCTURE

The management structures that control cooperative efforts are varied, and they are usually unique to each relationship. Cullen identified five typical management structures used by companies for their joint ventures and strategic alliances: dominant parent, shared management structure, split-control management structure, independent management structure, and rotating management.

The dominant parent is generally the majority owner of a joint venture. In cases where there is no majority owner, the dominant parent may be the company that contributes the most valuable resources. When there is a dominant parent, this company makes more operational

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Table 1
Cullen's Five Management Structures

1. Dominant Parent
2. Shared Management Structure
3. Split-Control Management Structure
4. Independent Management Structure
5. Rotating Management

and strategic decisions. In many instances, a joint venture is treated as a subsidiary of the dominant parent. Often when large multinational firms have cooperative alliances with firms in small countries, the multinational firm comes in as the dominant parent.

The shared management structure and the split-control management structure are very similar. In these structures, both parent companies share decision-making responsibilities. In the shared structure, there are an equal number of managers in controlling positions from each company (board of directors, top management, and functional management). In split-control structures, there are not equal numbers of managers from each company at the functional level. In areas of expertise, one company may hold most or all of these positions. This can be because of differences in expertise or because one firm may insist on this type of arrangement if they do not want to share their knowledge or technology.

Independent management structures are found when the management of a joint venture acts independently of either parent firm. Because a joint venture is a separate legal entity, this is possible, but it is highly unlikely with new joint ventures. It is more common to see the independent management structure as a joint venture matures and begins to act as an independent firm. If the independent management structure is found in a young joint venture, it is often because the parents agreed to recruit externally for management positions.

In a rotating management structure, key positions of the hierarchy rotate between firms. Each firm assigns a person for their term. This structure is popular when an alliance partner is from a less-developed country. With this type of management, local management can be trained so that technology and expertise are transferred to the community, according to Cullen.

DOMESTIC JOINT VENTURES AND ALLIANCES

Not all joint ventures and strategic alliances cross international boundaries. Companies in the same country can achieve many of the same benefits found in an international cooperative agreement. For instance, in 2007, SABMiller and Coors entered a joint venture that combined their U.S. operations. The two companies merged their brand portfolio to consolidate their position in the beer market. According to SABMiller, the large scale and increased resources will enable the companies to invest more in brands and product innovation. The company predicts that lower operating costs will result in $500 million in cost synergies per year.

Just as the companies that come together are quite varied, so are their reasons for doing so. There is, how-

ever, one best reason for bringing two firms together: synergy. Synergy is the realization that the whole may be greater than the sum of the parts, according to Hitt et al. Often, when two firms are combined, they find that their new venture is greater than the sum of what each could have done independently. Many of the reasons presented create synergy, but one must analyze the venture to make sure that it creates something greater than the two companies could have been on their own. When there is synergy, new products are created for the market quicker or better than they would have been if the companies had kept their resources to themselves. If there is synergy, everyone benefits.

SEE ALSO *Competitive Advantage; Diversification Strategy; International Business; Strategy Formulation*

BIBLIOGRAPHY

Campbell, R. Harvey. *West's Encyclopedia of American Law.* Gale, Cengage Learning, 2008.

Cullen, John. *Multinational Management: A Strategic Approach.* Cincinnati: South-Western College Publishing, 1999.

Geringer, J.M. *Joint Venture Partner Selection.* Westport, CT: Quorum Books, 1988.

Harbison, J.R., and P. Pekar, Jr. *A Practical Guide to Alliances: Leapfrogging the Learning Curve.* Los Angeles: Booz-Allen and Hamilton, Inc., 1998.

Hitt, M.A., R.D. Ireland, and R.E. Hoskisson. *Strategic Management: Competitiveness and Globalization.* 2nd ed. Minneapolis/St. Paul, MN: West Publishing, 1996.

Ott, Adrian Carol. "Are Strategic Alliances 'Black-Holes' or Lightening-Rods for Business Innovation?" Articles Base, 2007. Available from: http://www.articlesbase.com/marketing-articles/are-strategic-alliances-quotblackholesquot-or-lighteningrods-for-business-innovation-281191.html.

Reuer, J.J. *Strategic Alliances: Theory and Evidence.* New York: Oxford University Press, 2004.

SABMiller Website *SABMiller and Molson Coors to Combine U.S. Operations in Joint Venture.* Available from: http://www.sabmiller.com/sabmiller.com/en_gb/News+and+Media/News+releases/Group+news/SABMiller+and+Molson+Coors+to+combine+U.S.+ operations+in+joint+venture.htm.

Shafer, Ron. "Developing Strategic Partnerships." *Franchising World* 37, no. 1 (2005): 79–81.

Wallace, R.L. *Strategic Partnerships: An Entrepreneur's Guide to Joint Ventures and Alliances.* Chicago, IL: Dearborn Trade Publishers, 2004.

Zuber, A. "CKE Inks Pact for Texaco, Shell Sites." *Nation's Restaurant News* 33, no. 28 (1999): 1.

JUST-IN-TIME PRODUCTION

SEE *Lean Manufacturing and Just-in-Time Production*

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KNOWLEDGE-BASED VIEW OF THE FIRM

Knowledge-based view of the firm (KBV) is a management concept of organizational learning that provides firms with strategies for achieving competitive advantage. This is achieved through increased employee involvement in the formulation and administration of the operational goals and long-term transformational objectives of the firm. The continuous acquisition and transfer of knowledge within business organizations is necessitated by such factors as ever-changing competitive conditions in markets initiated by globalization, frequent deregulations, and technical advancements.

KBV is an important approach towards organizational learning that forms the basis for establishing human capital involvement in the structural and routine activities of the firm. KBV proposes the establishment of heterogeneous knowledge structures across the management hierarchies of a firm as a prerequisite condition for achieving sustainable knowledge-based competitive advantage. This is because knowledge-based resources are always characterized by difficulties of transmission, imitation, and social complexities.

As much as KBV is a relatively contemporary management concept, it draws much impetus and reference from classical theories of management such as the theory of the firm, the organizational theory, and the resource-based view of the firm. In fact, the fundamental assumptions of the knowledge-based theory of the firm are particularly believed to have stemmed from the resource-based view of the firm. However, the resource-based view of the firm does not give knowledge adequate recognition and, in fact, categorizes knowledge among the simple generic resources of the firm. Knowledge-based theory of the firm makes amends of these shortfalls by expounding on the strategic significance and distinctive characteristics of the different types of knowledge-based resources that portend competitive advantage for the firm, as demonstrated by the following assumptions:

- Knowledge-based resources hold the most strategic significance in firms.

- Production activities and processes in firms involve knowledge application.

- Individuals rather than organizations are responsible for creating, holding, and sharing knowledge.

- The incapability of markets to coordinate specialized knowledge necessitated the existence of firms, with management playing the coordination roles within the firms.

- Knowledge-based resources are characterized by difficulty of imitation and social complexities.

- Knowledge draws strategic significance from its appreciative value as opposed to other traditional factors of production, which depreciate.

The broad-based nature of knowledge can be analyzed through two major fronts: knowledge as an independent idiosyncratic characteristic of the firm and knowledge management as a determinant activity in the firm.

IDIOSYNCRATIC VIEWS OF KNOWLEDGE

Knowledge is a strategic management resource that initiates competitive advantage in the firm through value addition to

business data, information processes, and system operations. Knowledge is an important tool for change management that managers can use to respond to issues of staff retention. Explicit knowledge and tacit knowledge are the two major types of knowledge that firms can observe when seeking to achieve competitive advantage.

Explicit knowledge is the generalized knowledge that can easily be expressed and identified within the organization's routines, records, and information systems. Explicit knowledge defines industry trends that are generally practiced by competing firms rather as response to market demands and requirements than specific strategies for achieving competitive advantage. As such, the market value of explicit knowledge within a firm is more or less equivalent to its market value.

Firms utilize tacit knowledge to draw competitive advantage from the individual or firm-specific capabilities that are difficult to transmit or encapsulate. In a journal article titled "Knowledge-Based View of the Firm and Its Precursor," Carla Curado and Nick Bontis acknowledge that the intangible and dynamic nature of tacit knowledge creates the need for an idiosyncratic approach toward organizational learning and dependency. Firms apply tacit knowledge whenever responding to changes in market structures (such as the launch of new products by a competitor) or changes in market regulations that open up the market to competitors. Acquisition of tacit knowledge by individuals within the firm heavily depends on the ability of employees to share skills as well as the resolve to conduct education and research beyond the firm's boundaries.

KNOWLEDGE MANAGEMENT

Firms formulate knowledge management (KM) strategies so as to create and employ appropriate individual and collective knowledge resources in the pursuit of competitive advantage. Identifying, creating, storing, sharing, and applying knowledge are the main activities that define knowledge management.

Identifying Knowledge. The process of knowledge management begins with the review and appraisal of the existing resources as well as identifying any resource gaps that may need to be filled to increase the organizations competitive capacity.

Creating New Knowledge. This involves introducing new ways of conducting and managing business processes both at individual and team levels. The process of creating new knowledge may be achieved through training, brainstorming sessions, or internal and external consultancy. Training can be enhanced through job rotations, participation of employees in committee assignments, outdoor training, process simulations, lecture courses, and seminars.

Firms adopt knowledge creation strategies with the objective of fostering long-term innovative practices and developing strong performance foundation. Japanese companies are particularly known to apply the principles of *Kaizen* to motivate the creation of knowledge through organizational cultures that embolden vision of services and products alongside other strategies that promote transparency, sharing of information, and active utilization of knowledge. For example, Toyota has based its success through the Toyota Production System which focuses on the creation of idiosyncratic and tacit knowledge. The pervasiveness of the orientations of the different types of knowledge in the cultural contexts of organizations serves as the benchmark for companies that pursue knowledge creation and innovation. Companies can excel in knowledge creation by not only developing capabilities for collecting and organizing information about knowledge, but also by providing adequate channels for accessing and distributing knowledge across organizational structures.

Applying Knowledge. Applying knowledge is the stage where the organization emphasizes the continuous transformation of information into skills and knowledge with the objective of achieving competitive advantage. The value of knowledge-based resources can be realized only if relevant knowledge is applied purposefully to enhance business decisions and actions. Although many companies work diligently to acquire shelves of knowledge repositories, they fail to dedicate adequate attention to transformation of the repositories into information resources through which employees can apply the knowledge in running the current business activities and generating new ideas for future use. This is because the application of knowledge is a complex issue that encompasses different organizational dimensions such as organizational culture and process designs.

Sharing Knowledge. Relevant knowledge should always be made available and accessible at all times to all interested parties within the organization. In the book titled *Human Resource Management for Tourism, Hospitality and Leisure: An International Perspective*, Tom Baum identifies two methods of distributing knowledge: the stock method that involves distributing knowledge through information databases, and the flow method which involves direct knowledge distribution through individual and group collaborations and mentoring.

Managers can employ various strategies to incorporate knowledge distribution in work processes. Creation of specific roles for importing and exporting knowledge is one such strategy. This practice is evident in consulting firms such as Deloitte & Touche and PricewaterhouseCoopers, which allocate specialized responsibilities of managing knowledge transfer within both the organizations and client organizations. Another strategy involves

designing knowledge-oriented analytical procedures within work processes or projects. For example, the Japanese Toyota manufacturers rely on the Toyota Production System to insert reviews of knowledge already gained and knowledge that is still required among the key points of the quality improvement processes.

Storing Knowledge. Organizations store knowledge either in the form of tacit or explicit knowledge. Managers can overcome the challenges of storing knowledge by adopting the strategy of integrating knowledge use into the IT systems that support processes among knowledgeable workers. For example, General Motors designs new motor vehicle models using a "knowledge-based engineering" system that embeds a set of design rules into the computer-aided design system. The main objective of systematic knowledge integration is to provide continuous access to the organization's knowledge structures while providing room for individual creativity and innovation. Managers can further perfect the storing of knowledge by implementing continuous improvement programs that allow frequent revision of core organizational processes that constitute team routines and procedures.

CHALLENGES

Leading proponents of KBV such as R.M. Grant acknowledge that hurdles that usually emerge from divergence of interests between employee conditions and owner expectations can hamper smooth coordination of specialized knowledge. As such, firms that seek to entrench uniformity of interests should pursue coordination of specialized knowledge by encouraging cooperation among all employees in the organization. However, the pursuit of cooperation may lead to bureaucratic imposition of coordination objectives through hierarchical structures, a situation that can be avoided through incorporation of other administrative and enforcement tools such as recognition of organizational culture and process designs.

Organizational culture. Organizational culture basically involves the unique norms, shared values, and assumptions that define an organization alongside the practices that all groups and individuals share within the organization. KBV perceives the organizational culture in terms of the organization's reward structures for the decisions and actions of employees in regard to utilization and sharing of knowledge. Firms hire employees with expectations that employees will apply knowledge in their actions and decisions regarding their assigned responsibilities, an objective that should never be taken for granted and should always be highlighted and emphasized during hiring processes in organizations because it would be a difficult task for the firm to inculcate basic intellectual curiosity among new employees. KM thrives in organiza-

tional cultures that portray flexible orientations such as the human relations orientation.

Firms that observe a human relations cultural orientation operate more or less like family, with a flat internal structure that emphasizes employee empowerment, interpersonal relations, and staff development (as opposed to hierarchical structures and reporting channels). As much as hierarchies provide the convenience of processing knowledge, they present challenges to knowledge integration, especially in situations where decision making on the higher levels depends on the knowledge of employees in the lower levels of hierarchical structures. It is for this reason that KBV emphasizes organizational structures that are not only participative in nature, but also motivational, so as to create appropriate conditions for decentralization, spreading, and sharing of both idiosyncratic and tacit knowledge throughout the firm.

Process designs. Knowledge determines the key processes in the firm such as administration, marketing, product development and design, planning, and resource allocation. Therefore, knowledgeable workers should practice their skills in the course of their duties and experience the convenience of doing so, for they are the best knowledge repositories to be utilized in organizations. Firms can achieve this through creation of adequate links between work processes and knowledge, as well as through continuous evaluation of all key processes in the firm to ascertain the acquisition of knowledge by human brains and information sources.

Greater value-addition can be achieved through knowledge if managers explore ways of exporting and sharing knowledge acquired by employees in the course of their duties in the firm. Appropriate process designs emphasize adherence to routines, slotting of responsibilities, communication of new policies, issuance of directives, use of systems and documentations, and a consultative approach when seeking solutions to problems.

THE TECHNOLOGICAL PERSPECTIVE OF KBV

Technological business applications play an important role in advancing knowledge capabilities in organizations. Organizations are increasingly adopting IT applications to execute transactions, customer relations management, asset management, and total quality management, as well as to enhance competency and innovation among the workforce. Organizations can use IT applications to create a collaborative work environment by empowering employees with the capacity to share knowledge through publishing tools that are interactive in nature such as chats, e-mails, discussion groups, intranets, and video conferencing.

SEE ALSO *Knowledge Management*

BIBLIOGRAPHY

Andreu, Rafael, Joan Baiget, and Agusti Canals. "Firm-Specific Knowledge and Competitive Advantage: Evidence and KM Practices". *Knowledge and Process Management,* 15, No. 2, (2008):97-106. Available from: http://www3.interscience.wiley.com/cgi-bin/fulltext/118999975/PDFSTART?CRETRY=1&SRETRY=0.

Baum, Tom. *Human Resource Management for Tourism, Hospitality and Leisure: An International Perspective.* Thomson Learning, 2006.

Carysforth, Carol, and Mike Neild. *Administration, 3rd ed.* Heinmann, 2006.

Curado, Carla, and Nick Bontis. "The Knowledge-Based View of the Firm and Its Theoretical Precursor". *International Journal of Learning and Intellectual Capital,* 3, No. 4 (2006): 367-381. Available from: http://www.inderscience.com/search/index.php?action=record&rec_id=11747&prevQuery=&ps=10&m=or.

DeCenco, David, A., and Stephen P. Rubbins. *Fundamentals of Human Resource Management, 8th ed.* John Wiley & Sons Inc., 2006.

Ghemawat, P. *Strategy and Business Landscape, 2nd ed.* Upper Saddle River, New Jersey: Prentice-Hall 2006.

KNOWLEDGE CENTERS

A knowledge center is an Internet-based community or system designed to help people remotely share information. Knowledge centers offer a variety of tools and accessories that enable the immediate or delayed sending and receiving of information. This can include online chat rooms, discussion boards, downloadable texts and other materials, and sometimes even the ability to chat with multiple users via videoconferencing. A knowledge center is usually set up within a community where its advantages are far-reaching and utilitarian, offering the ability to "information swap" among groups of people who otherwise could not communicate due to geographic or time constraints.

Usually, knowledge centers are highly specialized and niched, designed with a very specific audience in mind. Most knowledge centers fall under categories that fit within the realm of education (the center facilitates the needs of educators and students) or within the realm of a particular industry or even corporation. There are knowledge centers for those in the medical sciences, for example, who use the knowledge centers to further the reach of their own research while simultaneously catching up on new research, events, and findings of other colleagues. In this way, a knowledge center promotes the rapid progression of an industry or particular subject matter and allows for faster solutions by way of synergy. An online community of experts and highly interested parties in a constant state of contribution are the life force of successful knowledge centers in every thinkable genre.

WHAT MAKES A KNOWLEDGE CENTER?

A knowledge center must implement some method by which people can communicate and swap important information. The methods for doing this must be efficient and either free or very economical to ensure their use; if they are not, like-minded people with a particular interest will access another knowledge center.

There must be constant updates to a knowledge center, and therefore there is a need for an administrator who can update the online content of the site, ensure that users are playing by the rules, check that live content does not violate any copyrights, and make sure the center is as efficient as it can be. For a university or corporate knowledge center, an administrator may be its own paid position or part of an existing position.

Other resources should be available through the knowledge center, including links to pertinent Web sites, training or study materials, and a member center where free or paid members can check the status of messages sent and received, bulletins, and more. It is imperative that a knowledge center have its information updated as regularly as possible to keep content fresh, accurate, and of universal interest.

KNOWLEDGE CENTER AND WHITE PAPERS

Some entities that have white papers, especially publicly traded companies, will create a knowledge center as a platform to host, among other things, its white papers. For most, white papers are used to aid in the marketing process for a new product or service offered by a firm. Prospective clientele and proponents of the new product or service can be the captive audience of a knowledge center, so placing white papers in this type of Internet forum can have phenomenal results. Bringing white papers to the same place where discussions about the new product or service are facilitated and where potential customers can engage industry experts via chat rooms or bulletins is good business sense and an expert use of the Internet.

A knowledge center representing a business endeavor or any other entity should always exist as a repository for useful information that will help those with full mastery of the subject matter as well as novices. Using the knowledge center as a place to post and catch up on useful, current, industry information should always be the central goal; using the knowledge center to promote outside causes or as a means to network in a social manner should always be discouraged by the administrator. The offering of useful Internet links, articles, and tools for communication are the assets that any knowledge center will need as its fundamental foundation.

BIBLIOGRAPHY

"Columbia Interactive E-resources: Knowledge Centers." Available from: http://ci.columbia.edu/ci/eresources/knowledge.html.

Maniaci, Nick. "Building of a Knowledge Center." *PMI Leadership Meeting* Toronto, Canada, 2005.

"Writing a White Paper." Available from: http://owl.english.purdue.edu/owl/resource/546/01/.

KNOWLEDGE MANAGEMENT

Knowledge management (KM) refers to an organization's strategic efforts to gain a competitive advantage by capturing and using the intellectual assets held by its employees and customers. Efforts to archive best practices and lessons learned, and to make better use of information stored in databases, also fall under the rubric of knowledge management. Advocates of knowledge management believe that capturing, storing, and distributing knowledge will help employees work smarter, reduce duplication, and ultimately produce more innovative products and services that meet the customers' needs and offer a good value.

If a company knows something (e.g., changing tastes of the customers, innovative solutions to international tax issues, or how to use information systems to better monitor production processes) that its competitors do not, then that company has an opportunity to offer a distinguishing product or service. Knowledge management, as a business practice, impacts the entire organization by helping employees, managers, and executives share information and best practices that positively impact collective performance. Unlike downsizing, which emphasizes the reduction and control of costs (often through attrition and layoffs), knowledge management is a value-adding practice that seeks to enhance profits, innovation, and decision making by providing more and better information to every member of the organization.

To better understand why knowledge has become a critical factor in businesses, we need to understand that the United States and many other industrial countries are moving toward a knowledge economy. A knowledge economy is one where a majority of workers spend their day applying know-how to the production of goods and delivery of services. In a knowledge economy, employees work to improve decision-making, design, and delivery processes, while only a limited number of people are involved with the actual manufacturing of goods. Important questions that we might ask about a knowledge economy include:

- How many people now spend their day applying knowledge?

- How did the change to a knowledge economy come about?

- How do organizations go about managing knowledge?

American labor trends indicate that the percentage of people working in an information-intensive capacity is increasing while the number of people working in agriculture, manufacturing, and nonprofessional service industries is decreasing.

The rapid increase in knowledge-intensive work is often attributed to communication technologies, and espe-

cially digital technologies, that allow employees to transfer or access large amounts of data in minutes. Since the end of World War II, the world has seen the invention of the first programmable computer, satellite technology, fax machines, microprocessors, floppy disks, portable computers, cellular telephones and pagers, and the World Wide Web. All of these technologies are historically important because they allow great quantities of information to be shared with partners who are geographically separated from us and who, using earlier technologies, might have had to wait hours, days, or even weeks to receive information. Technology has, in effect, brought people closer together by allowing voice, text, and images to be rapidly transmitted across great distances.

Recognizing that knowledge systems are usually based on local area network (LAN) or Internet technology, several critical questions arise when an organization attempts to implement a knowledge management system. First, how do you measure the value of a knowledge management system? Like soft-skills training, many organizations and experts are struggling to measure the value added by a knowledge management system. For example, the value of new technology in a manufacturing plant can be measured with relative accuracy and be said to decrease production costs by a certain amount per unit. Knowledge management systems, however, commonly do not have such a direct impact on operations. How can we accurately measure value of having immediate access to information that improves decision-making or strategy?

Another problem is, how do you create an organizational culture that values sharing? The old adage "Information is power" exemplifies the cultural reasons why knowledge management systems can be challenging to implement. Traditionally in the United States, employees have been recognized and rewarded for individual effort and achievement. Collaborative effort and cooperation have not traditionally been rewarded. Consequently, implementing a knowledge management system may likely require that an organization reassess the values by which business is conducted, the performance evaluation instruments, and the pay/bonus structures so that employees see ample incentive to share knowledge and cooperate throughout the organization.

How much information is too much? Information overload is a concern in organizations that are developing a knowledge management system. What information do we attempt to capture and make available? What information do we overlook? In large organizations, the answers to such questions can have a dramatic impact on the quantity and quality of information available to employees.

TACIT AND EXPLICIT KNOWLEDGE

Many knowledge management activities in business involve finding sources of tacit and explicit knowledge, and changing

tacit knowledge to more useful, explicit forms. *Tacit knowledge* is static: it consists of ideas, experiences, and data that reside in particular sources and are not often communicated. Usually, tacit knowledge is contained by employees; it is knowledge that workers have but do not share, either because the worker does not think their knowledge is important or because there is not an available communication channel to move that knowledge along to other members of the company. Other forms of tacit information may include unaccessed files or third-party analysis that has not been reviewed. Tacit knowledge is considered especially important in innovation, where latent talents and ideas that employees have can have great impact on new products or processes the company is seeking.

Explicit knowledge is available to other people: this type of knowledge, rather than residing in specific employees, has been integrated into the company as a whole. It can be accessed by anyone who requires the knowledge for their activities, and it is usually vital to the success of the company. Examples of explicit knowledge include manuals, presentations, and company reports. Databases and all data-compounding techniques deal with extracting explicit knowledge from information reservoirs. This type of knowledge is much more useful than tacit knowledge because it is available for application.

How can a company make tacit knowledge into explicit knowledge and gain competitive advantage from it? There are many methods. Some companies, especially prospector-types, willingly ask for employees' knowledge and opinions to better innovate new business techniques. Other companies, more defender based, hold all knowledge in higher management and work to collect and distribute executive knowledge. Most businesses are a combination of the two. However, some types of tacit knowledge cannot be expressed to multiple people. Employees may have a certain know-how or various insights or intuitions that cannot be quantified. For this type of tacit knowledge, the best employers can do is develop strong communication channels and highlight skilled employees who have a wealth of the more intangible knowledge assets.

The most difficult step in transforming tacit knowledge to explicit knowledge is collecting it from employees. Companies can set up collaboration initiatives at regular intervals to give their employees a chance to share their experiences and make collection easier. In service-related businesses, a step can be put into place to gather and submit employee opinions every time a transaction is carried through (this could also be done at timed intervals). Once tacit knowledge is collected, it is categorized, streamlined, and turned into explicit knowledge available to the entire company.

KM AND INTRANETS

One of the most common ways for businesses to distribute explicit information is through the company intranet.

The efficiency of the information channels in the intranet depends on how the knowledge is filed and shared. There are two primary schools of thought concerning the management of intranet knowledge. The first, more common belief proposes that the company intranet should be structured with a clear center, a hub of information that employees can access based on need and position. The second school of thought believes that knowledge is healthier and more naturally updated when it is available to everyone. These analysts propose that company intranet systems are more functional when information is available to everyone and freely accessed from any level.

Since employees spend so much time using the intranet system to trade knowledge, companies should be careful in how they categorize and manage intranet information. Is intranet knowledge well-organized, easy to find, and based on employee need? Do employees know about all the sources of knowledge on their company's intranet? Is there a training program in place for using all intranet systems? A 2008 study by Chaudhry, Ali, and Abadi in the *Journal of Knowledge Management Practice* gives several suggestions to improve intranets as a knowledge management tool, including:

- Redesign the user interface. Switching colors, fonts, and font sizes can aid readability for employees and help them absorb information more quickly.

- Conduct spring cleaning initiatives for the company intranet. Studies have shown that many documents are duplicated or refiled unnecessarily. Cleaning exercises also allow companies a chance to be sure that all files are formatted correctly and standardized according to company policy.

- Allow more online transactions. Employees can benefit by exchanging knowledge with each other, and transferring information over the intranet can be a much more efficient tool than using instant messaging or e-mail.

- Consistently update information. Some employees find their intranet systems to be filled with extra information they did not need. Updating information should include not only filing new information but cleaning out outdated information as well.

- Improve search systems. Most employees search the intranet systems by keyword. This can lead to complicated results, and companies can increase efficiency by creating better keyword search engines.

- Appoint a manager to be in charge of the intranet, so that they can implement changes, design regulations, and oversee necessary organizations.

KNOWLEDGE MAPS

KM strategies have long made use of knowledge maps, or visual representations of the pools of knowledge within

companies, who has access to them, and what other groups they affect. KM workers find knowledge maps useful for giving overviews of explicit knowledge, and finding particular pieces of information faster. There are a number of different types of knowledge maps, used for different purposes. The top four types of maps are:

- **Concept maps**. The concept map is a simple version of knowledge mapping, dividing the information groups into clear categories and showing relevant connections with circles and lines. These are usually made with a main body of knowledge and several branching groups, and are used in teaching and presentation formats. Unfortunately, it can be difficult to show processes with several related steps in concept mapping.

- **Mind maps**. These flexible, intuitive-based maps are used to express tacit knowledge for the benefit of other people, or for review. These can be more than one color and consist of interlaced connection with multiple central headings. These connections are often based on semantics or hierarchal structures. Mind maps can be developed into more structured maps further on in development.

- **Conceptual diagram**. These maps are one of the most complicated, involving many titles with textual definitions. Conceptual diagrams are most often used when there is a predetermined topic that needs extensive explanation.

- **Visual metaphor**. Visual metaphors use some sort of preexisting structure—a story, graphic, animal, or identifiable object—to communicate meaning in an easy way to understand. Visual metaphors help people remember key connections for certain topics. Visual metaphors should be chosen carefully for their association value.

SEE ALSO *Electronic Commerce; Electronic Data Interchange and Electronic Funds Transfer*

BIBLIOGRAPHY

Chaudhry, Abdus Sattar, Nor Ainah Ali, and Damayanti Iyan Abadi. "Exploiting the Potential of Intranets for Managing Knowledge in Organizations." *Journal of Knowledge Management Practice.* 9, no. 2, 2008. Available from: http://www.tlainc.com/articl153.htm

Ed. Cohen, Eli.*Setting Knowledge Free: The Journal of Issues in Informing Science and Technology.* Informing Science, 2008.

Hamza, Salah Eldin Adam. "Competitive Advantage Via a Culture of Knowledge Management." *Journal of Knowledge Management Practice.* 9, no. 2, 2008. Available from: http://www.tlainc.com/articl153.htm.

———.*Harvard Business Review on Knowledge Management.* Boston: Harvard Business School Press, 1998.

Huotari, M.L., and M. Iivonen. *Trust in Knowledge Management and Systems in Organizations.* Hershey, PA: Idea Group Publishing, 2003.

'Lystra, Miltiadis. *Knowledge Management Strategies: A Handbook of Applied Technologies.* Idea Group Inc., 2008.

Malhotra, Y. "Integrating Knowledge Management Technologies in Organizational Business Processes: Getting Real Time Enterprises to Deliver Real Business Performance." *Journal of Knowledge Management* 9, no. 1 (2005): 7–28.

Stewart, Thomas A. *Intellectual Capital: The New Wealth of Organizations.* New York: Doubleday/Currency, 1997.

Vouros, G.A. "Technological Issues Towards Knowledge-Powered Organizations." *Journal of Knowledge Management* 7, no. 2 (2003): 114–127.

KNOWLEDGE WORKERS

Knowledge workers, alternatively termed knowledge entrepreneurs, free agents, or human capital, constitute the fastest growing sector of the workforce in the world. In 2006, knowledge workers in North America outnumbered all other workers four to one. In his 1995 book, *Managing in a Time of Great Change*, Peter Drucker, the eminent management writer credited with coining the term "knowledge worker," defines these individuals as "high level employees who apply theoretical and analytical knowledge, acquired through formal education, to develop new products or services". Knowledge workers are those who acquire, manipulate, interpret, and apply information in order to perform multidisciplinary, complex and unpredictable work. They analyze information and apply expertise in a variety of areas to solve problems, generate ideas, or create new products and services.

Examples of knowledge workers include professionals, scientists, educators, and information system designers. Knowledge work is characterized by the use of information, by unique work situations, and by creativity and autonomy. Knowledge workers make decisions rather than physical items and work with ideas rather than with objects. Their work focuses on mental rather than muscle power and is characterized by non-repetitive tasks. Knowledge workers use different methods and techniques to solve problems and have the authority to decide what work methods to use in order to complete their varying job tasks.

CATEGORIZATION OF KNOWLEDGE WORKERS

Knowledge workers can be grouped into various categories, based on the amount of time spent on individual tasks or on the type of information or skills possessed. The fact that knowledge workers can be classified in different ways is indicative of the variety of jobs they hold.

Knowledge workers can be categorized according to the amount of time they are engaged in routine versus innovative

behaviors. On one end of the scale, workers perform tasks that are primarily repetitive and routine in nature but occasionally use complex information to make independent decisions, often with regard to customer service issues. Employees at the spectrum's opposite end spend most of their time accessing information and making independent decisions with regard to that information.

A second way to categorize those whose work focuses on information and ideas is as follows: specialty knowledge workers, portable knowledge workers, and creation of knowledge workers. Specialty knowledge workers possess a significant amount of knowledge related to a specific company's products or services. These individuals can be thought of as housing vital corporate assets in their heads. Portable knowledge workers possess information of wide and immediate utility. They are familiar with knowledge that is in demand by a variety of organizations. Software programmers, librarians, and persons with business degrees are examples of portable knowledge workers. Creation of knowledge workers focuses the majority of their efforts on innovative behaviors, such as product design and development. Examples of creation of knowledge workers include scientists and information systems designers.

KNOWLEDGE WORKER CHARACTERISTICS

Knowledge work is complex, and those who perform it require certain skills and abilities as well as familiarity with actual and theoretical knowledge. These persons must be able to find, access, recall, and apply information, interact well with others, and possess the ability and motivation to acquire and improve these skills. While the importance of one or more of these characteristics may vary from one job to the next, all knowledge workers need these basic qualifications. More jobs now require college degrees than ever before and a shortage of knowledge workers is imminent. Another future concern is the retirement of experienced plant managers, research scientists, and other knowledge workers that will lead to reduced capacity to innovate and pursue growth strategies as well as increase costly operational errors and decrease efficiency in the management of resources and productivity.

Possessing Factual and Theoretical Knowledge. Knowledge workers are conversant with specific factual and theoretical information. Schoolteachers possess information regarding specialized subject matter, teaching strategies, and learning theories. The sales representative commands factual knowledge concerning the product he or she sells and theoretical knowledge about how to interest customers in that product. Prospective knowledge workers may need years of formal education to master the information needed to enter a particular field of work. Because knowledge is

always being created, this type of employee will be acquiring additional information on a continual basis.

Finding and Accessing Information. At a time when the operations of today's information society depends on knowledge that is continually growing and changing, distribution of information within organizations has become problematic due to the massive amount of information with which employees need to be familiar. Knowledge workers must therefore know how to independently identify and find such material. Such employees need to know which sources provide the information they need and how to use these sources in order to locate information successfully.

Ability to Apply Information. Knowledge workers use information to answer questions, solve problems, complete writing assignments, and generate ideas. Use of analogical reasoning and relevance judgment enables employees to successfully address personal and customer service-related issues. Analogical reasoning is a knowledge-based problem-solving process in which persons apply information from precedents to new situations. Relevance judgment is the process by which individuals decide whether or not a precedent is applicable to the problem at hand. The non-repetitive nature of knowledge workers' jobs makes crucial the ability to apply information to new situations.

Communication Skills. Knowledge work is characterized by close contact with customers, supervisors, subordinates, and teammates. Successful knowledge workers present clearly, in spoken and written word, both factual and theoretical information. These employees listen with understanding and ask for clarification when they do not understand what is being said to them.

Knowledge workers must be able to speak, read, write, and listen in one-on-one and group settings. Emphasis on quality customer service and customization of goods and services to meet individual customer needs and wants brings knowledge workers into close contact with customers. The goals of organizational effectiveness and continual improvement of products, together with the need to continually consider new information in order to accomplish work, require communication between supervisor and supervised and among teammates or colleagues. Knowledge workers possess communications skills that enable them to collaborate with one another for goal-setting, decision-making, and idea-generating purposes.

Motivation. The nature of knowledge work requires continual growth, in terms of mastery of information and skill development, on the part of those who do this type of work. Knowledge workers must become and remain interested in finding information, memorizing that information, and applying it to their work. Because new technological

developments call on knowledge workers to change continuously the way they accomplish their work, these individuals must maintain a desire to apply their talents toward incorporating new information and new technologies into their work.

Intellectual Capabilities. Knowledge workers must have the intellectual capabilities to acquire the skills discussed above. Such intellectual capacities include those concerned with the understanding, recall, processing and application of specialized information. Persons who perform knowledge work must possess the abilities needed to acquire appropriate communication skills and to learn how to figure out where and how information can be located. Knowledge workers are able to learn how to read and write at post-secondary levels and to perform abstract reasoning. They also have the intellectual capacity to understand the value of acquiring and maintaining the knowledge and skills needed to accomplish their work.

HISTORICAL BACKGROUND

Some occupations have always centered on the use of specialized information. Only recently, however, have persons employed in these types of occupations begun to outnumber those employed in jobs that do not require intensive use of specialized knowledge. In the late 1950s and early 1960s, writers such as Fritz Machlup and Peter Drucker first identified and described the reasons behind this phenomenon. Today the increase in knowledge work professions concerns business administrators, professors, management consultants and others interested in learning how to increase business profits or improve life's quality.

Recently, the number of persons employed in traditional types of knowledge work professions has escalated while new types of knowledge work have appeared. Throughout history, people such as writers, teachers, and ministers, for example, have engaged themselves in intellectual activity. Their numbers grew as the population of Europeans in North America increased in the eighteenth century and early nineteenth century. Industrialization then fostered the creation of new categories of employees who used information to make their livings: inventors, consultants, and managers. As the population continued to grow, so did the economy, which became able to support greater numbers of knowledge workers.

In the 1950s, computer science and other knowledge-based professions rapidly expanded. Economist Fritz Machlup examined the distribution, use, and creation of information in the United States. He used statistical information to show that manual workers' share of the labor force was decreasing while the white-collar share was increasing. He tried to differentiate among various types of knowledge workers. Machlup showed that knowledge-producing occupations were growing much faster than manual labor occupations, and he redefined the word "work" in terms of a way to manage and use knowledge.

Peter Drucker wrote extensively on the subject of the knowledge worker. Drucker identified and described the reasons for the decline of the blue collar worker and the rise of the knowledge worker, and he made what are now considered accurate predictions about the knowledge worker's future place in society. He described how knowledge-based positions evolved from manufacturing and agricultural jobs as automation changed the way these jobs were accomplished. Drucker argued that service sector activities had increased, expanded, and diversified, causing the number of knowledge workers to grow. He explained how emphasis on and developments in science and technology fostered the creation of new knowledge professions while an expanding economy enabled their growth.

Information continues to influence work and alter the way it is accomplished. Technology makes possible computerized databases to manage and access such information. In turn, the introduction of new technologies creates jobs for those who design, manage, and utilize these technologies. Organizational expansion, brought on by the use of new knowledge, also creates this type of work, as employees turn their attention toward coordinating additional work. Information's importance in the workplace continues to make crucial its accessibility.

KNOWLEDGE WORKER SHORTAGE

The information society requires a highly qualified workforce. As compared to the past, a larger proportion of the population should attend college and participate in formal training programs designed to teach specialized information and specific skills associated with knowledge work. The fact that traditional blue-collar workers cannot acquire easily the knowledge and skills needed to become knowledge workers will create a shortage of these types of workers. Although colleges and universities may adapt their curriculums to prepare students for various types of knowledge work, it is unlikely that significantly greater percentages of the population will attend college. The American Society for Training and Development maintains that, while nine-tenths of all new jobs now require post-secondary levels of reading, writing, and math, only half of those entering the workforce for the first time have attained these skills. When the traditional blue-collar worker cannot make the transition to knowledge work, society will face problems caused by both unemployment and understaffing. According to the 2007 Talent Shortage Survey conducted by Manpower Inc., human capital will become increasingly scarce as the demographic bulge known as the baby boomers—the generation born between 1945 and 1960—begin to retire. The Generation Xers, those born between 1961 and 1970, are

expected to replace the retiring workforce, but they are only half in number of the boomer generation.

HIRING AND RETAINING THE KNOWLEDGE WORKER

The shortage of knowledge workers makes employers concerned with attracting and retaining these employees. In order to hire and retain knowledge workers, employers may offer higher salaries, attractive work environments, and continuing educational opportunities. Employers take actions designed to attract and retain knowledge workers by creating a free-agent community, respecting knowledge workers as new bosses, and providing growth opportunities. In a free-agent community, employees have the freedom to choose their work methods and work in the environments in which they function best. Treating knowledge workers as the new bosses means that management operates as a facilitator rather than as a controller of work. This gives knowledge workers the autonomy they need to complete their work as they see fit. Employers make work attractive and rewarding by providing growth opportunities, such as those that are associated with ongoing training and development, special assignments, and rotation of jobs and job responsibilities. In such ways, employers attempt to address the knowledge worker shortage.

IMPROVING KNOWLEDGE WORKER PRODUCTIVITY

Knowledge worker productivity influences success in today's competitive work economy, and businesses are focusing on increasing this productivity. Management facilitates the knowledge worker's job performance by providing access to relevant information; environments that promote this information's desired use, continuing educational opportunities, and a balance between guidance and autonomy.

Employers use costly technologies to facilitate access to and manipulation of information. The term information technology refers to computer equipment and programs used to access, process, store, and disseminate information. Examples of information technologies include word processing, spreadsheet, and electronic mail programs, and a variety of other software programs designed to process information in specific ways. Information technologies are designed to reduce the amount of time employees spend on information access, management and manipulation, and to increase the accuracy of these processes. Information technology is important because it helps make information accessible and manageable in a time when accessibility and manipulation of information are crucial to the world economy.

THE WORKPLACE

The characteristics of each individual knowledge worker's workplace depend on the type of work accomplished and what the employer is willing and able to provide. Workplace arrangements range from traditional physical office space occupied by employees between the hours of 9:00 A.M. to 5:00 P.M. each workday to virtual office space which can exist just about anywhere.

Knowledge workers who work exclusively with ideas and information may operate in a non-traditional workplace situated anywhere that employees have access to needed computer and communication equipment. Individuals who work in such "virtual offices" may utilize physical office space as necessary or use "hoteling" to visit customers. Hoteling is a process by which those who work out of virtual offices schedule physical office space for meetings with colleagues, customers, clients, and sales representatives. Writers, researchers, outside sales representatives, and product designers are examples of knowledge workers who might utilize non-traditional workspaces.

CHALLENGES AND OPPORTUNITIES

The increasing demand for employees who use their skills and talents to perform complex and non-repetitive work presents both challenges and opportunities. The challenges include attainment and maintenance of a well educated, highly skilled, and efficient workforce. Opportunities include chances for greater numbers of working age people to hold more rewarding jobs than previously possible and for employees to be judged according to their unique talents and abilities rather with regard to how quickly they complete repetitive tasks or how well they conform to pre-established work standards.

Education of a properly skilled workforce will take special effort. Society will need to convince its members to pursue educational and training opportunities that will qualify them for knowledge work. Businesses and educational institutions may work together to determine exactly what skills and knowledge students need to enter the workforce and how to educate students accordingly. Educators and employers will need to ensure that those who need to know how to use certain technologies are able to do so and will not become disconnected because they are unable to use advanced computer programs or telecommunications equipment. While potential knowledge workers will require familiarity with specialized information related to the type of work they plan to undertake, it will be important that their educational backgrounds give them a common basis for understanding one another.

Hiring, retention, and productivity of knowledge workers will remain important issues. As the shortage of persons qualified to perform knowledge work increases, employers will be challenged to find more effective ways to hire and retain these individuals. In order to improve productivity, employers will try to figure out how to promote teamwork among knowledge workers, how to best design the workplace, and

how to keep knowledge workers from becoming overwhelmed with the information they need to do their jobs.

The use of information technology to manage and manipulate information presents a series of challenges. Employers will need to find ways to fund these technologies and to provide training on their use. Corporate universities are increasingly popular in large businesses as a means of providing job-specific training to employees. Walt Disney, Boeing, and Motorola are three major companies that have a corporate university branch. In the article "Education in the Workplace: An Examination of Corporate University Models," Denise Heam lists a number of reasons why a business might set up an education department. These include:

1. Organize training

2. Start and support change in the organization

3. Get the most out the investment in education

4. Bring a common culture, loyalty, and sense of belonging to a company

5. Remain competitive in today's economy

6. Retain employees

In the current Information Age, an important use of corporate universities is to educate staff about the information technology systems used by the company.

In order to maximize the value of information technologies, employers will want to determine how and when information technologies increase knowledge worker productivity and performance, how to best match a particular technology with a specific job, and how computer programs can be best used to locate, process, and create information. Employers will also need to know how to evaluate employee use of information technologies and how to cope with underutilization, of and resistance to, these technologies. With this user-oriented infrastructure, mission critical business news and financial and research data is now available upon demand to the user's desktop. In fact, the availability of critical information via the web has created a new breed of telecommuting knowledge workers with anytime/anyplace capabilities.

The shift from blue-collar jobs to knowledge work presents new opportunities. Greater numbers of people will be able to hold jobs that enable them to develop their talents and use their creativity. These new knowledge workers will have greater job mobility. Employers will respect them as individuals who bring unique talents and abilities to their jobs as opposed to workers who perform repetitive tasks. Leadership opportunities will be open to increasingly greater numbers of people.

The twenty-first century has brought a new challenge in the form of outsourcing knowledge workers in several sectors of the economy. Business process outsourcing

(BPO) is the transfer of business operations, such as the production of an automotive component, to a third party. In the past, BPO was primarily used in manufacturing as a way of taking advantage of inexpensive labor and supplies; now everything from human resources to information technology is being outsourced. Contracting the services of BPO vendors outside of a company's home country is termed "offshore outsourcing." Use of BPO rather than an application service provider suggests that some of the risk associated with running the business segment is also being transferred to the third party. Services are now flowing to countries such as India, the Philippines, Morocco, and Egypt. According to the management consulting firm McKinsey the global BPO market is worth $122 to $154 billion. However, concern about high costs and poor quality (resulting from cultural and communication issues) due to outsourcing has been expressed on more than one occasion.

Under-utilization and cost demands of business worldwide are influencing the changes in knowledge-worker skills, requirements, and work location. Identifying and utilizing the knowledge worker in an effective and cost-efficient manner is a challenge for business and for the economy today.

BIBLIOGRAPHY

Cortada, James W., ed. *Rise of the Knowledge Worker.* Boston: Butterworth-Heinemann, 1998.

Donlan, Thomas G. "Catch a Tiger by the Tail." *Barron's,* 14 February 2005. Available from: http://proquest.umi.com.

Drucker, Peter F. *Managing in a Time of Great Change.* New York: Truman Talley Books/Dutton, 1995.

Goldsmith, Marshall. "Retain Your Top Performers." *Executive Excellence* 14, no. 11 (1997): 10–11.

Gordon, Edward E. "The New Knowledge Worker." *Adult Learning* 8, no. 4 (1997): 14–18.

Gould, Susan B., and Barbara R. Levin. "Building a Free Agent Community." *Compensation and Benefit Management* 14, no. 3 (1998): 24–30.

Haag, S., et al. *Management Information Systems For the Information Age.* Canada: McGraw Hill Ryerson, 2006.

Harmon, P. "An Overview of Business Process Outsourcing" *Business Process Trends Newsletter* 1, no. 9, 2003.

———."High Cost of Lost Knowledge." *IIE Solutions* June 2002.

———."Knowledge-Worker Productivity: The Biggest Challenge." *California Management Review* 41, no. 2 (1999): 41–57.

Krebsbach, Karen. "Outsourcing: Fighting a Giant Sucking Sound: Banks Face Backlash on IT Job Exports Overseas." *Bank Technology News* August 2003. Available from: http://infotrac. galegroup.com.

Munk, Nina. "The New Organization Man." *Fortune* 137, no. 5 (1998): 34–41.

Price, Steven M. "Facilities Planning: A Perspective for the Information Age." *IIE Solutions* 29, no. 8 (1997): 20–23.

"Talent Shortage Survey," Manpower Inc., 2007. Available from: http://files.shareholder.com/downloads/MAN/114859476x0x 87523/a49c96c9-cbfe-47ac-9207-476be0e84c20/Talent%20 Shortage%20Survey%20Results_2007_FINAL.pdf.

Paton, Rob, et al. *Handbook of Corporate University Development Managing Strategic Learning Initiatives in Public and Private Domains.* London: Gower Publishing, 2006.

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LAYOUT

In manufacturing, facility layout consists of configuring the plant site with lines, buildings, major facilities, work areas, aisles, and other pertinent features such as department boundaries. While facility layout for services may be similar to that for manufacturing, it also may be somewhat different—as is the case with offices, retailers, and warehouses. Because of its relative permanence, facility layout probably is one of the most crucial elements affecting efficiency. An efficient layout can reduce unnecessary material handling, help to keep costs low, and maintain product flow through the facility. Types of layouts include process, product, fixed-position, combination, cellular, and certain types of service layouts.

PROCESS LAYOUT

Process layouts are found primarily in job shops, or firms that produce customized, low-volume products that may require different processing requirements and sequences of operations. Process layouts are facility configurations in which operations of a similar nature or function are grouped together. As such, they occasionally are referred to as functional layouts. Their purpose is to process goods or provide services that involve a variety of processing requirements. A manufacturing example would be a machine shop. A machine shop generally has separate departments where general-purpose machines are grouped together by function (e.g., milling, grinding, drilling, hydraulic presses, and lathes). Therefore, facilities that are configured according to individual functions or processes have a process layout. This type of layout gives the firm the flexibility needed to handle a variety of routes and process requirements. Services that utilize process layouts include hospitals, banks, auto repair, libraries, and universities.

Improving process layouts involves the minimization of transportation cost, distance, or time. To accomplish this some firms use what is known as a Muther grid, where subjective information is summarized on a grid displaying various combinations of department, work group, or machine pairs. Each combination (pair), represented by an intersection on the grid, is assigned a letter indicating the importance of the closeness of the two (A = absolutely necessary; E = very important; I = important; O = ordinary importance; U = unimportant; X = undesirable). Importance generally is based on the shared use of facilities, equipment, workers or records, work flow, communication requirements, or safety requirements. The departments and other elements are then assigned to clusters in order of importance.

Advantages of process layouts include:

- **Flexibility.** The firm has the ability to handle a variety of processing requirements.

- **Cost.** Sometimes, the general-purpose equipment utilized may be less costly to purchase and less costly and easier to maintain than specialized equipment.

- **Motivation.** Employees in this type of layout will probably be able to perform a variety of tasks on multiple machines, as opposed to the boredom of performing a repetitive task on an assembly line. A process layout also allows the employer to use some type of individual incentive system.

- **System protection.** Since there are multiple machines available, process layouts are not particularly vulnerable to equipment failures.

Disadvantages of process layouts include:

- **Utilization.** Equipment utilization rates in process layout are frequently very low, because machine usage is dependent upon a variety of output requirements.

- **Cost.** If batch processing is used, in-process inventory costs could be high. Lower volume means higher per-unit costs. More specialized attention is necessary for both products and customers. Setups are more frequent, hence higher setup costs. Material handling is slower and more inefficient. The span of supervision is small due to job complexities (routing, setups, etc.), so supervisory costs are higher. Additionally, in this type of layout accounting, inventory control, and purchasing usually are highly involved.

- **Confusion.** Constantly changing schedules and routings make juggling process requirements more difficult.

PRODUCT LAYOUT

Product layouts are found in flow shops (repetitive assembly and process or continuous flow industries). Flow shops produce high-volume, highly standardized products that require highly standardized, repetitive processes. In a product layout, resources are arranged sequentially, based on the routing of the products. In theory, this sequential layout allows the entire process to be laid out in a straight line, which at times may be totally dedicated to the production of only one product or product version. The flow of the line can then be subdivided so that labor and equipment are utilized smoothly throughout the operation.

Two types of lines are used in product layouts: paced and unpaced. Paced lines can use some sort of conveyor that moves output along at a continuous rate so that workers can perform operations on the product as it goes by. For longer operating times, the worker may have to walk alongside the work as it moves until he or she is finished and can walk back to the workstation to begin working on another part (this essentially is how automobile manufacturing works).

On an unpaced line, workers build up queues between workstations to allow a variable work pace. However, this type of line does not work well with large, bulky products because too much storage space may be required. Also, it is difficult to balance an extreme variety of output rates without significant idle time. A technique known as assembly-line balancing can be used to group the individual tasks performed into workstations so that there will be a reasonable balance of work among the workstations.

Product layout efficiency is often enhanced through the use of line balancing. Line balancing is the assignment of tasks to workstations in such a way that workstations have approximately equal time requirements. This minimizes the amount of time that some workstations are idle due to waiting on parts from an upstream process. It also avoids the problem of building up an inventory queue in front of a downstream process.

Advantages of product layouts include:

- **Output.** Product layouts can generate a large volume of products in a short time.

- **Cost.** Unit cost is low as a result of the high volume. Labor specialization results in reduced training time and cost. A wider span of supervision also reduces labor costs. Accounting, purchasing, and inventory control are routine. Because routing is fixed, less attention is required.

- **Utilization.** There is a high degree of labor and equipment utilization.

Disadvantages of product layouts include:

- **Motivation.** The system's inherent division of labor can result in dull, repetitive jobs that can prove to be quite stressful. Also, assembly-line layouts make it very hard to administer individual incentive plans.

- **Flexibility.** Product layouts are inflexible and cannot easily respond to required system changes—especially changes in product or process design.

- **System protection.** The system is at risk from equipment breakdown, absenteeism, and downtime due to preventive maintenance.

FIXED-POSITION LAYOUT

A fixed-position layout is appropriate for a product that is too large or too heavy to move. For example, battleships are not produced on an assembly line. For services, other reasons may dictate the fixed position (e.g., a hospital operating room where doctors, nurses, and medical equipment are brought to the patient). Other fixed-position layout examples include construction (e.g., buildings, dams, and electric or nuclear power plants), shipbuilding, aircraft, aerospace, farming, drilling for oil, home repair, and automated car washes. In order to make this work, required resources must be portable so that they can be taken to the job for "on the spot" performance.

Due to the nature of the product, the user has little choice in the use of a fixed-position layout. Disadvantages include:

- **Space.** For many fixed-position layouts, the work area may be crowded so that little storage space is available. This also can cause material handling problems.

- **Administration.** Oftentimes, the administrative burden is higher for fixed-position layouts. The span of control can be narrow, and coordination difficult.

COMBINATION LAYOUTS

Many situations call for a mixture of the three main layout types. These mixtures are commonly called combination or hybrid layouts. For example, one firm may utilize a process layout for the majority of its process along with an assembly in one area. Alternatively, a firm may utilize a fixed-position layout for the assembly of its final product, but use assembly lines to produce the components and subassemblies that make up the final product (e.g., aircraft).

CELLULAR LAYOUT

Cellular manufacturing is a type of layout where machines are grouped according to the process requirements for a set of similar items (part families) that require similar processing. These groups are called cells. Therefore, a cellular layout is an equipment layout configured to support cellular manufacturing.

Processes are grouped into cells using a technique known as group technology (GT). Group technology involves identifying parts with similar design characteristics (size, shape, and function) and similar process characteristics (type of processing required, available machinery that performs this type of process, and processing sequence).

Workers in cellular layouts are cross-trained so that they can operate all the equipment within the cell and take responsibility for its output. Sometimes the cells feed into an assembly line that produces the final product. In some cases a cell is formed by dedicating certain equipment to the production of a family of parts without actually moving the equipment into a physical cell (these are called virtual or nominal cells). In this way, the firm avoids the burden of rearranging its current layout. However, physical cells are more common.

An automated version of cellular manufacturing is the flexible manufacturing system (FMS). With an FMS, a computer controls the transfer of parts to the various processes, enabling manufacturers to achieve some of the benefits of product layouts while maintaining the flexibility of small batch production.

Some of the advantages of cellular manufacturing include:

- **Cost.** Cellular manufacturing provides for faster processing time, less material handling, less work-in-process inventory, and reduced setup time, all of which reduce costs.

- **Flexibility.** Cellular manufacturing allows for the production of small batches, which provides some degree of increased flexibility. This aspect is greatly enhanced with FMSs.

- **Motivation.** Since workers are cross-trained to run every machine in the cell, boredom is less of a factor. Also, since workers are responsible for their cells' output, more autonomy and job ownership is present.

In the twenty-first century, companies are taking advantage of software simulation capabilities to cut the cost of building new production facilities. Such software enables three-dimensional visualization of building and work cell layouts. For example, a German truck manufacturer used simulation software when developing an initial draft plan of its new manufacturing facility. The trucks manufactured consisted of about 6,500 parts delivered in containers to the workstations. Each container of parts was required to be available at the right time and the right place to keep production flowing. The facility simulation revealed how the original plans would have led to the concentration of materials at certain locations and rendered feasible work processes impossible. The company used the software to configure alternative manufacturing designs, systems layouts, material handling, tests for usability, and the supply concept. Additionally, line balancing and cycle periods were all placed in the facility, then visualized and optimized. The software helped the truck manufacturer minimize costs and reduce production problems.

OTHER LAYOUTS

In addition to the aforementioned layouts, there are others that are more appropriate for use in service organizations. These include warehouse/storage layouts, retail layouts, and office layouts.

With warehouse/storage layouts, order frequency is a key factor. Items that are ordered frequently should be placed close together near the entrance of the facility, while those ordered less frequently remain in the rear of the facility. Pareto analysis is an excellent method for determining which items to place near the entrance. Since 20 percent of the items typically represent 80 percent of the items ordered, it is not difficult to determine which 20 percent to place in the most convenient location. In this way, order picking is made more efficient.

While layout design is much simpler for small retail establishments (shoe repair, dry cleaner, etc.), retail stores, unlike manufacturers, must take into consideration the presence of customers and the accompanying opportunities to influence sales and customer attitudes. For example, supermarkets place dairy products near the rear of the store so that customers who run into the store for a quick gallon of milk must travel through other sections of the store. This increases the chance of the customer seeing an item of interest and making an impulse buy. Additionally, expensive items such as meat are often placed so that the

customer will see them frequently (e.g., pass them at the end of each aisle). Retail chains are able to take advantage of standardized layouts, which give the customer more familiarity with the store when shopping in a new location.

Office layouts must be configured so that the physical transfer of information (paperwork) is optimized. Communication also can be enhanced through the use of low-rise partitions and glass walls.

A number of changes taking place in manufacturing have had a direct effect on facility layout. One apparent manufacturing trend is to build smaller and more compact facilities with more automation and robotics. In these situations, machines need to be placed closer to each other in order to reduce material handling. Another trend is an increase in automated material handling systems, including automated storage and retrieval systems (AS/AR) and automated guided vehicles (AGVs). There also is movement toward the use of U-shaped lines, which allow workers, material handlers, and supervisors to see the entire line easily and travel efficiently between workstations. So that the view is not obstructed, fewer walls and partitions are incorporated into the layout. Finally, thanks to lean manufacturing and just-in-time production, less space is needed for inventory storage throughout the layout.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Product-Process Matrix*

BIBLIOGRAPHY

Finch, Byron J. *Operations Now: Profitability, Processes, Performance.* 2nd ed. Boston: McGraw-Hill/Irwin, 2006.

"Seeing a Better Future: Simulation Software Renders Optimal Plant Layout Before Construction." *Manufacturing Business Technology* 20 December 2007. Available from: http://www.mbtmag.com/article/CA6514506.html?nid=3894&rid=2058905398.

Stevenson, William J. *Operations Management.* 8th ed., Boston: McGraw-Hill/Irwin, 2005.

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED)

Leadership in Energy and Environmental Design (LEED) is a rating system developed by the U.S. Green Building Council (USGBC), which awards points to buildings that satisfy environmentally responsible criteria. The USGBC is a nonprofit organization that was created in 1993 to promote sustainable building. The Council has grown to include more that 14,500 member organizations and companies. Since the first rating system was put into effect in 1998, LEED has expanded to review six environ-

mental categories, which include sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design. The rating systems have come to be recognized as the international benchmark for green building and development. Projects that are eligible for LEED certification include new construction, commercial interiors, core and shell developments, as well as existing buildings, homes, schools, retail facilities, and healthcare facilities.

LEED serves as a guide for the design, construction, and operations of environmentally sustainable buildings. Verified projects receive a LEED plaque demonstrating that the building has been certified by the USGBC. To earn LEED certification, a building must meet a set of prerequisites. The project then earns points by using sustainable strategies and documenting the building's environmental performance. Buildings are rated as Certified, Silver, Gold, or Platinum.

DEVELOPMENT

LEED rating systems are developed by volunteer committees made up of people from the building industry in cooperation with technical advisory groups. The consensus process involves stakeholder comment and review, and a member ballot. Finally, the rating system is open to the appeals process.

As of 2008, LEED professional accreditation has been granted to 43,000 building professionals since the program's inception in 2001. These individuals display extensive knowledge of green building practices and the LEED rating systems. In 2008, the Green Building Certification Institute (GBCI) was created to administer this program.

BENEFITS

In 2008, two studies by the New Buildings Institute (NBI) and the CoStar Group found that LEED-certified buildings outperform non-LEED-certified buildings in terms of energy use, occupancy rates, sale value, and rental rates. According to the NBI, LEED-certified buildings use 25 to 30 percent less energy than non-certified buildings. Gold and Platinum LEED-certified buildings have average energy savings of some 50 percent. Additionally, incentives for buildings to be certified by LEED are granted at state and local levels.

Since there are obvious advantages to owning an energy-efficient household, many would assume that most new construction would be "green" building. Unfortunately, this is not yet the case. The problem stems from the fact that many developers, while realizing the benefits of LEED designs, are reluctant to increase the initial cost of the house in order to build in this manner. To put it another way, the developer does not reap any of the benefits of the energy-efficient construction, and since putting in these

types of devices often increases the cost, there is the danger of building a green home that is more expensive than the regular home and therefore does not sell.

OVERCOMING RELUCTANCE FOR GREEN BUILDING

There are two major ways in which this obstacle to LEED-designed construction can be overcome. One is through better marketing; many people would be excited about lower monthly energy costs (especially in the late 2000s, as these costs move ever upward), and so they could be convinced to pay more upfront for a house that was energy efficient with the understanding that over time, their initial monetary outlay would be recouped via lower bills.

A second way to overcome higher initial prices for green construction is through legislation, particularly that of a local nature. For example, a city council has an interest in having energy-efficient houses within its domain, for such energy-saving units should allow the city's utilities (electricity, water) to manage growth and demand for these services better. In other words, a huge increase in new housing would typically mean a proportional increase would be needed for gas, electricity, and other utilities, but if the new housing is energy-efficient, this spike in utility demand is mitigated. To achieve this, then, local governments can modify local building codes to offer rebates to developers on various forms of green building, thereby encouraging more new construction be LEED certified.

BIBLIOGRAPHY
"What is LEED?" Available from: http://www.usgbc.org/ DisplayPage. aspx?CategoryID=19.

LEADERSHIP STYLES AND BASES OF POWER

Studies of leadership styles are diverse in nature and multiple definitions have been offered. However, leadership style can be defined broadly as the manner and approach of providing direction, implementing plans, and motivating people.

Bases of power refer to the methods that managers and leaders utilize to influence their employees. When examining bases of power, the concept of authority must also be considered. These two are interconnected attributes tied to the behavior of superiors over subordinates. In their article, "Are There No Limits To Authority?", David Knights and Darren McCabe explain that "power should be understood to be a condition of social relations. Thus, it is erroneous to ask who has power. Instead, it is necessary to explore how power is exercised."

In turn, the nature of how power is exercised is a workable definition for authority. In short, authority and power are intertwined, with power being the ability to do things or have others do what one has ordered, while authority is the foundation on which that power is built.

STYLES OF LEADERSHIP

Three different styles of leadership were identified by Kurt Lewin, renowned social scientist, in 1939: authoritarian, democratic, and laissez-faire. His results indicated that the democratic style is superior to the other two styles. Attributes of each style are outlined below.

- The *authoritarian* makes all decisions, independent of member's input. The authority figure dictates direction, leaving members in the dark about future plans. The authority figure selects which members will work collaboratively and determines solely the work tasks for the teams. This leader type is very personal in his praise and criticisms of each member, but does not actively participate with the group, unless demonstrating to the group. The authority figure is unfriendly and/or impersonal, but not openly hostile.

- The *democratic* leader welcomes team input and facilitates group discussion and decision making. This leader type shares plans with the group and offers multiple options for group consideration. The democratic leader encourages members to work freely with each other and leaves division of tasks to the group. This leader is objective in praise and criticism, and joins group activities without over-participating.

- The *laissez-faire* leader allows the group complete freedom for decision-making, without participating himself. This leader type provides materials and offers to assist only by request. The laissez-faire leader does not participate in work discussions or group tasks. This leader does not offer commentary on members' performance unless asked directly, and does not participate or intervene in activities.

Since 1939, Lewin's research has been the basis for many further research studies and articles on organizational behavioral in theory and in action. Each leadership style can be appropriate depending on the environment within which it is implemented, the members of the group (employees), and the goals or tasks that are being undertaken by the group. Leaders may adjust their style of leadership to fit certain tasks, groups, or settings.

An authoritarian leadership style can be effective when a situation calls for expedited action or decision-making. Group members who are not self-motivated, who prefer structure, and appreciate significant direction and monitoring may thrive under this style.

A democratic leadership style allows for multiple viewpoints, inputs, and participation, while still maintaining control and the leadership role. A quality democratic leader recognizes each member's strengths and effectively elicits the best performance from each member, all the while guiding and leading effectively. A challenge for the democratic leader is to recognize that not all tasks need to be handled by the group; that the leader should appropriately address some issues alone.

A laissez-faire leadership style works best when group members are highly skilled and motivated, with a proven track record of excellence. This hands-off approach can allow these capable members to be productive and effective. The laissez-faire style is interpreted by the members as a sign of confidence and trust in their abilities and further empowers them to be successful and motivated.

BASES OF POWER

Five bases of power were identified by French and Raven in 1960, which laid the groundwork for most discussions of power and authority in the latter half of the twentieth century. These five types of power are coercive, legitimate, reward, referent, and expert. Power can be manifested through one or more of these bases.

Coercive Power. Coercive power rests in the ability of a manager to force an employee to comply with an order through the threat of punishment. Coercive power typically leads to short-term compliance, but in the long-run produces dysfunctional behavior.

Coercion reduces employees' satisfaction with their jobs, leading to lack of commitment and general employee withdrawal. In the United States, Canada, and Western Europe, coercive power has seen a decline in the last fifty years. Several reasons contribute to this, ranging from the legal erosion of employment-at-will and the awareness of employee violence or other forms of retaliatory behavior.

Equally important as an effect on the receding popularity of coercion as a basis of power has been the influence of quality management theorists, such as Philip Crosby and W. Edwards Deming. They suggested that there is a decline in productivity and creativity when coercive power is employed. The use of coercive power results in an atmosphere of insecurity or fear. In spite of this insight, coercion as a base of power continues to play a role even in those organizations influenced by theories of quality management.

In times of economic crisis or threats to the survival of the organization at large, coercion may come to the forefront. Coercive power may also materialize as organizations attempt to streamline their operations for maximum efficiency. If employees must be fired, those who fail to conform to the organizational goals for survival will be the most likely candidates for termination. The threat of termination for failure to comply, in turn, is coercive power.

Legitimate Power. Legitimate power rests in the belief among employees that their manager has the right to give orders based on his or her position. For example, at the scene of a crime, people usually comply with the orders of a uniformed police officer based simply on their shared belief that he or she has the predetermined authority to give such orders. In a corporate setting, employees comply with the orders of a manager who relies on legitimate power based on the position in the organizational hierarchy that the manager holds. Although employees may comply based on legitimate power, they may not feel a sense of commitment or cooperation.

Reward Power. Reward power, as the name implies, rests on the ability of a manager to give some sort of reward to employees. These rewards can range from monetary compensation to improved work schedules. Reward power often does not need monetary or other tangible compensation to work when managers can convey various intangible benefits as rewards.

When reward power is used in a flexible manner, it can prove to be a strong motivator, as Crosby, Deming, and others have shown. Still, when organizations rely too rigidly on rewards, the system can backfire. Employees may be tempted to unethically or even illegally meet the quotas to which overly rigid reward systems may be tied.

Another problem associated with rewards as a base for power is the possibility that the rewards will divert employees' attention from their jobs and focus their attention instead on the rewards dangled before them.

Referent Power. Referent power derives from employees' respect for a manager and their desire to identify with or emulate him or her. In referent power, the manager leads by example. Referent power rests heavily on trust. It often influences employees who may not be particularly aware that they are modeling their behavior on that of the manager and using what they presume he or she would do in such a situation as a point of reference.

The concept of empowerment in large part rests on referent power. Referent power may take considerable time to develop and thus may not prove particularly effective in a workforce with a rapid turnover of personnel.

One common error in applying referent power in cross-cultural situations, however, comes in misunderstanding the ways in which employees identify with their superiors. Since identification with one's superior in the United States is hampered by symbols of legitimate power (for example, titles or dress), those who advocate its use encourage managers to

dress down to the level of their employees and use terms such as "facilitator" and "coach" coupled with "associates" and "group members" rather than "boss" and "subordinates."

In societies such as Argentina or Mexico, symbols of legitimate power may not readily hamper identification, whereas American-style egalitarianism may diminish the respect employees feel for the manager. In short, U.S. employees are likely to identify with managers by personally liking them and feeling liked in return, whereas Argentine and Mexican employees are likely to identify with managers by respecting them and feeling respected in return. Thus, referent power may be more cross-culturally variable than the other four bases of power laid out by French and Raven.

Imberman describes how specialized training is now used in the grocery industry to train Latino immigrants in the democratic supervisory techniques of U.S. managers. In the past, when these men and women were promoted to supervisory positions, they tended to rely heavily on the Latino model of authoritarianism under which they were raised. The managerial style hindered their ability to effectively supervise employees or to garner the respect they were seeking. To remedy this situation, specialized training programs are now utilized. The end result is effective and confident supervisors, motivated workers, higher productivity, less waste, and better customer service.

Expert Power. Expert power rests on the belief of employees that an individual has a particularly high level of knowledge or highly specialized skill set. Managers may be accorded authority based on the perception of their greater knowledge of the tasks at hand than their employees.

Interestingly, in expert power, the superior may not rank higher than the other persons in a formal sense. Thus, when an equipment repair person comes to the CEO's office to fix a malfunctioning piece of machinery, no question exists that the CEO outranks the repair person; yet regarding the specific task of getting the machine operational, the CEO is likely to follow the orders of the repair person.

Expert power has within it a built-in point of weakness: as a point of power, expertise diminishes as knowledge is shared. If a manager shares knowledge or skill instruction with his or her employees, in time they will acquire a similar knowledge base or skill set. As the employees grow to equal the manager's knowledge or skills, their respect for the superiority of his expertise diminishes.

The result is either that the manager's authority diminishes or that the manager intentionally chooses not to share his or her knowledge base or skill set with the employees. The former choice weakens the manager's authority over time, while the latter weakens the organization's effectiveness over time.

MULTIDIMENSIONAL POWER

Traditional theories such as those of French and Raven, as well as the empowerment advocates of the 1980s, such as Crosby and Deming, have tended to approach power and authority as one-dimensional. By contrast, several experts have more recently begun to reconfigure how power is viewed to a more multidimensional interweaving of relations or conflicting needs.

For example, Grant, Shani, and Krishnan described TQM's consumer-focused goals and traditional management's economic model of the firm as two inherently opposed paradigms. Because these two paradigms are grounded in two independent sources of authority, they produce different but coexisting dimensions of power.

It has also been argued that authority is culturally based. Geert Hofstede, in one of the most thorough empirical surveys on cross-cultural influences on work-related values, delineated marked differences in what he called "power distance."

For Hofstede, power distance is the degree to which members of a culture feel comfortable with inequalities in power within an organization; that is, the extent to which one's boss is seen as having greater power than oneself. Thus, views regarding both power and leadership shape the conception of authority within an organization. And because both these facets of authority conception differ drastically from culture to culture, authority itself is conceived of differently from society to society.

Consequently, no single dimension of authority and power is likely to hold equally for all managers and employees in a multicultural domestic setting or in the multicultural milieu of the multinational corporation.

Finally, one can also argue against the one-dimensional view of authority and power when they are viewed not as independent elements in the abstract, but as intrinsically derived from relations within the organization. Power and authority are multidimensional because relationships are by nature multidimensional.

Theorists believe that leadership is a function influenced by the leader, the followers, and the situation. Fred Fiedler presented this in the Leadership Contingency Model in the early 1970s, and it is still studied nearly four decades later. Fiedler suggested that the most successful leadership outcome is a result of matching the leader to the situation. Therefore, most valuable leadership in an organization may be those leaders who have proven they are able to adapt and lead successfully in a variety of situations. The optimal organization/leadership style, therefore, is contingent upon various internal and external constraints.

The ways in which managers influence their employees and encourage them to be productive depend on many variables, including the personality of the leader,

the skills of the group/employees, the task or assignment at hand, or the group dynamics and personalities of group members. As with leadership styles, each base of power has its place in management and can prove effective in the right setting and right circumstances.

While most literature on leadership emphasizes the influence of the leader on the group, the opposite is also true. Groups can influence leader behavior by selectively responding to specific leader behaviors. External factors—such as organizational policies, group norms, and individual skills and abilities—also influence leaders. The followers' skills and abilities and the nature of the task itself affect the leader's influence.

Along with leadership styles, there is much similarity and terminology crossover in the study of leadership theories; researchers should examine both terms in the available literature to access the full spectrum of knowledge on the topic of leadership.

SEE ALSO *Leadership Theories and Studies; Management Styles; Organizational Culture; Span of Control*

BIBLIOGRAPHY
Alanazi, F.M., and Arnoldo Rodrigues. "Power Bases and Attribution in Three Cultures." *The Journal of Social Psychology* 143, no. 3 (June 2003): 375–395.

Carson, Paula Phillips, et al. "Power in Organizations: A Look Through the TQM Lens." *Quality Progress* 28, no. 11 (November 1995): 73–78.

Cevallos, Ernie A. "Thoughts on Leadership." *BizThink* 7 May 2007. Available from: http://biz-think.blogspot.com/2007/05/thoughts-on-leadership.html.

Crosby, Philip B. *Quality Is Free: The Art of Making Quality Certain.* New York, NY: McGraw-Hill, 1979.

Deming, W. Edwards. *Out of the Crisis.* Cambridge, MA: Massachusetts Institute of Technology Press, 1986.

French, J.P.R., Jr., and B. Raven. "The Bases of Social Power." In *Studies in Social Power.* Dorwin Cartwright, ed. Ann Arbor, MI: University of Michigan Press, 1959.

Grant, Robert M., Rami Shani, and R. Krishnan. "TQM's Challenge to Theory and Practice." *Sloan Management Review* 35, no. 2 (Winter 1994): 25–35.

Heller, T. "Changing Authority Patterns: A Cultural Perspective." *Academy of Management Review* 10, no. 3 (July 1985): 488–495.

Huey, John. "Sam Walton in His Own Words." *Fortune* 29 June 1992, 98–106.

Imberman, Woodruff. "Managing the Managers." *Progressive Grocer* 84, no. 3 (2005): 26–27.

Knights, David, and Darren McCabe. "Are There No Limits to Authority?: TQM and Organizational Power." *Organization Studies* 20, no. 2 (March 1999): 197–224.

Lewin, Kurt, R. Lippitt, and R.K. White. "Patterns of Aggressive Behavior in Experimentally Created 'social Climates'." *Journal of Social Psychology* 10, no. 2 (May 1939): 271–301.

O'Regan, N., and A. Ghobadian. "Leadership and Strategy: Making it Happen." *Journal of General Management* 29, no. 3 (Spring 2004): 76–92.

Steensma, H., and F. van Milligen. "Bases of Power, Procedural Justice and Outcomes of Mergers: The Push and Pull Factors of Influence Tactics." *Journal of Collective Negotiations* 30, no. 2 (2003): 113–134.

Victor, David A. *International Business Communication.* New York, NY: HarperCollins, 1992.

Vroom, V. H. and A.G. "The Role of the Situation in Leadership." *American Psychologist* 62, no. 1 (January 2007).

LEADERSHIP THEORIES AND STUDIES

Leadership can be defined as a process by which one individual influences others toward the attainment of group or organizational goals. Three points about the definition of leadership should be emphasized. First, leadership is a social influence process. Leadership cannot exist without a leader and one or more followers. Second, leadership elicits voluntary action on the part of followers. The voluntary nature of compliance separates leadership from other types of influence based on formal authority. Finally, leadership results in followers' behavior that is purposeful and goal-directed in some sort of organized setting. Many, although not all, studies of leadership focus on the nature of leadership in the workplace.

Leadership is probably the most frequently studied topic in the organizational sciences. Thousands of leadership studies have been published and thousands of pages on leadership have been written in academic books and journals, business-oriented publications, and general-interest publications. Despite this, the precise nature of leadership and its relationship to key criterion variables such as subordinate satisfaction, commitment, and performance is still uncertain, to the point where Fred Luthans, in his book *Organizational Behavior* (2005), said that "it [leadership] does remain pretty much of a 'black box' or unexplainable concept."

Leadership should be distinguished from management. Management involves planning, organizing, staffing, directing, and controlling, and a manager is someone who performs these functions. A manager has formal authority by virtue of his or her position or office. Leadership, by contrast, primarily deals with influence. A manager may or may not be an effective leader. A leader's ability to influence others may be based on a variety of factors other than his or her formal authority or position.

In the sections that follow, the development of leadership studies and theories over time is briefly traced. Table 1 provides a summary of the major theoretical approaches.

Table 1

Leadership Perspectives

Historical Leadership Theories

Leadership Theory	Time of Introduction	Major Tenets
Trait Theories	1930s	Individual characteristics of leaders are different than those of nonleaders.
Behavioral Theories	1940s and 1950s	The behaviors of effective leaders are different than the behaviors of ineffective leaders. Two major classes of leader behavior are task-oriented behavior and relationship-oriented behavior.
Contingency Theories	1960s and 1970s	Factors unique to each situation determine whether specific leader characteristics and behaviors will be effective.
Leader-Member Exchange	1970s	Leaders from high-quality relationships with some subordinates but not others. The quality of leader-subordinates relationship affects numerous workplace outcomes.
Charismatic Leadership	1970s and 1980s	Effective leaders inspire subordinates to commit themselves to goals by communicating a vision, displaying charismatic behavior, and setting a powerful personal example.
Substitutes for Leadership	1970s	Characteristics of the organization, task, and subordinates may substitute for or negate the effects of leadership behaviors.

HISTORICAL DEVELOPMENT

Three main theoretical frameworks have dominated leadership research at different points in time. These included the trait approach (1930s and 1940s), the behavioral approach (1940s and 1950s), and the contingency or situational approach (1960s and 1970s).

Trait Approach. The scientific study of leadership began with a focus on the traits of effective leaders. The basic premise behind trait theory was that effective leaders are born, not made, thus the name sometimes applied to early versions of this idea—the "great man" theory. Many leadership studies based on this theoretical framework were conducted in the 1930s, 1940s, and 1950s.

Leader trait research examined the physical, mental, and social characteristics of individuals. In general, these studies simply looked for significant associations between individual traits and measures of leadership effectiveness. Physical traits such as height, mental traits such as intelligence, and social traits such as personality attributes were all subjects of empirical research.

The initial conclusion from studies of leader traits was that there were no universal traits that consistently separated effective leaders from other individuals. In an important review of the leadership literature published in 1948, Ralph Stogdill concluded that the existing research had not demonstrated the utility of the trait approach.

Several problems with early trait research might explain the perceived lack of significant findings. First, measure-ment theory at the time was not highly sophisticated. Little was known about the psychometric properties of the measures used to operationalize traits. As a result, different studies were likely to use different measures to assess the same construct, which made it very difficult to replicate findings. In addition, many of the trait studies relied on samples of teenagers or lower-level managers.

Early trait research was largely atheoretical, offering no explanations for the proposed relationship between individual characteristics and leadership.

Finally, early trait research did not consider the impact of situational variables that might moderate the relationship between leader traits and measures of leader effectiveness. As a result of the lack of consistent findings linking individual traits to leadership effectiveness, empirical studies of leader traits were largely abandoned in the 1950s.

Leader Behavior Approach. Partially as a result of the disenchantment with the trait approach to leadership that occurred by the beginning of the 1950s, the focus of leadership research shifted away from leader traits to leader behaviors. The premise of this stream of research was that the behaviors exhibited by leaders are more important than their physical, mental, or emotional traits. The two most famous behavioral leadership studies took place at Ohio State University and the University of Michigan in the late 1940s and 1950s. These studies sparked hundreds of other leadership studies and are still widely cited.

The Ohio State studies utilized the Leader Behavior Description Questionnaire (LBDQ), administering it to samples of individuals in the military, manufacturing companies, college administrators, and student leaders. Answers to the questionnaire were factor-analyzed to determine if common leader behaviors emerged across samples. The conclusion was that there were two distinct aspects of leadership that describe how leaders carry out their role.

Two factors, termed consideration and initiating structure, consistently appeared. Consideration involves showing concern for subordinates, being supportive, recognizing subordinates' accomplishments, and providing for subordinates' welfare. Initiating structure, sometimes called task-oriented behavior, involves planning, organizing, and coordinating the work of subordinates.

The Michigan leadership studies took place at about the same time as those at Ohio State. Under the general direction of Rensis Likert, the focus of the Michigan studies was to determine the principles and methods of leadership that led to productivity and job satisfaction. The studies resulted in two general leadership behaviors or orientations: an employee orientation and a production orientation. Leaders with an employee orientation showed genuine concern for interpersonal relations. Those with a production orientation focused on the task or technical aspects of the job.

The conclusion of the Michigan studies was that an employee orientation and general, instead of close, supervision yielded better results. Likert eventually developed four "systems" of management based on these studies; he advocated System 4 (the participative-group system, which was the most participatory set of leader behaviors) as resulting in the most positive outcomes.

One concept based largely on the behavioral approach to leadership effectiveness was the Managerial (or Leadership) Grid, developed by Robert Blake and Jane Mouton. The grid combines "concern for production" with "concern for people" and presents five alternative behavioral styles of leadership. An individual who emphasized neither method was practicing "impoverished management" according to the grid. If a person emphasized concern for people and placed little emphasis on production, he was termed a "country-club" manager.

Conversely, a person who emphasized a concern for production but paid little attention to the concerns of subordinates was a "task" manager. A person who tried to balance concern for production and concern for people was termed a "middle-of-the-road" manager.

Finally, an individual who was able to simultaneously exhibit a high concern for production and a high concern for people was practicing "team management." According to the prescriptions of the grid, team management was the best leadership approach. The Managerial Grid became a

major consulting tool and was the basis for a considerable amount of leadership training in the corporate world.

The assumption of the leader behavior approach was that there were certain behaviors that would be universally effective for leaders. Unfortunately, empirical research has not demonstrated consistent relationships between task-oriented or person-oriented leader behaviors and leader effectiveness. Like trait research, leader behavior research did not consider situational influences that might moderate the relationship between leader behaviors and leader effectiveness.

Contingency (Situational) Approach. Contingency or situational theories of leadership propose that the organizational or work group context affects the extent to which given leader traits and behaviors will be effective. Contingency theories gained prominence in the late 1960s and 1970s. Four of the more well-known contingency theories are Fiedler's contingency theory, path-goal theory, the Vroom-Yetton-Jago decision-making model of leadership, and the situational leadership theory. Each of these approaches to leadership is briefly described in the paragraphs that follow.

Introduced in 1967, Fiedler's contingency theory was the first to specify how situational factors interact with leader traits and behavior to influence leadership effectiveness. The theory suggests that the "favorability" of the situation determines the effectiveness of task- and person-oriented leader behavior.

Favorability is determined by (1) the respect and trust that followers have for the leader; (2) the extent to which subordinates' responsibilities can be structured and performance measured; and (3) the control the leader has over subordinates' rewards. The situation is most favorable when followers respect and trust the leader, the task is highly structured, and the leader has control over rewards and punishments.

Fiedler's research indicated that task-oriented leaders were more effective when the situation was either highly favorable or highly unfavorable, but that person-oriented leaders were more effective in the moderately favorable or unfavorable situations. The theory did not necessarily propose that leaders could adapt their leadership styles to different situations, but that leaders with different leadership styles would be more effective when placed in situations that matched their preferred style.

Fiedler's contingency theory has been criticized on both conceptual and methodological grounds. However, empirical research has supported many of the specific propositions of the theory, and it remains an important contribution to the understanding of leadership effectiveness.

Path-goal theory was first presented in a 1971 *Administrative Science Quarterly* article by Robert House. Path-goal

theory proposes that subordinates' characteristics and characteristics of the work environment determine which leader behaviors will be more effective. Key characteristics of subordinates identified by the theory are locus of control, work experience, ability, and the need for affiliation. Important environmental characteristics named by the theory are the nature of the task, the formal authority system, and the nature of the work group. The theory includes four different leader behaviors, which include directive leadership, supportive leadership, participative leadership, and achievement-oriented leadership.

According to the theory, leader behavior should reduce barriers to subordinates' goal attainment, strengthen subordinates' expectancies that improved performance will lead to valued rewards, and provide coaching to make the path to payoffs easier for subordinates. Path-goal theory suggests that the leader behavior that will accomplish these tasks depends upon the subordinate and environmental contingency factors.

Path-goal theory has been criticized because it does not consider interactions among the contingency factors and also because of the complexity of its underlying theoretical model, expectancy theory. Empirical research has provided some support for the theory's propositions, primarily as they relate to directive and supportive leader behaviors.

The Vroom-Yetton-Jago decision-making model was introduced by Victor Vroom and Phillip Yetton in 1973 and revised by Vroom and Jago in 1988. The theory focuses primarily on the degree of subordinate participation that is appropriate in different situations. Thus, it emphasizes the decision-making style of the leader.

There are five types of leader decision-making styles, which are labeled AI, AII, CI, CII, and G. These styles range from strongly autocratic (AI), to strongly democratic (G). According to the theory, the appropriate style is determined by answers to up to eight diagnostic questions, which relate to such contingency factors as the importance of decision quality, the structure of the problem, whether subordinates have enough information to make a quality decision, and the importance of subordinate commitment to the decision.

The Vroom-Yetton-Jago model has been criticized for its complexity, for its assumption that the decision makers' goals are consistent with organizational goals, and for ignoring the skills needed to arrive at group decisions to difficult problems. Empirical research has supported some of the prescriptions of the theory.

The situational leadership theory was initially introduced in 1969 and revised in 1977 by Hersey and Blanchard. The theory suggests that the key contingency factor affecting choice of leadership style is the task-related maturity of the subordinates. Subordinate maturity is defined as the ability of subordinates to accept responsibility for their own task-related behavior. The theory classifies leader behaviors into the two broad classes of task-oriented and relationship-oriented behaviors. The major proposition of situational leadership theory is that the effectiveness of task and relationship-oriented leadership depends upon the maturity of a leader's subordinates.

Situational leadership theory has been criticized on both theoretical and methodological grounds. However, it remains one of the better-known contingency theories of leadership and offers important insights into the interaction between subordinate ability and leadership style.

RECENT DEVELOPMENTS

Although trait, behavioral, and contingency approaches have each contributed to the understanding of leadership, none of the approaches have provided a completely satisfactory explanation of leadership and leadership effectiveness. Since the 1970s, several alternative theoretical frameworks for the study of leadership have been advanced. Among the more important of these are leader-member exchange theory, transformational leadership theory, the substitutes for leadership approach, and the philosophy of servant leadership.

Leader-Member Exchange Theory. Leader-member exchange (LMX) theory was initially called the vertical dyad linkage theory. The theory was introduced by George Graen and various colleagues in the 1970s and has been revised and refined in the years since. LMX theory emphasizes the dyadic (i.e., one-on-one) relationships between leaders and individual subordinates, instead of the traits or behaviors of leaders or situational characteristics.

The theory's focus is determining the type of leader-subordinate relationships that promote effective outcomes and the factors that determine whether leaders and subordinates will be able to develop high-quality relationships.

According to LMX theory, leaders do not treat all subordinates in the same manner, but establish close relationships with some (the in-group) while remaining aloof from others (the out-group). Those in the in-group enjoy relationships with the leader that are marked by trust and mutual respect. They tend to be involved in important activities and decisions. Conversely, those in the out-group are excluded from important activities and decisions.

LMX theory suggests that high-quality relationships between a leader-subordinate dyad will lead to positive outcomes such as better performance, lower turnover, job satisfaction, and organizational commitment. Empirical research supports many of the proposed relationships.

Transformational Leadership Theories. Beginning in the 1970s, a number of leadership theories emerged that focused on the importance of a leader's charisma to

leadership effectiveness. Included within this class of theories are House's theory of charismatic leadership, Bass's transformational leadership theory, and Conger and Kanungo's charismatic leadership theory.

These theories have much in common. They all focus on attempting to explain how leaders can accomplish extraordinary things against the odds, such as turning around a failing company, founding a successful company, or achieving great military success. The theories also emphasize the importance of leaders inspiring subordinates' admiration, dedication, and unquestioned loyalty through articulating a clear and compelling vision.

Transformational leadership theory differentiates between the transactional and the transformational leader. Transactional leadership focuses on role and task requirements and utilizes rewards contingent on performance. By contrast, transformational leadership focuses on developing mutual trust, fostering the leadership abilities of others, and setting goals that go beyond the short-term needs of the work group.

Bass's transformational leadership theory identifies four aspects of effective leadership, which include charisma, inspiration, intellectual stimulation, and consideration. A leader who exhibits these qualities will inspire subordinates to be high achievers and put the long-term interest of the organization ahead of their own short-term interest, according to the theory. Empirical research has supported many of the theory's propositions.

Substitutes for Leadership Theory. Kerr and Jermier introduced the substitutes for leadership theory in 1978. The theory's focus is concerned with providing an explanation for the lack of stronger empirical support for a relationship between leader traits or leader behaviors and subordinates' satisfaction and performance. The substitutes for leadership theory suggests that characteristics of the organization, the task, and subordinates may substitute for or negate the effects of leadership, thus weakening observed relationships between leader behaviors and important organizational outcomes.

Substitutes for leadership make leader behaviors such as task-oriented or relationship-oriented unnecessary. Characteristics of the organization that may substitute for leadership include formalization, group cohesiveness, inflexible rules, and organizational rewards not under the control of the leader. Characteristics of the task that may substitute for leadership include routine and repetitive tasks or tasks that are satisfying. Characteristics of subordinates that may substitute for leadership include ability, experience, training, and job-related knowledge.

The substitutes for leadership theory has generated a considerable amount of interest because it offers an intuitively appealing explanation for why leader behavior impacts subordinates in some situations but not in others. However, some of its theoretical propositions have not been adequately tested. The theory continues to generate empirical research.

Servant Leadership. This approach to leadership reflects a philosophy that leaders should be servants first. It suggests that leaders must place the needs of subordinates, customers, and the community ahead of their own interests in order to be effective. Characteristics of servant leaders include empathy, stewardship, and commitment to the personal, professional, and spiritual growth of their subordinates. Servant leadership has not been subjected to extensive empirical testing but has generated considerable interest among both leadership scholars and practitioners.

Entrepreneurial Leadership. The entrepreneurship theory of leadership, which started developing in the 1970s, is a dynamic process of vision, change, and creation. Entrepreneurial leaders are able to create visionary scenarios to assemble and mobilize a team committed to discovering strategic value creation. These leaders aim to improve performance, adaptability, and long-term potential, particularly in highly competitive and invariably changing business environments. The entrepreneurial leader aims to drive employees to higher levels of achievement by utilizing inventive organizational strategies.

Essential ingredients of the entrepreneurial leader are the willingness to take calculated risks—in terms of time, equity, or career; the ability to form an effective venture team; the creative skill to organize the needed resources; the fundamental skill of building a solid business plan; and, finally, the vision to recognize opportunity where others see chaos, contradiction, and confusion.

Regardless of the type of leadership employed, leaders everywhere have similarities. Wharton Business School professor, Robert J. House, created the Global Leadership and Organization Effectiveness (GLOBE) research program in the early 1990s to determine what defined leaders around the world and to compare their styles and values. GLOBE has demonstrated that effective leaders have similarities; they are charismatic, dynamic, optimistic, and socially adept, and are expected to be trustworthy and have foresight. Most leaders rely on team performance and have developed styles for dealing and operating with leaders from different cultures.

Leadership continues to be one of the most written about topics in the social sciences. Although much has been learned about leadership since the 1930s, many avenues of research, such as the GLOBE program, still remain to be explored.

SEE ALSO *Contingency Approach to Management;*
Leadership Styles and Bases of Power; Management Styles

BIBLIOGRAPHY

Bass, Bernard M., Bruce J. Avolio, Dong I. Jung, and Yair Berso. "Predicting Unit Performance by Assessing Transformational and Transactional Leadership." *Journal of Applied Psychology* 88, no. 2 (2003): 207–218.

Blank, Warren, John R. Weitzel, and Stephen G. Green. "A Test of the Situational Leadership Theory." *Personnel Psychology* 43, no. 3 (1990): 579–597.

Fiedler, Fred E. *A Theory of Leadership Effectiveness.* New York, NY: McGraw-Hill, 1967.

Graeff, Claude L. "The Situational Leadership Theory: A Critical View." *Academy of Management Review* 8, no. 2 (1983): 285–291.

Graen, George, and William Schiemann. "Leader-Member Agreement: A Vertical Dyad Linkage Approach." *Journal of Applied Psychology* 63 (1978): 206–212.

Greenberg, Jerald, and Robert A. Baron. *Behavior in Organizations: Understanding and Managing the Human Side of Work.* Upper Saddle River, NJ: Prentice-Hall, 2000.

Gupta, Vipin, Ian C. MacMillan, and Gita Surie. "Entrepreneurial Leadership: Developing and Measuring a Cross-Cultural Construct." *Journal of Business Venturing* 19, no. 2 (2004); 241–260. Available from: http://www.leadershipreview.org/2004summer/BergstromArticle.pdf.

House, Robert J. "A Path-Goal Theory of Leader Effectiveness." *Administrative Science Quarterly* 16 (1971): 321–339.

House, Robert J., and Ram N. Aditya. "The Social Scientific Study of Leadership: Quo Vadis?" *Journal of Management* 23, no. 3 (1997): 409–473.

Kinicki, Angelo, and Robert Kreitner. *Organizational Behavior.* Boston, MA: McGraw-Hill Irwin, 2006.

Kirkpatrick, Shelley A., and Edwin A. Locke. "Leadership: Do Traits Matter?" *Academy of Management Executive* 5, no. 2 (1991): 48–60.

Kuratko, Donald F. "Entrepreneurial Leadership in the 21st Century: Guest Editor's Perspective." *Journal of Leadership and Organization Studies* 22 June 2007. Available from: http://goliath.ecnext.com/coms2/gi_0199-6643013/Entrepreneurial-leadership-in-the-21st.html#abstract.

Luthans, Fred. *Organizational Behavior.* Boston, MA: McGraw-Hill Irwin, 2005.

Podsakoff, Philip M., et al. "Do Substitutes for Leadership Really Substitute for Leadership? An Empirical Examination of Kerr and Jermier's Situational Leadership Model." *Organizational Behavior and Human Decision Processes* 54, 1 (1993): 1–44.

Steers, Richard M., Lyman W. Porter, and Gregory A. Bigley. *Motivation and Leadership at Work.* New York: McGraw-Hill, 1996.

Stogdill, Ralph M. "Personal Factors Associated with Leadership: A Survey of the Literature." *Journal of Psychology* 25 (1948): 335–71.

Stogdill, Ralph M., and Bernard M. Bass. *Handbook of Leadership: A Survey of Theory and Research.* New York, NY: Free Press, 1974.

Tarrant, Deborah. "Where to for Leadership?" *Management Today* May 2008. Available from: http://www.aim.com.au/DisplayStory.asp?ID=665.

Vroom, Victor H., and Phillip W. Yetton. *Leadership and Decision Making.* Pittsburgh, PA: University of Pittsburgh Press, 1973.

Wren, Daniel A. *The Evolution of Management Thought.* New York, NY: Wiley, 1994.

Yukl, Gary. *Leadership in Organizations.* Englewood Cliffs, NJ: Prentice-Hall, 1994.

LEAN MANUFACTURING AND JUST-IN-TIME PRODUCTION

Associated with Japanese management techniques, just-in-time production (JIT) is a set of principles and practices based on the philosophy that firms should hold little or no inventory beyond that required for immediate production or distribution. That is, a manufacturer should receive raw materials or parts from its suppliers perhaps just hours before they will be used in production, and the firm's output should be shipped to its customers as soon after completion as possible—without holding onto a stock of either raw goods or finished products.

In practice, JIT has often been expressed as a holistic management system aimed at reducing waste, maximizing cost efficiency, and securing a competitive advantage. Thus, a number of additional conditions are considered necessary for the successful implementation of JIT. These include small lot sizes, short setup and changeover times, efficient and effective quality controls, and perhaps most of all, designing the whole production process to minimize back-ups and maximize the efficiency of human and machine labor.

Lean manufacturing encompasses a number of things. It essentially is a Westernized version of JIT and Japanese *kaizen*, or continuous improvement. Lean manufacturing is a process for measuring and reducing inventory and streamlining production. It is a means for changing the way a company measures plant performance. A knowledge-based system, lean manufacturing takes years of hard work, preparation, and support from upper management. Lean manufacturing is so named because it purports to use much less of certain resources (space, inventory, workers, etc.) than is used by normal mass-production systems to produce comparable output. The term came into widespread use with the 1990 publication of the book *The Machine That Changed the World* by James P. Womack, Daniel T. Jones, and Daniel Roos. The book is based on the MIT five-year International Motor Vehicle Program's study of the auto industry in fourteen countries. This seminal study of the automobile industry explains the concept of lean production to a North American audience for the first time.

The *APICS Dictionary* defines lean manufacturing as a philosophy of production that emphasizes minimizing the amount of all resources (including time) used in various enterprise activities. It involves identifying and eliminating non-value-adding activities in design, production, supply chain management, and customer relations. Lean producers employ teams of multi-skilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety. In effect, they

incorporate the advantages of both mass production (high volume, low unit cost) and craft production (variety and flexibility). Quality is higher than in normal mass production. Compensation and rewards are based on meeting the total cost equation rather than on labor, overhead, or individual quality measures.

Lean manufacturing and JIT (lean/JIT) share most of the same characteristics, goals, and philosophy. In fact, the terms are often used interchangeably.

HISTORY OF LEAN MANUFACTURING/JIT

Since Japan is a physically small country with minimal resources and a large population, the Japanese have always been careful not to waste resources such as time, labor, and space. Waste is seen as abhorrent to the Japanese because they have so little space and so few natural resources. Hence, it has been necessary for the Japanese to maximize the yield from minimally available resources. Also, dense population has made it necessary for the Japanese people to maintain mutual respect in order to work and live together.

Under this *wa* (harmony) culture, everyone tries to maintain the best possible human relationship and is reluctant to be involved in any confrontations. Additionally, most Japanese firms have a *rentai* relationship, which entails maintaining a "joint responsibility" between management and workers. Under this relationship, management should treat all workers equally. In exchange, each worker respects management's leadership position and follows orders exactly without mistakes, cooperates with coworkers, and generates ideas and creativity to improve the firm's competitiveness. This type of culture reinforces the basic tenets of lean/JIT: waste minimization, continuous improvement, and respect for all workers.

This concept was originally developed in Japan in the mid-1970s by the Toyota Motor Corporation. In fact, many firms continue to refer to lean/JIT as the Toyota system. The concept emphasized the avoidance of waste of materials, space, and labor. Significant attention was paid to identifying and correcting potential problems that could lead to any form of waste. Operations were constantly being improved and fine-tuned so as to further eliminate waste and thereby increase productivity and yield. In addition, equal respect was paid to all workers, while minimizing the trappings of status. As a result, by using lean/JIT, Toyota was able to reduce the time needed to produce a car from fifteen days to one day.

In the June 2008 issue of the *Harvard Business Review*, Hirotaka Takeuchi, Emi Osono, and Norihiko Shimizu examine "The Contradictions That Drive Toyota's Success." Two characteristics of the Toyota Corporation that are thought to be germane to the company's success are the setting of vague goals and the company's eagerness to experiment. Toyota President Katsuaki Watanabe tells his employees that his goal is to "build a car that makes the air cleaner, prevents accidents, makes people happier and healthier when they drive it, and gets you from coast to coast on one tank of gas." The philosophy is that by assigning broad goals, researchers are allowed the freedom to explore innovative paths to improve the product. Toyota's commitment to constantly improving their operations requires a steady stream of new ideas and concepts. By encouraging employees to try new things in order to gain knowledge from their successes and failures, Toyota has turned the management process of Plan-Do-Check-Act process into the Toyota Business Practices (TBP), which outlines a routine for experimentation that encompasses eight steps:

- Clarify the problem
- Break down the problem
- Set a target
- Analyze the root cause
- Develop countermeasures
- See countermeasures through
- Monitor both results and processes
- Standardize successful processes

Vague goals and routine experimentation are two of the ways in which Toyota has been able to implement the principle of continuous improvement successfully.

United States. In 1924 Henry Ford's Highland Park plant, and later the River Rouge operation, mass-produced Model T parts just-in-time for assembly while assembly lines pulled work forward to the next assembly stations just-in-time. One hundred freight cars of material were unloaded daily, with materials flowing through fabrication, subassembly, final assembly, and back onto the freight cars. The production cycle was twenty-one days. At River Rouge the cycle was only four days, and that included processing ore into steel at the on-site steel mill.

Unfortunately, this "just-in-time" type manufacturing soon gave way to the large lot sizes and lengthy cycle times dictated by the economies of scale of mass production, mass markets, and standard designs with interchangeable parts. U.S. manufacturers held on to this paradigm until the early 1980s, when the development of the Toyota production system caused it to shift. U.S. manufacturers initially greeted lean/JIT with a great deal of ambivalence, thinking that the concept would never work in the United States due to its reliance on the cultural aspects of the Japanese work environment. However, this view changed when firms such as Hewlett-Packard and Harley-Davidson yielded significant benefits from its use.

MANUFACTURING

The idea behind lean/JIT is a concept called ideal production. Simply produce and deliver finished goods just in time to be sold, subassemblies just in time to go into subassemblies, and purchased materials just in time to be transformed into fabricated parts. The goal of lean/JIT is to find practical ways to create the effect of an automated industry that will come as close as possible to this concept of ideal production.

While the prevailing view of lean/JIT is that of an inventory control system, lean/JIT goes much further. It is an operational philosophy that incorporates an improved inventory control system in conjunction with other systems. These systems include:

- A setup improvement system

- A maintenance improvement system

- A quality improvement system

- A productivity improvement system

Inventory Control System. When larger quantities are ordered or produced, average inventory obviously is larger. This larger inventory results in increased inventory-carrying charges. If a reduction in carrying costs is desired, smaller quantities should be ordered and orders should be placed more often. However, the practice of ordering smaller quantities can have the side effect of increasing ordering costs. To balance these two costs, the concept of economic order quantity (EOQ) was developed. The EOQ formula derives the point, or order quantity, where inventory carrying costs and ordering or setup costs are the same. An order of this quantity will minimize the sum of the two costs.

However, the EOQ formula is flawed. While carrying costs and ordering/setup costs are obvious, other costs that can significantly affect lot size are not considered. The user of the formula often fails to consider quality, scrap, productivity, and worker motivation and responsibility. In addition, the EOQ formula user frequently fails to consider that even though setup costs are significant, they are not unalterable. American manufacturing managers traditionally considered setup costs as a necessary evil and made little or no effort to reduce them.

The lean/JIT philosophy suggests that a firm should eliminate any reliance upon the EOQ formula and seek the ideal production quantity of one. Of course, a lot size of one is not always feasible, but it is a goal used to focus attention on the concept of rapid adjustments and flexibility. Naturally, a reduction in inventory levels means an increase in setups or orders, so the responsibility rests with production to make every effort to reduce setup time and setup costs. It should be noted that this assumes setup time and cost are positively related. This is not always true

because the cost to reduce setup time could be very high if retooling or equipment redesign are involved.

Setup Cost Reduction System. Toyota began a campaign to reduce setup times in 1971. Five years later, the time required to set up presses to form fenders and hoods had fallen from 1 hour to 12 minutes, while U.S. manufacturers needed 6 hours to perform the same task. As the company continued to emphasize reduction of setup times, its operations became capable of "one-touch" setups, which take less than 1 minute.

Setup time can be divided into two phases: external time and internal time. External time includes activities that can take place while the machine is running, such as transporting dies between storage and the machines. These items are external to the run time and do not interrupt it. Internal time includes activities that can only be conducted when the machine is stopped, such as mounting and removing dies. These are items that will interrupt the run time. Ensuring that appropriate tools are ready before changeover begins can eliminate external time. Internal time can be reduced by addressing the question, "How can operations be quickened?" Appropriate responses could include the use of locating pins and hand levers to replace bolts, the standardization of any remaining bolts, permanent installation of wrenches for adjusting nuts, and the use of an air driver instead of a ratchet.

Management tends to analyze the large, obvious costs such as direct labor, but then treats setup as an inherent cost that must be accepted. However, only by reducing setup time and costs can lot sizes be reduced toward the ideal lot size of one.

Preventive Maintenance System. Most arguments against preventive maintenance (PM) suggest that PM programs are more expensive than programs that only repair broken equipment. The flaw in this line of thought arises from the unpredictable nature of equipment breakdown. This reaction mode of maintenance usually means that the maintenance personnel must temporarily patch the equipment and defer the substantive repair until time allows. Unfortunately, since the equipment already has suffered lost time due to the initial breakdown, the likelihood of finding repair time decreases. The result often is a circular process of "adjust and tinker," with an increased risk of unexplained defects in the output.

A proposed requirement for lean/JIT is that machinery be in top running condition at all times. When using small lot sizes, management can ill afford unexpected downtime in production flow. Equipment must be in condition to produce whatever is needed, whenever it is needed. Therefore, a little time should be scheduled each

day to ensure that machinery is capable of producing top quality results. Preventive maintenance is necessary for continuous, long-term improvement in the quality of the production process.

Quality Improvement System. In order for companies to successfully produce goods while receiving only minimum deliveries, no room can be allowed for poor quality. This requires an overhaul in the thinking of management, which traditionally sought the so-called acceptable quality level (AQL). After receipt, delivered goods are randomly inspected to see how many defective parts there are within a predetermined sample size. If the number of defects exceeds a certain amount (the AQL), the entire batch is rejected. No such provision is made under lean/JIT; all parts must be good. The Japanese use the term *zero defects* to describe this philosophy.

Zero defects certainly cannot be obtained overnight, nor can it be expected from all of a firm's current suppliers. To facilitate the receipt of high quality goods, a firm must offer more than the usual short-term contract or purchase order to the lowest bidder. A firm also may have to eliminate or decrease the use of multiple sourcing, or purchasing the same part from several sources as a backup in case one source experiences quality or delivery problems. By issuing long-term contracts to a single source, the lean/JIT firm gives its supplier the confidence and incentive to spend time and money on ensuring near perfect quality while constantly improving the product. Frequently, this makes for a captive supplier who must maintain the required quality in order to survive. The lean/JIT firm should then work constantly and directly with the supplier to monitor quality and provide technical support.

The use of lean/JIT improves the quality of suppliers, as well as the lean/JIT firm's internal quality. When lot sizes are drastically reduced, defect discovery is naturally enhanced. If a worker produces a lot size of one and passes it to the next station, the quality of feedback will be immediate. In this way, defects are discovered quickly and their causes can be corrected immediately. Production of large lots with high defect rates is avoided.

U.S. manufacturers traditionally allowed lot sizes and inventory levels to remain high "just in case" a quality problem, an equipment problem, or a delivery problem should arise. This "just in case" inventory, commonly called buffer stock, allowed the firm to maintain its production flow while the problem was being corrected. When a quality problem emerged and inventory was ample, the search for the source of the problem was postponed until a more suitable time. This suitable time may have never occurred. When lot sizes are minimal, one worker's problem threatens to bring subsequent processes to a halt. This

means that all production workers and management must collaborate to find an immediate solution. The benefits here are twofold. First, the firm avoids the production of large quantities of defective parts. Secondly, good managers will be able to use this as motivation for unity of purpose within the workforce.

Productivity Improvement System. Productivity can be defined as good output divided by required input. The productivity facet of lean/JIT has been described as nothing sitting idle, which wastes time. If equipment is operated only for productive purposes, then energy waste is eliminated. If all inventory is converted into product, then material waste is eliminated. If errors are not allowed, then rework is eliminated.

A number of productivity improvements may result from lean/JIT implementation. Among these are lower inventory levels, lower scrap rates, reductions in rework costs, reductions in inventory carrying costs, smaller floor space requirements, reduced material handling, simpler inventory accounting, and more positive inventory control. All of these lower the input component or increase the good output of the productivity ratio.

Reductions in idle inventories allow the firm to reduce internal lead times—from the purchase of raw materials to the shipping of finished goods—allowing quicker changes in product mix and production quantities. Furthermore, the firm's ability to forecast is enhanced because the forecast horizon is shortened.

TEN STEPS TO LEAN/JIT PRODUCTION

Steve L. Hunter lists ten steps to implement a lean/JIT production system:

1. Reengineer the manufacturing system
2. Reduce setup
3. Integrate quality control
4. Integrate preventive maintenance
5. Level and balance the system
6. Integrate a pull system
7. Control inventory
8. Implement a vendor program
9. Utilize computer integrated manufacturing (CIM) benefits

SIX SIGMA AND LEAN SIX SIGMA

Six Sigma is a management process that shares many characteristics with just-in-time manufacturing and lean production. Developed by Motorola in the 1980s, the strategy encompasses a set of practices inspired by other

management methods such as quality control and zero defects. Six Sigma aims to identify and correct constraints on manufacturing and other business processes in order to achieve a specific financial objective. In Six Sigma, defects include any attribute of the business that could result in customer dissatisfaction.

The term "Sigma" refers to a scale for measuring quality. Processes that operate at "Six Sigma quality" produce fewer than 3.4 defects per million opportunities (DPMO). The management system aims to reduce the frequency of defects in all processes to this level. According to the Motorola University, the Six Sigma improvement methodology has four focuses:

1. Understanding and managing customer requirements

2. Aligning key business processes to achieve those requirements

3. Utilizing rigorous data analysis to minimize variation in those processes

4. Driving rapid and sustainable improvement to business processes

The Six Sigma management system is a framework for creating clear objectives and aligning improvement efforts with the overall business strategy. Six Sigma is applied from the top down of an organization. Martial arts rankings—from green belts through to champion black belts, who work directly under the executive leadership—are used to establish a hierarchy of business functions.

When principles of Six Sigma and lean manufacturing are used together, it is called Lean Six Sigma. This methodology yields process improvement through the use of quantitative analysis and rigorous cost reduction through the elimination of waste.

Lean Six Sigma has been used to streamline IT operations at Bank of America Corporation, Sara Lee Corporation, Xerox Corporation, General Electric, and Seagate Technology. Sara Lee required that all of its IT employees become certified in Lean Six Sigma before the company began the implementation of SAP software. By making Lean Six Sigma the educational standard in the IT department, Sara Lee was able to obtain strategic alignment. CIO Mark Brewer of Seagate used Six Sigma to solve what was believed to be a bandwidth problem. Six Sigma processes were used to calculate server response times, and when the discrepancies between them were analyzed, the IT department realized that the problem was not with the bandwidth. This discovery ended up saving the company from a huge expense that would not have addressed the initial problem. Brewer claims that once he began thinking of IT operations as a factory, Six Sigma immediately became relevant.

BENEFITS OF LEAN/JIT PRODUCTION

While it was noted that inventory reduction is not the sole goal of lean/JIT implementation, it is a very obvious benefit. Less workspace is now needed due to the use of smaller lot sizes and reduced inventory levels. Much of this inventory was stored between and within work centers. By reducing inventory, firms have been able to actually move work centers closer together, freeing up space and reducing material handling distances. This results in a neater, more organized facility that provides for speedy identification of bottlenecks and fewer lost parts.

Additionally, this reduction in inventory and lot sizes promotes rapid feedback from downstream work centers when there is a quality problem. This feedback results in a reduction in scrap and rework, and ultimately a higher level of overall quality.

Reduced inventory and lot sizes also result in increased inventory turns. Inventory turn increases have been noted at Haworth, Hewlett-Packard, Richardson-Vicks Homecare Products, IBM, Raleigh (a fourfold increase), and Harley-Davidson.

The introduction of preventive maintenance and the use of smaller, more flexible machinery combine to yield increased equipment utilization. One major firm was able to change from three lines running three shifts to two lines running one shift with no change in output.

The next phase of lean manufacturing is lean product development, where companies seek a competitive advantage by shortening the time-to-market cycle. At Toyota, engineers and manufacturers collaborate in the development process with the goal of designing a product that facilitates lean manufacturing.

The lean/JIT producer combines the advantages of craft and mass production, while avoiding the high cost of the former and the rigidity of mass production. Lean/JIT producers set their sights explicitly on perfection: continually declining costs, zero defects, zero inventories, and endless product variety. Lean/JIT manufacturing is the new paradigm for manufacturing, replacing a mass-production system that has existed for more than seventy years.

SEE ALSO *Cellular Manufacturing; Continuous Improvement; Flexible Manufacturing; Japanese Management; Poka-Yoke; Quality and Total Quality Management; World-Class Manufacturer*

BIBLIOGRAPHY
Cox, James F., III, and John H. Blackstone, Jr. *APICS Dictionary.* 9th ed. Falls Church, VA: American Production and Inventory Control Society, 1998.
Hayes, Bruce. Manage IT Projects and Resources the Six Sigma Way. *Six Sigma.* 2008. Available from: http://software.isixsigma.com/library/content/c080507a.asp

Hunter, Steve L. "The 10 Steps to Lean Production." *FDM* 76, no. 5 (2004): 22–25.

Kerri. DMAIC Versus DMADV. *Six Sigma.* 2008. Available from: http://www.isixsigma.com/library/content/c001211a.asp

Stevenson, William J. *Operations Management.* 8th ed. Boston: Irwin/McGraw-Hill, 2005.

Takeuchi, Hirotaka et al. "The Contradictions That Drive Toyota's Success." *Harvard Business Review.* June, 2008. Available from: http://harvardbusinessonline.hbsp.harvard.edu/hbsp/hbr/articles/article.jsp?articleID=R0806F&ml_action=get-article&print=true&ml_issueid=BR0806

Teresco, John, "Toyota's Real Secret: Hint, It's Not TPS." *Industry Week* 1 February 2007. Available from: http://www.industryweek.com/ReadArticle.aspx?ArticleId=13432

Womack, James P., and Daniel T. Jones. *Lean Thinking: Banish Waste and Create Wealth in Your Corporation.* New York: Simon & Schuster, 1996.

Womack, James P., Daniel T. Jones, and Daniel Roos. *The Machine That Changed the World: Based on the Massachusetts Institute of Technology 5-Million Dollar 5-Year Study on the Future of the Automobile.* New York: Rawson Associates, 1990.

LEVERAGED BUYOUTS

A leveraged buyout (LBO) is a restructuring of the capitalization and ownership of a company. The term *leveraged* refers to the use of debt as the primary method of financing the restructuring. The *buyout* portion refers to the fact that the method is often used to transform a publicly held company into one that is privately held. There are a number of reasons why this type of transaction might take place. These include cost savings, managerial incentives, and tax benefits.

A private equity firm is an investment manager that buys up companies using one of a number of strategies referred to as private equity; one of these strategies is the LBO. When an investor uses debt to acquire a company, the investor does not have to put down all of the capital required to make the acquisition. Once the company has been acquired, its cash flows are used to repay the debt. The investor makes large returns when the company is sold because the investor only put up a fraction of the original purchasing price. In other cases, the group pursuing the buyout might include the publicly held firm's upper management. This type of action is known as a management buyout (MBO).

Among the multiple parties involved when a public firm is taken private, there normally are both winners and losers. Existing shareholders who have their shares purchased in the buyout often win big. This is because most LBOs involve the payment of a premium over the market price at which the shares were trading prior to the announcement of the takeover. Similarly, the parties taking control of the firm gain managerial control and the enhanced flexibility normally associated with privately run

firms. The new owners also have access to the firm's assets and cash flows, which formerly were part of the public corporation.

The biggest losers in an LBO are the firm's existing creditors. Because the buyout is financed primarily with debt capital, existing bondholders become creditors of a much riskier firm. This drives down the market value of outstanding bonds and makes future debt service much more uncertain. During the 1980s, a number of institutional investors who held large bond positions in firms that were the subject of MBOs sued the management of the firms. They claimed that managers knowingly engaged in activities that harmed their economic investment as creditors of the corporation. These suits resulted in settlements and damage awards in several instances.

HISTORY OF LEVERAGED BUYOUTS

When a public firm experiences an LBO, its entire equity is purchased by a small group of investors. In order to entice existing shareholders to sell the firm's outstanding shares, the group often offers a premium above the stock's prevailing market value. The capital they need to purchase the shares is obtained by issuing debt, in the form of bonds, against the firm's assets and cash flows. From a balance-sheet perspective, the action all takes place on the right-hand side. That is, the transaction involves the exchange of debt for equity. The result is that creditors have a larger claim, and owners a smaller claim, on the firm's assets. Note that the assets on the left-hand side of the firm's balance sheet do not change. Instead, what changes is how they are financed.

During the 1980s, leveraged buyouts became a huge part of America's corporate landscape. This largely was the result of a single investment banking firm, Drexel Burham Lambert, and the efforts of one of its principals, Michael Milken. It was Milken who determined that high-yield bonds could fill an existing funding gap in corporate financing. The bonds, commonly referred to as *junk bonds* because of their riskiness, would be enticing to investors who otherwise might not be willing to take an equity position in high-risk firms. Drexel developed a market for junk bonds and served as the investment bank for corporate raiders and management groups interested in taking over existing corporations. The market flourished for several years, before Milken was prosecuted and convicted of securities violations. Drexel Burham Lambert ultimately went bankrupt, but the firm's legacy lives on in the active market for high-yield debt and private equity firms.

REASONS FOR TAKING
A FIRM PRIVATE

The junk bond market enabled small investor groups to raise large sums of money in order to take public companies

private. A number of reasons motivated managers and investors to pursue LBOs.

One advantage that a private firm has over a public one is administrative cost savings. A publicly traded company must produce annual reports, 10-K reports, comply with numerous regulations required by the Securities and Exchange Commission, hold annual shareholder meetings, and respond to shareholder requests. The management of publicly held firms must meet regularly with security analysts who follow the firm's stock, and maintain a shareholder relations department to deal with investor concerns. These costs are not required of a privately held firm.

In a private firm, managers no longer have to answer to the shareholder constituency. Lack of public accountability translates into greater management flexibility, since managers no longer have to focus as strongly on short-term operating results. The intense interest in reported quarterly earnings can bias managers in public firms to devote a great amount of effort and resources on short-term performance. Thus, managers of private firms have the luxury of being able to engage in investment activity that takes longer to produce tangible rewards. This greater flexibility and freedom from having to answer to shareholders is very enticing to upper-level management.

In addition, the process of buying up existing shares of the firm's stock severely diminishes the absolute number of shareholders. Because of their large capital investment and the fact that they now answer to themselves, the shareholders that remain after an LBO are highly interested in the firm's operations. These shareholders play an active role in the firm's management, as opposed to the hundreds of thousands of passive investors that hold a publicly traded firm's common stock.

The new entity's management has enhanced incentives to operate efficiently and profitably. This is because the high amount of debt service resulting from an LBO leaves little room for corporate perks and excess. The combination of having to pay the large interest expense on the debt and, in the case of MBOs, working for themselves as opposed to anonymous shareholders, results in much greater motivation for management to perform. Equity holders remaining after an LBO often have some special expertise or talent that they bring to the firm, such as access to additional capital sources. Shareholders in the new private firm who are not part of active management also have much greater incentive to monitor active management, since their personal stake in the firm is typically high.

Corporate tax shields are another potential advantage of restructuring with debt financing. The corporate tax code in the United States allows companies to deduct the interest paid on debt as an expense for tax purposes. No such deduction is allowed for dividends paid on equity shares. Thus, increased use of debt results in lower tax obligations owed to the Internal Revenue Service. Firms facing large tax liabilities may reap considerable benefits from the tax savings that result from debt financing.

Finally, large publicly held corporations in mature industries typically have access to large amounts of free cash flow. These dollars are valuable, because they can be used to develop new products and markets or invest in other firms. In a public corporation, these cash flows may be used for perquisites such as corporate travel to conventions and trade shows, company cars, membership in clubs, and other types of non-monetary rewards. By taking the firm private, remaining shareholders gain access to the firm's free cash flow and can put it to use, thereby reaping direct benefits.

THE 1990s

With the demise of Drexel Burnham Lambert and the default on several prominent junk bond issues associated with 1980s restructurings, leveraged buyout activity slowed considerably in the 1990s. The appetite of investors for new junk bond issues decreased, and some of the firms that had previously gone private subsequently were recapitalized as public corporations.

THE 2000s

After a lull in the 1990s, leveraged buyouts began to regain some of their charm in the early part of the twenty-first century. According to Dealogic, a New York-based deal tracker, LBO firms accounted for 10 percent of the $540 billion in mergers and acquisitions announced in the United States, double the average of 5 percent over the previous 10 years. Europe also showed a significant increase in LBO activities throughout the early 2000s. By 2004 and 2005, leveraged buyouts of large companies were becoming common again. The next eighteen months would see a buyout frenzy fuelled by the low cost of debt. From the beginning of 2006 to the middle of 2007, nine of the ten largest buyouts were announced. Kohlberg Kravis Roberts (KKR), TPG, and Goldman Sachs Capital Partners completed a massive buyout in the United States in October 2007 when they acquired TXU CORP for $31.8 billion. In September 2007, a huge leveraged buyout occurred when shareholders approved the acquisition of Canadian phone company BCE by Teachers Private Capital, Madison Dearborn, and Providence Equity for $32.6 billion. According to Dow Jones, private equity firms acquired 654 companies in the United States for $375 billion in 2006. This was eighteen times the value of deals closed in 2003.

In July 2007, problems in the mortgage markets began to impact the leveraged finance and high-yield debt markets. By September, the credit crunch became widely publicized with high-profile writedowns by major banks such as Citigroup and UBS. LBOs petered out as the credit markets

dried up, and it became apparent that another cycle of the private equity boom had come to an end.

SEE ALSO *Financial Issues for Managers; Shareholders*

BIBLIOGRAPHY

Amihud, Yakov, ed. *Leveraged Management Buyouts: Causes and Consequences.* Washington, DC: Beard Books, 2002.

Barr, Alistair. "M&A seen slowing in U.S. next year. Credit crunch sidelines private-equity firms; weaker economy also a drag." *MarketWatch* 17 December 2007.

Berstein, Peter L. *Capital Ideas: The Improbable Origins of Modern Wall Street.* New York: Free Press, 1992.

Dolbeck, Andrew. "The Return of the Leveraged Buyout Deal." *Weekly Corporate Growth Report,* 23 August 2004, 1–3.

Grocer, Stephen. "M&A in 2007: Inside the Numbers." *Wall Street Journal,* 11 January 2007. Available from: http://blogs.wsj.com/deals/2008/01/03/ma-in-2007-inside-the-numbers/.

Higgins, Robert C. *Analysis for Financial Management.* 7th ed. Boston: Irwin/McGraw-Hill, 2004.

Rickertsen, Rick, and Robert E. Gunther. *Buyout: The Insider's Guide to Buying Your Own Company.* New York: AMACOM, 2001.

Tenorio, V. "Anatomy of a Cycle." *The Deal,* 25 January 2008. Available from: http://www.thedeal.com/servlet/Satellite?pagename=NYT&c=TDD Article&cid=1201057158053.

Thornton, Emily, Ronald Grover, and Tom Lowry. "Those Bulging Buyouts." *Business Week,* 9 February 2004, 74.

LICENSING AND LICENSING AGREEMENTS

A license provides the legal authority to engage in certain acts. Some licenses are required for the protection of the public. For example, a physician is licensed to assure professional competence, and the owner of a bar and restaurant is licensed to prove moral fitness. Some licenses are designed to raise government revenue (e.g., automobile licenses) or to grant some other party permission to make use of land (e.g., land easement). In business, a license is the granting of permission to use a property right in a limited capacity, while still allowing the licensor to retain ownership. For example, under a licensing agreement a U.S. clothing manufacturer may allow a foreign producer to use its designs and specifications to make clothes.

For a license to exist, there must be a contract between two or more parties giving an explanation as to what property rights the licensor is agreeing to give up to the licensee. This agreement or contract is known as the licensing agreement. These agreements have been in existence since the first copyrights and patents were issued in the late eighteenth century.

The licensing agreement is a complex legal document that begins by identifying parties to the agreement, as well as the dates of the agreement. It specifies the subject matter to be licensed, including patents and trade secrets. Also specified are the provisions or rights of the license, such as whether it grants exclusive rights or is subject to other agreements. Any limitations, such as territorial and quantity restrictions, are also specified. A final section can specify duration, termination, and related provisions of the agreement.

In business, licensing agreements or arrangements are mutually beneficial. The licensor provides his or her property right and the licensee contributes expertise in the particular industry or territory covered by the license. The resulting relationship becomes much the same as a joint venture or partnership. There are several types of licensing agreements, including copyright licensing, patent licensing, merchandise licensing, trademark licensing, and software licensing.

BENEFITS OF LICENSING

Typically, a trademark owner will grant a license in order to exploit the trademark rights in areas where he or she does not have the appropriate expertise, infrastructure, or capital resources to maximize the value of the right. While the licensor is exploiting the trademark right, the licensee is betting that the name or symbol recognition of the property will influence consumers and motivate them to buy a particular item. Characters that have enjoyed popularity from trademark licensing relationships include Mickey Mouse, Barbie, and King Mufasa from the Lion King. A major trend has been for manufacturers and retailers to build the core of their business with trademark-licensed products.

When granting a license, copyright owners are motivated by the prospect of receiving royalties for each product, performance, or copy of their work. In the case of a publication, the copyright is an exclusive right given to an author of an original work. Books, plays, magazines, photography, paintings, sculpture, articles, musical compositions, and radio and television programs are additional commodities that can be copyrighted. The exclusive right also allows copyright owners to reproduce their own work or allow others to do so.

LICENSING AS A GLOBALIZATION STRATEGY

In its most general sense, licensing is a key mode of entry for firms considering international expansion. A licensing agreement gives a foreign company the rights to produce and/or sell another firm's goods in their country. The agreement also may include production and sales in more than one country. The licensee takes the risks and makes the investment in facilities for handling the manufacturing of the goods, as well as managing other supply chain

linkages to deliver and even sell the goods to the final consumer. The licensor is normally paid a royalty on each unit produced and sold. Because there is little investment for the licensor, this method is seen as an easier way to become an international or global company.

Licensing is growing as manufacturers and retailers build their core businesses and change their strategies to include more licenses. For example, Merck and Upjohn have licensed organizations in other parts of the world to manufacture and sell their pharmaceutical products. Other firms using licensing agreements in this way include McDonald's, Nestlé, Anheuser-Busch, and KFC.

The release of hot movies like the *Lord of the Rings* trilogy also triggers many license agreements and ties between mass merchandisers and licensors for toys, games, and children's apparel. Some retailers go so far as to demand exclusive agreements for licensed apparel and movie tie-in products in order to pursue marketplace differentiation strategies.

Service-based businesses also can benefit from licensing arrangements. Within the airline industry, many of the code-sharing arrangements that allow airlines to sell each other's seats are much like licensing agreements. Airlines and other firms enter such agreements when they need help commercializing a new technology, expanding a brand franchise globally, or building a marketing image. Rather than entering a new or international market alone, licensing is a faster way to grow a market and achieve market-share dominance. It also may allow firms to gain a larger market for their nonlicensed products.

In the early twenty-first century, a growing number of technology companies began launching intellectual property (IP) licensing programs in order to turn dormant projects into revenue, penetrate new markets, and evaluate potential business partners. These firms conducted inventories of their knowledge bases and patent families, and identified technologies that were outside the core business yet still offered some potential for development. They then sought to license these technologies to other firms.

In *Licensing Journal,* George A. Frank explained: "Patents that some corporations had obtained for reasons not directly related to the development or transfer of technology were proving to be a vast untapped resource. IP licensing has now become a tremendous income source, and indeed is now an important benchmark by which a corporation's success is measured." IBM, for example, earns more than $1 billion per year from its IP licensing program.

As human embryonic stem cell research increases during the twenty-first century, medical companies and research facilities are developing numerous licensing agreements. Several high level committees have been formed throughout the world to create guidelines to resolve intellectual property issues that will be critically important in this research area. These guidelines attempt to consider all legal issues that will arise. In 2005 the National Institutes of Health recommended that "whenever possible, non-exclusive licensing should be pursued as a best practice. A non-exclusive licensing approach favors and facilitates making broad enabling technologies and research uses of inventions widely available and accessible to the scientific community."

In the United States, the Wisconsin Alumni Research Foundation (WARF) has been a leader in stem cell licensing and agreements. WARF, the patent and licensing arm of the University of Wisconsin-Milwaukee, signed its twenty-fourth human embryonic stem cell licensing agreement in 2008; it allows biotech firms to use its human embryonic stem cells for the development of new research technology.

RISKS TO LICENSING

There are some risks and disadvantages to licensing. The firm may lose control over the manufacture and marketing of its goods in other countries. As a mode of international market entry, licensing also may be less profitable than other choices because returns must be shared between two parties. There even is a risk that the foreign licensee may sell a similar competitive product after the license agreement expires. Other risks and issues involve selecting a partner, as well as all of the general uncertainties in doing business with an international partner, including language, culture, political risk, and currency fluctuations. Alternatives to licensing include exporting, acquisitions, establishing a wholly owned international subsidiary, franchising, and forming strategic alliances.

SEE ALSO *Franchising; Intellectual Property Rights*

BIBLIOGRAPHY

Bradbury, Danny. "Breaking the Licensing Mould: Software Licensing Models Have Gone Through Some Changes in Recent Years, but None Are as Controversial as Microsoft's Latest Initiative." *MicroScope* 32, no. 3 (2002).

Ferraro, Neil P. "Poetic License? Caveats for Buying or Selling Technology: A Well-Crafted License Agreement Helps Maximize Financial and Technological Profits and Reduce Risk." *Contract Management* 44, no. 7 (2004).

Frank, George A. "Licensing IP Rights: Why, How, What, and When—A Corporate Perspective." *Licensing Journal* 24, no. 6 (2004).

"Guidelines for Human Embryonic Stem Cell Research." National Academies Press (2005). Available from: http://www.med.unc.edu/roadmap/stemcell/Guidelines%20For%20Human%20Embryonic%20Stem%20Cell%20Research.pdf.

Nanayakkara, Tamara. "Negotiating Technology Licensing Agreements." *International Trade Forum* April 2002. Available from: http://www.tradeforum.org/news.

O'Haver, R. Russ. "Management Intangibles: Capitalizing on Your IP Assets." *Journal of Internet Law* 7, no. 6 (2003).

Pitts, Robert A., and David Lei. *Strategic Management: Building and Sustaining Competitive Advantage.* 2nd ed. Cincinnati: South-Western College Publishing, 2000.

"WARF Inks 24th Stem Cell License." *The Business Journal of Milwaukee* 8 May 2008. Available from: http://www.bizjournals.com/milwaukee/stories/2008/05/05/daily44.html?ana=from_rss.

LIFELONG LEARNING TRENDS

SEE *Continuing Education and Lifelong Learning Trends*

LINE-AND-STAFF ORGANIZATIONS

In addition to task organizational boundary considerations, organizational structure involves the designation of jobs within an organization and the relationships among those jobs. There are numerous ways to structure jobs within an organization, but two of the most basic forms include simple line structures and line-and-staff structures.

In a line organization, top management has complete control and the chain of command is clear and simple. Examples of line organizations are small businesses in which the top manager, often the owner, is positioned at the top of the organizational structure and has clear "lines" of distinction between him and his subordinates.

The line-and-staff organization combines the line organization with staff departments that support and advise line departments. Most medium and large-sized firms exhibit line-and-staff organizational structures. The distinguishing characteristic between simple line organizations and line-and-staff organizations is the multiple layers of management within line-and-staff organizations. The following sections refer primarily to line-and-staff structures, although the advantages and disadvantages discussed apply to both types of organizational structures.

Several advantages and disadvantages are present within a line-and-staff organization. An advantage of a line-and-staff organization is the availability of technical specialists. Staff experts in specific areas are incorporated into the formal chain of command. A disadvantage of a line-and-staff organization is conflict between line and staff personnel.

LINE-AND-STAFF POSITIONS

A wide variety of positions exist within a line-and-staff organization. Some positions are primary to the company's mission, whereas others are secondary—in the form of support and indirect contribution. Although positions within a line-and-staff organization can be differentiated in several ways, the simplest approach classifies them as being either line or staff.

Figure 1
Line-and-Staff Organization
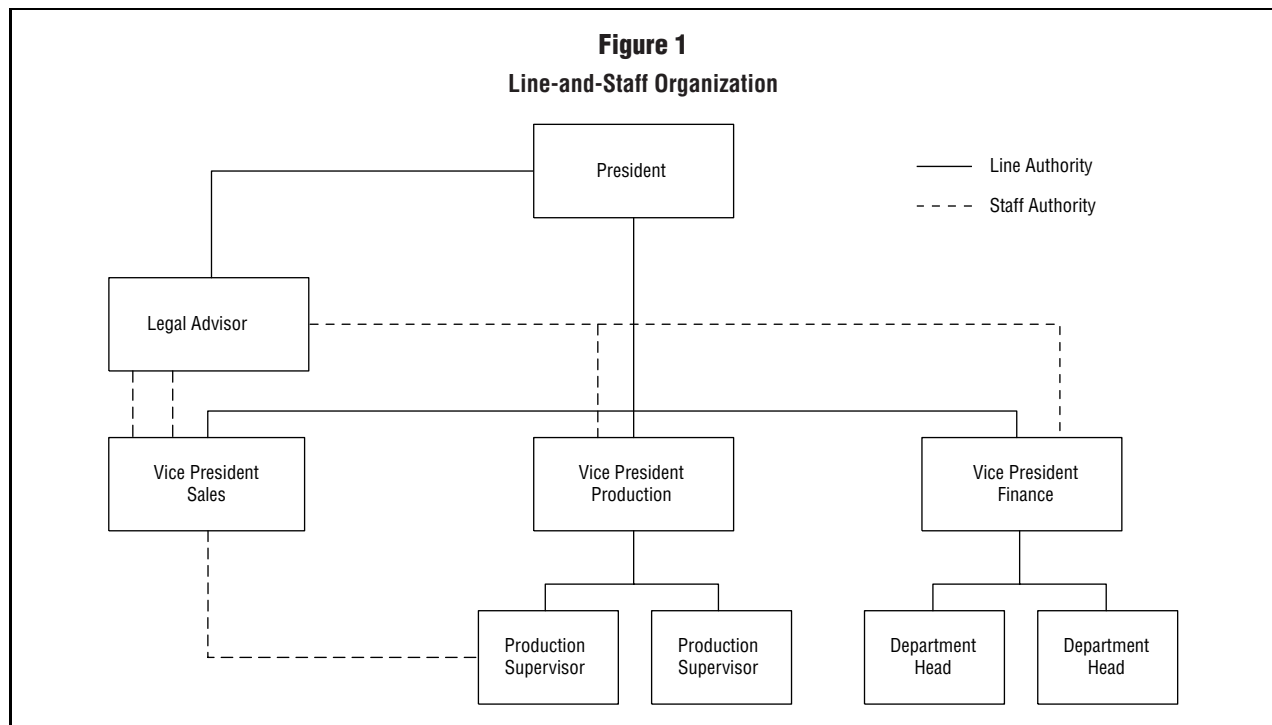
A line position is directly involved in the day-to-day operations of the organization, such as producing or selling a product or service. Line positions are occupied by line personnel and line managers. Line personnel carry out the primary activities of a business and are considered essential to the basic functioning of the organization.

Line managers make the majority of the decisions and direct line personnel to achieve company goals. An example of a line manager is a marketing executive. Although a marketing executive does not actually produce the product or service, he or she directly contributes to the firm's overall objectives through market forecasting and generating product or service demand. Therefore, line positions, whether they are personnel or managers, engage in activities that are functionally and directly related to the principal workflow of an organization. In his book *Leadership: How to Lead, How to Live*, Harvard business professor D. Quinn Mills notes that "Line positions often provide invaluable learning of a type not easily obtained in school or even in staff positions. A line manager learns how to respond to customers when they are pressuring him from all sides; how to energize employees who aren't motivated by money or promotions and who don't care who you are or what you learned in school. . ."

Staff positions serve the organization by indirectly supporting line functions. Staff positions consist of staff personnel and staff managers. Staff personnel use their technical expertise to assist line personnel and aid top management in various business activities. Staff managers provide support, advice, and knowledge to other individuals in the chain of command.

Although staff managers are not part of the chain of command related to direct production of products or services, they do have authority over personnel. An example of a staff manager is a legal adviser. He or she does not actively engage in profit-making activities, but does provide legal support to those who do. Therefore, staff positions, whether personnel or managers, engage in activities that are supportive to line personnel. Dr. Mills offers, "There is no better place to learn about an organization than from a key staff position. A person has the responsibility of learning how things are done; of determining the major trends in the marketplace and among competitors; or deciding courses of action. In a sense it is the staff person who often decides what to do; the line manager who carries out the plan."

LINE-AND-STAFF AUTHORITY

Authority within a line-and-staff organization can be differentiated. Three types of authority are present: line, staff, and functional. Line authority is the right to carry out assignments and exact performance from other individuals.

Line Authority. Line authority flows down the chain of command. For example, line authority gives a production supervisor the right to direct an employee to operate a particular machine, and it gives the vice president of finance the right to request a certain report from a department head. Therefore, line authority gives an individual a certain degree of power relating to the performance of an organizational task.

Two important clarifications should be considered, however, when discussing line authority: (1) line authority does not ensure effective performance, and (2) line authority is not restricted to line personnel. The head of a staff department has line authority over his or her employees by virtue of authority relationships between the department head and his or her directly-reporting employees.

Staff Authority. Staff authority is the right to advise or counsel those with line authority. For example, human resource department employees help other departments by selecting and developing a qualified workforce. A quality control manager aids a production manager by determining the acceptable quality level of products or services at a manufacturing company, initiating quality programs, and carrying out statistical analysis to ensure compliance with quality standards. Therefore, staff authority gives staff personnel the right to offer advice in an effort to improve line operations.

Functional Authority. Functional authority is referred to as limited line authority. It gives a staff person power over a particular function, such as safety or accounting. Usually, functional authority is given to specific staff personnel with expertise in a certain area. For example, members of an accounting department might have authority to request documents they need to prepare financial reports, or a human resource manager might have authority to ensure that all departments are complying with equal employment opportunity laws. Functional authority is a special type of authority for staff personnel, which must be designated by top management.

LINE-AND-STAFF CONFLICT

Due to different positions and types of authority within a line-and-staff organization, conflict between line and staff personnel is almost inevitable. Although minimal conflict due to differences in viewpoints is natural, conflict on the part of line and staff personnel can disrupt an entire organization. There are many reasons for conflict. Poor human relations, overlapping authority and responsibility, and misuse of staff personnel by top management are all primary reasons for feelings of resentment between line and staff personnel. This resentment can result in various departments viewing the organization from a narrow stance instead of looking at the organization as a whole.

Fortunately, there are several ways to minimize conflict. One way is to integrate line and staff personnel into a work team. The success of the work team depends on how well each group can work together in efforts to increase productivity and performance. Another solution is to ensure that the areas of responsibility and authority of both line and staff personnel are clearly defined. With clearly defined lines of authority and responsibility, each group may better understand their role in the organization. A third way to minimize conflict is to hold both line and staff personnel accountable for the results of their own activities. In other words, line personnel should not be entirely responsible for poor performance resulting from staff personnel advice.

Line-and-staff organizations combine the direct flow of authority present within a line organization with staff departments that offer support and advice. A clear chain of command is a consistent characteristic among line-and-staff organizational structures. Problems of conflict may arise, but organizations that clearly delineate responsibility can help minimize such conflict.

SEE ALSO *Leadership Styles and Bases of Power; Organizational Chart; Organizational Structure; Organizing*

BIBLIOGRAPHY

Hitt, Michael, Stewart Black, and Lyman W. Porter. *Management.* Englewood Cliffs, NJ: Prentice Hall, 2004.

Jones, Gareth R. *Organizational Theory, Design, and Change.* Upper Saddle River, NJ: Prentice Hall, 2004.

Judge, Timothy A., and Herbert G. Heneman, III. *Staffing Organizations.* Boston, MA: McGraw-Hill-Irwin, 2006.

Mills, D. Quinn. "Book Excerpt: What are Advantages and Disadvantages of Line and Staff Management Positions?" *Transitions at Work* 7 May 2007. Available from: http://transitions.atwork-network.com/2007/05/07/what-are-advantages-and-disadvantages-of-line-and-staff-management-positions/.

Young, Gary J., Martin P. Charns, and Timothy C. Heeren. "Product-Line Management in Professional Organizations: An Empirical Test of Competing Theoretical Perspectives." *Academy of Management Journal* 47, no. 5: 723—735.

LOCATION STRATEGY

Being in the right location is a key ingredient in a business's success. If a company selects the wrong location, it may not have adequate access to customers, workers, transportation, materials, and so on. Consequently, location often plays a significant role in a company's profit and overall success. A location strategy is a plan for obtaining the optimal location for a company by identifying company needs and objectives, and searching for locations with offerings that are compatible with these needs and objectives. Generally, this means the firm will attempt to maximize opportunity while minimizing costs and risks.

A company's location strategy should conform with, and be part of, its overall corporate strategy. Hence, if a company strives to become a global leader in telecommunications equipment, for example, it must consider establishing plants and warehouses in regions that are consistent with its strategy and that are optimally located to serve its global customers. A company's executives and managers often develop location strategies, but they may select consultants (or economic development groups) to undertake the task of developing a location strategy, or at least to assist in the process, especially if they have little experience in selecting locations.

Formulating a location strategy typically involves the following factors:

1. **Facilities.** Facilities planning involves determining what kind of space a company will need given its short-term and long-term goals.

2. **Feasibility.** Feasibility analysis is an assessment of the different operating costs and other factors associated with different locations.

3. **Logistics.** Logistics evaluation is the appraisal of the transportation options and costs for the prospective manufacturing and warehousing facilities.

4. **Labor.** Labor analysis determines whether prospective locations can meet a company's labor needs given its short-term and long-term goals.

5. **Community and site.** Community and site evaluation involves examining whether a company and a prospective community and site will be compatible in the long term.

6. **Trade zones.** Companies may want to consider the benefits offered by free-trade zones, which are closed facilities monitored by customs services where goods can be brought without the usual customs requirements.

7. **Political risk.** Companies considering expanding into other countries must take political risk into consideration when developing a location strategy. Since some countries have unstable political environments, companies must be prepared for upheaval and turmoil if they plan long-term operations in such countries.

8. **Governmental regulation.** Companies also may face government barriers and heavy restrictions and regulation if they intend to expand into other countries. Therefore, companies must examine governmental—as well as cultural—obstacles in other countries when developing location strategies.

9. **Environmental regulation.** Companies should consider the various environmental regulations that might

affect their operations in different locations. Environmental regulation also may have an impact on the relationship between a company and the community around a prospective location.

10. **Incentives.** Incentive negotiation is the process by which a company and a community negotiate property and any benefits the company will receive, such as tax breaks. Incentives may play a significant role in a company's selection of a site.

Depending on the type of business, companies also may have to examine other aspects of prospective locations and communities. Based on these considerations, companies are able to choose a site that will best serve their needs and help them achieve their goals.

COMPANY REQUIREMENTS

The initial part of developing a location strategy is determining what a company will require of its locations. These needs then serve as some of the primary criteria a company uses to evaluate different options. Some of the basic requirements a company must consider are:

- **Size.** A company must determine what size property or facility it needs.

- **Traffic.** If it is in the service business, a company must obtain statistics on the amount of traffic or the number of pedestrians that pass by a prospective location each day.

- **Population.** Whether a service or manufacturing operation, a company must examine the population of prospective locations to ensure that there is a sufficient number of potential customers (if a service business) or a sufficient number of skilled or trainable workers. In addition, manufacturers also benefit from being close to their customers, because proximity to customers reduces shipment time and increases company responsiveness to customers.

- **Total costs.** Companies must determine the maximum total costs they are willing to pay for a new location. Total costs include distribution, land, labor, taxes, utilities, and construction. More obscure costs also should be considered, such as transportation costs to ship materials and supplies, and the loss of customer responsiveness if moving further away from the customer base.

- **Infrastructure.** Companies must consider what their infrastructure requirements will be, including what modes of transportation they will need and what kinds of telecommunications services and equipment they will need.

- **Labor.** Companies must establish their labor criteria and determine what kind of labor pool they will need, including the desired education and skill levels.

- **Suppliers.** Companies must consider the kinds of suppliers they will need near their locations. In addition, having suppliers nearby can help companies reduce their production costs.

Besides these basic requirements, companies must consider their unique requirements of prospective locations. These requirements may correspond to their overall corporate strategy and corporate goals and to their particular industries.

LOCATION SELECTION TECHNIQUES

Manufacturing. Several techniques exist that can be used as part of a location strategy to determine the merits of prospective sites. Location strategists often divide assessment of prospective locations into macro analysis and micro analysis. Macro analysis encompasses the evaluation of different regions and communities, whereas micro analysis includes the evaluation of particular sites. The main macro analysis techniques are factor-rating systems, linear programming, and center of gravity.

Factor-rating systems are among the most commonly used techniques for choosing a location, because they analyze diverse factors in an easily comprehensible manner. Factor-rating systems simply consist of a weighted list of the factors a company considers the most important and a range of values for each factor (see Table 1). A company can rate each site with a value from the range based on the costs and benefits offered by the alternative locations, and multiply this value by the appropriate weight. These numbers are then summed to get an overall "factor rating." Then a company can compare the overall ratings of alternative sites. This technique enables a company to choose a location systematically based on the best rating.

Linear programming provides a method for evaluating the cost of prospective locations within a production/distribution network. This technique uses a matrix of production facilities and warehouses that shows the unit shipping costs from a manufacturing location designated by a variable, such as *X*, to prospective destinations, such as warehouses designated by other variables—*E, F,* and *G*—and the total amount of goods the prospective manufacturer, *X*, could produce. Other prospective manufacturing locations and the same information for each are also included in the matrix. After computing the total costs for each prospective location, a company can determine which one has lower total costs in terms of the entire production/distribution network.

Table 1			
Sample Factor-Rating System			
Factor	Rating (1-100)	Weight	Factor-Rating
Energy availability	60	.3	18
Labor availability	80	.2	16
Transportation	40	.2	8
Supplies	90	.1	9
Taxes and regulations	70	.1	7
Infrastructure	70	.1	7
Overall Factor-Rating	—	—	65

The center of gravity method is useful for identifying an individual location by considering existing locations, the distances between them, and the volume of products to be shipped. Companies use this method mostly for locating distribution warehouses. To use this technique, companies plot their existing locations on a grid with a coordinate system (the particular coordinate system used does not matter). The idea behind this technique is to identify the relative distances between locations. After the existing locations are placed on the grid, the center of gravity is determined by calculating the X and Y coordinates that would have the lowest transportation costs.

Services. Since service businesses generally must maintain a number of sites to remain close to customers, the location selected should be close to the targeted segment of the market. The market also can influence the number of new locations, as well as their size and features.

A simple technique for determining service locations is to establish a set of minimum criteria for opening new outlets. These criteria should be developed so that the locations selected have strong chances of success. A company could assess the potential of prospective locations based on primary criteria such as:

- The population of the community should be more than 100,000.

- The annual per capita income should be more than $35,000.

After selecting locations that satisfy these criteria, a company might further evaluate the potential locations based on a set of criteria that considers the location's industrialization, person/car ratio, labor availability, population density, and infrastructure.

For example Wal-Mart keeps its stores close to each other so it can economize on shipping. This relative prox-

imity enables one truck to make numerous shipments—a benefit the store loses if stores are more spread out. Wal-Mart's dense network of stores, therefore, facilitates the delivery logistics. Another benefit of this strategy is the easy transfer of experienced managers and personnel to new stores opening near existing stores.

Sometimes, more often in the case of franchises, stores can be placed too close together. This practice—referred to as cannibalization—can affect a company's earnings. In theory, franchises should be placed closely enough to ensure an effective market presence, but not so close that specific locations are battling over the same group of consumers.

TRENDS IN LOCATION STRATEGY

Globalization and technology have been the biggest drivers of change in the location decision process over the last thirty years. Location activity has been very high in recent decades as a result of technology improvements, economic growth, international expansion and globalization, and corporate restructuring, mergers, and acquisitions.

The top five location factors for global companies are costs, infrastructure, labor characteristics, government and political issues, and economy. Key sub-factors are the availability and quality of the labor force, the quality and reliability of modes of transportation, the quality and reliability of utilities, wage rates, worker motivation, telecommunication systems, record of government stability, and industrial relations laws. Other sub-factors—protection of patents, availability of management resources and specific skills, and system and integration costs—are of increasing importance.

Whereas wages and the industrial relations environment are significant factors in multinational location decisions, by far the main determinant is the host country market size. Furthermore, global economic considerations have become paramount in location strategy as companies contemplate the advantages afforded by various locations in terms of positioning in international markets and against competitors.

When companies seek new sites they generally strive to keep operating and start-up costs low, and so they often choose locations in collaboration with economic development groups to achieve these goals. Companies also now expect to move into new facilities more quickly than in the past, so they tend to focus more on leasing facilities than purchasing land and building new facilities. Also, by leasing facilities, companies can relocate every few years if the market requires it.

Technology, especially communications technology, has not only been a driver of change, but has facilitated the site selection process. Managers can obtain initial information on alternative locations via the Internet and promotional software. Site selection agencies increasingly

use geographical information system (GIS) technology, and e-mail has become a dominant mode of communication in location research and negotiation.

Location databases have enabled companies to do initial screening themselves, hence reducing their need to rely on economic developers to provide only very specific information and details on locations—such as commuting patterns and workforce characteristics.

Telecommunications technology has created the "virtual office" of employees working from remote locations. The growth of the virtual office has impacted location strategy in that some companies no longer need as much workspace because many employees work from remote sites. When these employees need to work at the office, they can call and reserve office space for themselves. The decrease in facility size can lead to millions of dollars worth of savings each year, while increasing productivity.

SEE ALSO *Globalization; International Business*

BIBLIOGRAPHY

Bognanno, Mario F., Michael P. Keane, and Donghoon Yang. "The Influence of Wages and Industrial Relations Environments on the Production Location Decisions of U.S. Multinational Corporations." *Industrial and Labor Relations Review* 58, no. 2 (2005): 171.

MacCarthy, B.L., and W. Atthirawong. "Factors Affecting Location Decisions in International Operations–A Delphi Study." *International Journal of Operations and Production Management* 23, no. 7 (2003): 794–828.

Maze, Jonathan. "Location Strategies Help Avoid Lawsuits." *Franchise Times* November–December 2007. Available from: http://www.franchisetimes.com/content/contents.php?issue=November-December&year=2007.

Spee, Roel, and Wim Douw. "Cost-Reduction Location Strategies." *Journal of Corporate Real Estate* 6, no. 1 (September 2003): 30–38.

Talley-Seijn, Margaret. "30 Years of Location Strategies." *Plants, Sites and Parks* 31, no. 3 (July 2004): 26–29.

"Thomas J. Holmes on Wal-Mart's Location Strategy." *FedGazette* March 2006. Available from: http://woodrow.mpls.frb.fed.us/pubs/fedgaz/06-03/holmes.cfm.

LOGISTICS AND TRANSPORTATION

According to the Council of Supply Chain Management Professionals (CSCMP), logistics management can be defined as "that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements."

The history of logistics is rooted in its military application. Since WWII it has developed into an important function of business as it became evident that logistics and transportation add place and time value to products and enhance the form and possession value added by manufacturing and marketing.

The concept of logistics as a business discipline began to appear in the business-related literature in the 1960s when it was called physical distribution. At that time its focus was on the outbound side of the logistics system. With the emerging importance of Supply Chain Management, logistics and transportation has become even more crucial as supply chain managers realize that the coordination and integration of the logistics systems of all organizations with the supply chain are requirements for success.

According to Coyle, Bardi, and Langley, there are four subdivisions of logistics:

- Business logistics—this is the same as the definition from the CSCMP and is the approach adopted in this essay.

- Military logistics—all that is necessary to support the operational capability of military forces and their equipment in order to ensure readiness, reliability, and efficiency.

- Event logistics—management of all involved (activities, facilities, and personnel) in organizing, scheduling, and deploying the resources necessary to ensure the occurrence of an event and efficient withdrawal afterwards.

- Service logistics—acquisition, scheduling, and management of facilities, personnel, and materials need to support and sustain a service operation.

This essay addresses the concept of business logistics. Business logistics systems can be classified into four categories:

1. *Balanced System.* Firms with a balanced system have reasonably balanced inbound and outbound flows.

2. *Heavy inbound.* These firms have a very heavy inbound flow but a very simple outbound flow. Firms with heavy inbound flow typically do not warehouse their finished goods (for example, aircraft manufacturers).

3. *Heavy outbound.* These firms have a complex outbound flow and a very simple inbound flow. Their inbound flow is usually raw material from a relatively short distance. Typically their outbound shipments are a wide variety of packaged finished goods requiring storage and transportation to the final consumer.

4. **Reverse system.** Reverse supply chain logistics systems have reverse flows on the outbound side of their system. Durable products are returned for credit, trade-in, repair, salvage, or disposal, or the firm-utilized returnable or reusable containers.

Coyle, Bardi, and Langley list a number of activities that lie within the realm of logistics:

- Order fulfillment—activities involved with completing customer orders. Transportation and logistics would be an integral part of completing the orders since they directly impact delivery.

- Traffic and transportation—the physical movement of goods.

- Warehousing and storage—a number of warehousing decisions directly impact logistics and transportation. For example, how many warehouses are needed, where should they be located, how large should they be, how much inventory should be held in each?

- Plant and warehouse site location—location can alter time and place relationships between the warehouse and the customer. Frequently transportation cost is a major factor in plant and warehouse location.

- Materials handling—the placement of goods and the movement of goods within a warehouse, factory, or other facility. This includes incoming movement of goods and the movement of goods from storage to order-picking areas to dock areas for shipment.

- Industrial packaging—transportation directly impacts the type of packaging needed. Fast methods of transport, such as air, generally require little in the way of packaging while the slower modes, such as water or rail, require substantial packaging expenditures to ensure safe shipment.

- Purchasing—quantities purchased directly affect transportation costs. Also, transportation relates directly to the distance or location of goods purchased by the firm. Purchasing and logistics are increasingly integrated in many major firms.

- Demand forecasting—accurate and reliable forecasting is essential for effective inventory control purposes, especially within firms utilizing lean manufacturing and just-in-time (JIT) production.

- Inventory control—this is directly related to transportation and warehousing. If transportation is slow, higher levels of inventory are needed, therefore more warehouse capacity is needed.

- Production planning—production planning must operate in close coordination with logistics in order to ensure adequate market coverage. Production

planning and logistics are increasingly integrated within large corporations.

- Parts and service support—the effectiveness of parts and service support depend upon speed of transportation, location of warehouses, and forecasting of support function needs. Thus, parts and service support have a direct impact on customer service levels.

- Return goods handling—reverse supply chain logistics is an increasingly important but frequently overlooked dimension in logistics.

- Salvage and scrap disposal—disposal is an integral part of the reverse supply chain. There is an increasing interest, as seen in the logistics literature, in the impact of the location of evaluation and disposal facilities for returned goods.

- Customer service levels—logistics plays an extremely important role in ensuring that customers get the right products at the right place at the right time. Transportation, warehousing, forecasting, inventory control, and production planning all have a direct impact on customer satisfaction.

The two most obvious aspects of logistics are warehousing and transportation.

Warehousing and Storage. Warehousing is defined as the storage of goods: raw materials, semi-finished goods, or finished goods. This includes a wide spectrum of facilities and locations that provide warehousing. Since this is a point in the logistics system where goods are held for varying amounts of time, the flow is interrupted or stopped, thereby creating additional costs to the product.

In a macroeconomic sense, warehousing creates time utility for raw materials, industrial goods, and finished products. It also increases the utility of goods by broadening their time availability to prospective customers.

Transportation. Transportation involves the physical movement or flow of goods. The transportation system is the physical link that connects customers, raw material suppliers, plants, warehouses, and channel members. These are the fixed points in a logistics supply chain.

The basic modes of transportation are water, rail, motor carrier, air, and pipeline. Water is the slowest mode, with rail, motor carrier, and air following in order of speed of delivery. Generally, the order is reversed when looking at costs.

Selection of the appropriate carrier has several steps. First the firm selects a transportation mode. The shipper must compare the service desired with the rate or cost of service. Service usually means transit time or the time that elapses from the time the consignor makes the goods

available for dispatch until the carrier delivers to the consignee. Pickup and delivery, terminal handling, and movement between origin and destination account for the time involved in transporting goods.

The firm must balance the need for quick delivery with the costs inherent in the mode of transport. This includes the rate charged for the service, minimum weight requirements, loading and unloading facilities, packaging, possible damage in transit, and any special services that may be desired or required. If next day delivery is imperative, the shipper will utilize an air freight carrier but will pay a premium price for such rapid service. If time is not a particularly critical element the shipper may elect to use rail or a motor carrier, or may even utilize a water carrier if time is inconsequential. Water-based modes of transportation are the least expensive and are used for commodity type products such as grain, coal, and ore. Some firms even utilize more than one mode of transportation, called intermodal transport, to move their goods.

Once a mode is selected, the shipper must decide the legal classification or type of carrier they wish to utilize: common, regulated, contract, exempt, or private.

Common carriers serve the general public at reasonable prices and without discrimination. They cannot refuse to carry a particular commodity or refuse to serve a particular point with the scope of the carrier's operation. Common carriers are liable for all goods lost, damaged, or delayed unless caused by an act of God, an act of a public enemy, an act of public authority, an act of the shipper, or some defect within the good itself.

Regulated carriers are required to provide safe and adequate service and facilities upon reasonable request and are liable for damage up to limits established by the carrier. Regulated carriers can be motor carriers or water carriers and are subject to minimal federal controls.

A contract carrier does not serve the general public, but rather serves one or a limited number of contracted customers. They have no legal service obligation. They often provide a specialized service and usually have lower rates than common or regulated carriers.

Exempt carriers are exempt from regulation regarding rates and services. Exempt status comes from the type of commodity hauled or the nature of the carrier's operation. Exempt motor carriers are usually local and typically transport such items as agricultural goods, newspapers, livestock, and fish. Exempt water carriers transport bulk commodities such as coal, ore, grain, and liquid. Exempt rail carriers transport piggyback shipments and exempt air carriers haul cargo.

A firm's own transportation is termed a private carrier. Private carriers are not "for-hire" and not subject to the same federal regulations as other types of transport.

However, the carrier's primary business must be something other than transportation.

Once the mode and type of carrier is determined a final decision can be made based on other factors. Accessibility is one such factor. Some firms have geographic limits to their routing network. Others may not possess physical access to needed facilities or have the ability to provide the equipment and facilities that movement of a particular commodity may require. Reliability—the consistency of the transit time a carrier provides—is also a key factor. Finally, convenience and communication are other important considerations when selecting a carrier.

Measures that a transportation firm would use to judge its performance include: orders shipped on time, orders shipped complete, order preparation time, product availability, and transit time. From the customer perspective performance can be gauged from orders received on time, orders received complete, orders received damage free, orders filled accurately, and orders billed accurately.

GLOBAL LOGISTICS

The expansion of the global marketplace puts the concept of global logistics into the limelight. Logistics experts must now manage all of the aforementioned logistics activities within a worldwide arena spanning a multitude of countries, languages, cultures, governments, and regulations. Along with this expansion of the marketplace comes the need for global channel intermediaries. Today's global logistics manager would be familiar with the role of each of the following:

- Foreign freight forwarders—handlers of myriad foreign freight services such as rate quotes, vessel chartering, booking of vessel space, handling of documentation and cargo insurance, tracing and expediting, arranging inland transportation, and providing translation services.

- Export management companies—suppliers of expertise to those wishing to sell products overseas but lacking the necessary resources.

- Export trading companies—locaters of overseas buyers. They also handle export documentation, transportation, and the meeting of foreign government requirements.

- Customs house brokers—overseers of the movement of goods through customs. They also ensure that accompanying documents are complete and accurate.

- Ship brokers—sales representatives for ship owners and purchasing representatives for the shipper.

- Ship agents—local representative of the ship operator that handles the ship's arrival, berthing, clearance, loading, and unloading.

- Export packers—suppliers of export packaging services.

- Port authorities—owner and operator of the port. They provide wharf, dock, and other terminal facilities at port locations.

As the global market continues to expand, there is an increasing need for real-time logistics data in order to make decisions across the supply chain. Thus, a number of software companies now offer products designed specifically for the logistics and transportation industry. These products provide information like GPS tracking, automatic vehicle routing, and instantaneous updates on route progress. One such product, TerritoryPro by Appian Logistics, creates maps of optimal sales and delivery territories based on information about volume, workload, and other constraints. As the market for more sophisticated global logistics software continues to grow, the logistics and transportation industry is sure to continue its trend toward increased automation of tasks formerly performed by human beings.

SEE ALSO *Exporting and Importing; Forecasting; Lean Manufacturing and Just-in-Time Production; Reverse Supply Chain Logistics; Warehousing and Warehouse Management*

BIBLIOGRAPHY

Coyle, John J., Edward J. Bardi, and C. John Langley, Jr. *The Management of Business Logistics: A Supply Chain Perspective.* Mason, OH: South-Western Thomson Learning, 2003.

Logistics Glossary. Forbes.com. Available from: http://www.forbes.com/fdc/logistics/glossary_a.shtml.

Murphy, Jr., Paul R., and Donald Wood. *Contemporary Logistics.* 9th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Territory Pro–Constraint Based Geographic Territories. Appian Logistics. Available from: http://appianlogistics.com/index.php/products/terrtorypro/

LONG TAIL

Long tail is a type of business strategy which focuses on lowering distribution costs and marketing a wide variety of goods to a large consumer group, an approach made easier by the rise of e-commerce and e-retailers. The term *long tail* comes from a reference to a mathematical graph in which the concentration of a particular item or occurrence is shown, from a short, high head (the concentrated occurrence) to a sloping, drawn-out tail (the area of lower occurrence).

In business statistics, a bell curve is created to illustrate the probability of markets and the results of surveys, polls, averages, and so forth. A symmetrical curve will have two identical tails, both descending away from the highest middle point (the mode, the highest concentration of occurrence or the most popular answer). However, most statistical graphs will show a skewed, unsymmetrical frequency, meaning that the line of the graph will tend more toward one range, creating a long tail. A skewed curve can tend either toward the left, making a positive distribution, or toward the right, giving the graph a negative distribution. The graph in the example below has a positive long tail, the most common example of skewed distributions. Analysts use such graphs to determine what products are most popular, what types of marketing are most effective with customers, and what companies are most effective at selling in their industry, among other types of information.

While many companies attempt to fall within the head of a product distribution (the most popular, best-selling section), other businesses have tried to make money by appealing to a broader audience of consumers with a wider range of goods that, though less popular, can be sold successfully in lower quantities to many niche markets. One of the most famous types of broad-market companies in the early twentieth century was Sears Roebuck. Sears Roebuck produced a famous catalog advertising furniture, appliances, clothing items, houses, and other items to customers across America. The business was run as a mail-order company, so Sears Roebuck was able to concentrate on storage and distribution. Customers could order nearly any item they wanted through the catalog, and have it shipped straight to them. A century later, the Internet revolutionized the same system for many other companies.

Calling such business strategies "long tail" began in 2004, when Chris Anderson wrote a revolutionary article in *Wired* Magazine describing long tail effects and abilities. He later followed this with a 2006 book, *The Long Tail: Why the Future of Business Is Selling Less of More*, which has recently been updated in a 2008 edition. In his original article, Anderson questioned the techniques of companies selling only on the steep head of the graph, the few items statistically proven to be bestselling. He suggested that customers had more individuality than companies gave them credit for, and that nearly any item could find a perfect market if given the right opportunity.

A TALE OF TWO BOOKS

Anderson's first example for his long tail theory involved two popular mountain-climbing books published a decade apart, first *Touching the Void* in 1988 and then the bestselling *Into Thin Air* a decade later. Although *Touching the Void* was nearly out of print, Amazon.com began to suggest the book in their online store as a possible interest for those purchasing *Into Thin Air*. However, customer reviews and online recommendations for the earlier book soon escalated exponentially, leading to new

enthusiasm. Before long, *Touching the Void* was outselling *Into Thin Air* and stayed on the *New York Times* best-selling list for weeks, all due to the fact that Amazon.com still carried the nearly out of print book for those possibly interested in it. This, according to Anderson, was a perfect example of how selling in the long tail can pay off.

The long tail theory applies to much more than books. Any online company with strong distribution abilities can and often does make use of the myriad niche markets available in today's interconnected world. Anderson also applied the theory to the music industry, which he considered especially open due to the song-by-song basis on which music could be sold. Song lovers, able to find and pick out their favorite tracks, tend to gravitate to their favorite bands regardless of popularity, so that no matter what albums online music stores offer, there is likely to be a group of consumers, somewhere, who will buy songs from that album. Movie distributors over the Internet, such as Netflix, demonstrate a similar advantage.

There are several common marketing theories which Anderson disagreed with in his groundbreaking article, among them the continuance of the hit-driven market and the 80-20 rule. Hit-driven economics occurs in a wealthy, profitable market where there is a varied supply and not enough shelf space. Businesses must choose what products to display, so they choose the hits (the products society has chosen, goods surrounded by the most buzz). Hit-driven economics creates profit, but Anderson suggests that it fails to meet the needs of consumers and is outdated with today's technology. He proposes that businesses now operate in an abundant market where many specific goods, not only the hits, can be made available through the Internet. The 80-20 rule is similar, stating that only 20 percent of available title products—such as music or book releases—will become bestsellers and therefore will be worthy of attention. However, Anderson argues that nearly all the titles will sell at least a minimal number of copies, and that the 80-20 rule blinds businesses to sales outside the mainstream.

Fortunately, selling outside the mainstream in online trade is much easier than in space-limited, brick-and-mortar establishments. Cost savings are found through several different methods. Since there is no shelf space, there is no need to pay for anything other than product storage. Since most interfaces are digital, money can be saved by limited personnel and smaller office space. Distribution fees are also either lower or nonexistent, and manufacturing costs can often be lowered.

STEPS IN UTILIZING THE LONG TAIL

Anderson describes three driving forces in his book, three technological innovations recently developed that enable companies to access the long tail in a profitable way. These advances have changed the business market in fundamental ways, according to Anderson, allowing successful strategies to be centered away from mainstream items:

1. ***Tools of production.*** Certain tools of production have been developed in recent years that enable nearly anyone to create certain kinds of goods. Camcorders have become smaller and of higher quality, and they are available at lower costs. Software creation programs have become more common, and the number of those trained in computer programming has also increased. Along with the open source perspective many online businesses are taking, this allows nearly anyone with proper skills to make improvements and innovations to online structures. Many new software packages enable users to create their own music, publish their own articles, or form their own blogs. As a result of these changes, a vast number of small, niche products has risen with their own marketing possibilities. The key, naturally, is to locate and distribute the high quality products that others will be interested in.

2. ***The Internet aggregators***. Internet aggregators include most online e-retailers, Internet stores that are able to gather a large number of products or services to sell. There are many types of aggregation. Some online stores, such as Amazon, offer many different types of products in one centralized location, much as the Sears catalog did a century ago. Others, such as eBay, gather not products but potential long tail sellers, making money off the services they offer. Some aggregators specialize in a particular good, such as iTunes and their wide variety of music. The key attribute of Internet aggregators is their ability to offer the long tail items all from a single, virtual store. These are the businesses which can follow long tail strategies.

3. ***Software connecting supply and demand***. These are the necessary players that help connect small-time producers using tools of production, Internet aggregators with the ability to offer all their products in one online store, and consumers who have particular demands and interests. All types of Internet systems can function as connectors of long tail supply and demand. Social networking sites provide a platform where people can share knowledge and interests, increasing the size of many niche markets. Blogs spread information concerning cultural fads, hobbies, and various pastimes that can also affect long tail markets. Many search engines and e-mail providers, such as Google, also provide necessary connections between consumers looking for certain goods and companies offering them.

In addition to these three driving forces of long tail strategies, Anderson also gave three general rules for

companies trying to profit by their long tail business. These rules apply mostly to entertainment industries, where niche markets are the most widespread, but can be used in any situation where long tail sales are a goal:

- **Make everything available.** An online aggregate should attempt to offer every type of its product line possible. If the e-retailer is selling movies, or renting them as Netflix does, they should offer every type of movie they can, especially those marketed to a small audience (such as documentaries, independent movies, and foreign films that buyers would not be able to find in an average video or retail store). "Almost anything is worth offering on the off chance it will find a buyer," Anderson says, and when accessing the long tail this is a necessary step. Every genre and subgenre should have representation, and the more esoteric it is, the better the chances are that the product will have a particular niche market.

- **Cut the price in half—now lower it**. Anderson's second step is to lower prices to the point where they accurately reflect the costs involved in distribution. Since long tail distribution costs are naturally low, long tail e-retailers should have naturally low prices for their products. Anderson uses the music industry as an example: as of 2008, iTunes allows customers to download song tracks for 99 cents. The music industry could offer songs at lower prices—Anderson estimates about 79 cents instead—but stay away from lowering prices too much for fear that CD manufactures and distributors would be displaced, causing ramifications throughout the record industry. However, this might not be the case. The music industry, especially in the long tail, may be elastic enough to increase in demand equal to lowered prices. E-retailers, in other words, can sell more by dropping prices, and many niche markets depend on such low prices. Anderson also points out that the older tracks (or movies, or books), already invested in, can easily stand price cuts that make them more noticeable to possible customers.

- **Aid customers looking into the long tail**. Long tail businesses must avoid the tempting problem of only offering products lying within the long tail part of statistical graphs. This is not a successful strategy, since customers are not drawn to the smaller business niches in a direct process, but rather through a series of introductory steps, often beginning with more popular items closer to the head of the graph and progressing down to less significant products closer to the consumers' taste. This is often done through a series of recommendations. When a customer accesses an online store to search for a popular item—the new release of a book or movie, for instance—the e-retailer gives them several recommendations of similar, lesser known products that curious customers can inspect. These recommendations in turn lead to other, even rarer product recommendations the customer can search through until he or she finds the right good, possibly located far down the long tail. Without offering popular products and recommendations in the first place, e-retailers cannot attract consumers to lesser known items.

THE LONG TAIL DEBATE

In 2008, Professor Anita Elberse wrote an article in the *Harvard Business Review* that sparked a series of debating posts between her and Chris Anderson over the applicability of the long tail theory. Elberse began by proposing that Anderson's ideas, while sound, were not nearly as effective as he theorized. Her own research led her to downplay the effectiveness of a long tail strategy and suggest that the long tail is too flat and extended to be useful, that profitable business is not moving toward niche markets but is instead staying firmly in place near the head, where the bestselling products are. Since Anita Elberse had both collaborated with Anderson in his book research and conducted detail analysis of the music industry herself, her argument attracted a large amount of attention in the business world.

Chris Anderson replied with an article refining his definition of long tail and head, and he challenged Elberse's interpretation of music industry percentages. According to his view, the prominent head of Elberse's argument technically counted as only a small portion of available products, the few percentage points of successful goods found on the shelves in brick-and-mortars. The total of other goods, what Anderson referred as the tail, sold overall more copies (and made a higher profit) than the total of the head, which still confirmed his theory. Anderson used the same logic on the other studies conducted by Elberse, splitting the head and tail into percentages that agreed with his views.

Elberse responded to Anderson's retort with another article, in which she agreed with his main tenets but underlined two of her beliefs. First, she emphasized the increasing flatness of the long tail, proposing that the more online retailers offered goods to niche markets, the flatter the tail would become, until businesses would begin struggling to cover all possible products. Second, Elberse pointed out that all "light hitters," or infrequent shoppers, preferred the bestsellers by far, and that bestsellers were rated higher by all customers than the rarer tracks—showing that quality counted more than quantity. Her efforts were directed toward moving away from defining all sales as either head or tail, and toward an empirical view of strategic effectiveness.

SMALL BUSINESSES

Although Elberse's argument is based on careful analysis, her points concern mostly large corporations who have the ability to reach across the full length of the long tail. Smaller businesses can make use of long tail strategy to find successful markets for their goods. Anita Campbell explores the long tail advantages of small businesses in her 2008 article, "Is it Time to Chuck the Long Tail Theory?" and comes to the conclusion that large corporation can afford to concentrate on making and marketing bestsellers, but small businesses cannot afford to pick and choose products. What they can do, according to Campbell, is use the power of distribution to access possible long tail buyers.

In the exhibit shown above, large corporations have the resources to use legal distribution, supply and demand, and capitalism to utilize long tails, while small businesses need to work with independent production and let the long tail market find them. For them, the distribution power and online representation today's technology offers is a step toward introducing their creations up the tail toward the head. Small business's lesser known goods can find niche markets through the online availability (long tail software) and work upward, creating their own popularity.

LONG TAIL EXAMPLES

Amazon.com: With their innovative recommendations list and vast variety of products, Amazon typifies the online retailer making use of long tail strategies.

Netflix: Making a point to carry all titles, not just those for sale in local video rental stores, Netflix has revolutionized online DVD rental services.

Rhapsody: Chris Anderson notes that online music seller Rhapsody dared to attempt his second long tail step of drastically reducing song track prices in an experiment, selling some tracks at both 79 and 49 cents; though Rhapsody lost money on the endeavor, the company made it up by selling triple the number of usual songs.

eBay: The famous online C2C seller allows customers to search for a vast variety of products and, more importantly, provides the services necessary for niche markets to function successfully.

Google: The Internet giant gives consumers the ability to search for whatever particular products they want.

ISSUES WITH LONG TAIL STRATEGY

As Anita Elberse countered in her articles, no matter how much discussion centers around maximizing profit through appeal to the long tail, the statistics show that the money still lies in bestsellers. While long tail products may be able to find a market somewhere in the world, businesses must choose what strategy to invest in, and most find it easier to focus on the head rather than the tail. Consumers simply prefer the blockbuster titles, and no matter how available other products become, the bestsellers appear to receive the best reviews, the highest accolades, and the most interest. For companies with limited resources, investing in the head goods is easier and more profitable, unless an entire long tail system is already in place.

Others predict a failing in long tail markets that will arrive when the costs of communicating and maintaining ever-increasing availability outweigh the profits of appealing to countless niche markets. For instance, social networking sites collect and provide many kinds of content (such as video and audio clips only a step away from entering niche markets as a possible source of profit), which users can share with their friends and create a buzz about. However, as the number of users, the number of generated pieces, and the number possible markets increases, the costs of maintaining the social networking sites also rise. More employees are needed to secure the data and more servers are needed to hold the information, which often leads to a need for more office space and more system updates. Eventually, these rising costs will eat away at the profitability of the social networks, and some content will have to be dropped to save space. Who decides what content will be dropped? The social networking companies will most likely choose some of the oldest information—but when users discover their shared information is being deleted, they will lose interest in sharing, and the niche markets will disperse, beginning a cycle of loss. This same danger applies to all long tail strategies, although it remains to be seen whether the niche markets will actually dry up in this manner.

BIBLIOGRAPHY

Anderson, Chris. "The Long Tail." *Wired.* Condenet Inc, 2008.

Anderson, Chris. "Debating the Long Tail." *Harvard Business Publishing.* Harvard Business School, 2008.

Anderson, Chris. *The Long Tail: Why the Future of Business Is Selling Less of More.* Hyperion, 2006.

Asay, Matt. "Blockbusters Stomp on the Long Tail, Harvard Business Study Finds." *CNet News.com,* 2008. Available from: http://news.cnet.com/8301-10784_3-9978874-7.html.

Campbell, Anita. "Is It Time to Chuck the Long Tail Theory?" *Small Business Trends,* 2008. Available from: http://www.smallbiztrends.com/2008/07/long-tail-criticism.html.

Elberse, Anita. "Should You Invest in the Long Tail?" *Harvard Business Review,* Harvard Business Publishing, 2008.

Elberse, Anita. "The Long Tail Debate: A Response to Chris Anderson." *Harvard Business Publishing: Conversation Starter,* 2008. Available from: http://conversationstarter.hbsp.com/2008/07/the_long_tail_debate_a_respons.html.

Foremski, Tom. "Choking on the Long Tail: The Unbearable Burden." *Silicon Valley Watcher,* 2008. Available from: http://www.siliconvalleywatcher.com/mt/archives/2008/03/saturday_post_c.php.

Godin, Seth. *Meatball Sundae: Is Your Marketing Out of Sync?* Portfolio, 2007.

Needham, David, and Robert Dransfield. *Business Studies.* Nelson Thornes, 1994.

M

MACROECONOMICS

SEE *Economics*

MACROENVIRONMENTAL FORCES

An organization's macroenvironment consists of nonspecific aspects in the organization's surroundings that have the potential to affect the organization's strategies. When compared to a firm's task environment, the impact of macroenvironmental variables is less direct, and the organization has a more limited impact on these elements of the environment.

Macroenvironmental variables include sociocultural, technological, political-legal, economic, and international variables. A firm considers these variables as part of its environmental scanning to better understand the threats and opportunities created by the variables and how strategic plans need to be adjusted so the firm can obtain and retain competitive advantage.

The macroenvironment consists of forces that originate outside of an organization and generally cannot be altered by actions of the organization. In other words, a firm may be influenced by changes within this element of its environment, but cannot itself influence the environment. The curved lines in Figure 1 indicate the indirect influence of the environment on the organization.

SOCIOCULTURAL FACTORS

The sociocultural dimensions of the environment consist of customs, lifestyles, and values that characterize the society in which the firm operates. Sociocultural components of the environment influence the ability of the firm to obtain resources, make its goods and services, and function within the society. Sociocultural factors include anything within the context of society that has the potential to affect an organization. Population demographics, rising educational levels, norms and values, and attitudes toward social responsibility are examples of sociocultural variables.

Population Changes. Changes in population demographics have many potential consequences for organizations. As the total population changes, the demand for products and services also changes. For instance, the decline in the birthrate and improvement in health care have contributed to an increase in the average age of the population in the United States.

Many firms that traditionally marketed their products toward youth are developing product lines that appeal to an older market. Clothing from Levi Strauss & Co. was traditionally popular among young adults. While its popularity in this market has waned, the firm has been able to develop a strong following in the adult market with its Dockers label. (In 2008, the company attempted to attract a younger market for Dockers with a viral marketing campaign.)

Other firms are developing strategies that will allow them to capitalize on the aging population. Firms in the health-care industry and firms providing funeral services are expected to do well, given the increasing age of the U.S. population. They are projected as a growth segment of U.S. industry simply because of the population demographics.

Figure 1
Elements of the Macroenvironment
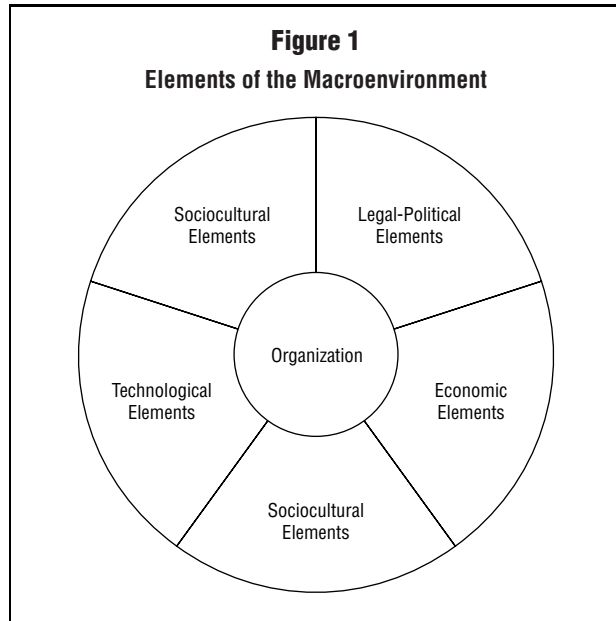
Rising Educational Levels. Rising educational levels also have an impact on organizations. Higher educational levels allow people to earn higher incomes than would have been possible otherwise. The increase in income has created opportunities to purchase additional goods and services, and to raise the overall standard of living of a large segment of the population. The educational level has also led to increased expectations of workers, and has increased job mobility. Workers are less accepting of undesirable working conditions than were workers a generation ago. Better working conditions, stable employment, and opportunities for training and development are a few of the demands businesses confront more frequently as the result of a more educated workforce.

Norms and Values. Norms (standard accepted forms of behavior) and values (attitudes toward right and wrong) differ across time and between geographical areas. Lifestyles differ as well among different ethnic groups. As an example, the application in the United States of Japanese-influenced approaches to management has caused firms to reevaluate the concept of quality. Customers have also come to expect increasing quality in products. Many firms have found it necessary to reexamine production and marketing strategies to respond to changes in consumer expectations.

Social Responsibility. Social responsibility is the expectation that a business or individual will strive to improve the welfare of society. From a business perspective, this translates into the public expecting businesses to take active steps to make society better by virtue of the business being in existence. Like norms and values, what is considered

socially responsible behavior changes over time. In the 1970s affirmative action was a high priority. During the early part of the twenty-first century, prominent social issues were environmental quality (most prominently, recycling and waste reduction) and human rights, in addition to general social welfare. More than just philanthropy, social responsibility looks for active participation on the part of corporations to serve their communities.

Corporate responsibility has become an increasingly important issue as concerns about the environment grow, compelling large organizations to address the topic or risk public scorn. Search engine giant Google, for example, provides grants to projects aimed at developing renewable energy, while Starbucks has several programs devoted to sustainable coffee research.

The stakeholder approach to social responsibility demonstrates some of the complexities of incorporating socially-responsible issues into a firm's strategies. Stakeholders are anyone with a stake in the organization's existence. Highly visible stakeholders are stockholders, employees, customers, and the local community. Decisions to be responsible and maximize the return to stockholders may require closing an unprofitable plant. However, employees and members of the local community could view this move as socially irresponsible since the move would not benefit the community.

TECHNOLOGICAL FACTORS

Technology is another aspect of the environment a firm should consider in developing strategic plans. Changing technology may affect the demand for a firm's products and services, its production processes, and raw materials. Technological changes may create new opportunities for the firm, or threaten the survival of a product, firm, or industry. Technological innovation continues to move at an increasingly rapid rate.

Demand. Technology can change the lifestyle and buying patterns of consumers. Developments in the field of personal computers have dramatically expanded the potential customer base and created innumerable opportunities for businesses to engage in business via the Internet. Whereas computers were traditionally used only by large organizations to handle data processing needs, personal computers are commonly used by smaller firms and individuals for uses not even imagined in the past. Similarly, new developments in technology led to a reduction in prices for computers and expanded the potential market. Lower prices allow computers to be marketed to the general public rather than to business, scientific, and professional users—the initial market.

Technology may also cause certain products to be removed from the market. Asbestos-related illnesses have

severely limited asbestos as a resource used in heat-sensitive products such as hair dryers. Further, a number of chemicals that have been commonly used by farmers to control insects or plants are prohibited from use or require licensure as a consequence of those chemicals appearing in the food chain.

Production Processes. Technology also changes production processes. The introduction of products based on new technology often requires new production techniques; further, new production technology may alter production processes. Robotics represents one of the most visible challenges to existing production methods. Robots may be used in positions considered hazardous for people or that require repetitive, detailed activities.

The consequences for other jobs currently occupied by people are not clear. When production was first automated, although some workers were displaced, new jobs were created to produce and maintain the automated equipment. The impact of robotics on jobs is in large part a function of the uses made of the technology and the willingness of workers to learn to use new technology.

In some industries, use of robots during the early 2000s increased production and efficiency but resulted in significant numbers of job losses. However, technological innovation can also result in increased job growth. For example, Ford Motor Company's $375-million technology update to its Norfolk assembly plant to build its 2004 F-150 resulted in the ability to build more models on its assembly line and consequently created about 270 new jobs, an 11 percent increase.

Evaluating Technological Changes. There is little doubt that technology represents both potential threats and potential opportunities for established products. Products with relatively complex or new technology are often introduced while the technology is being refined, making it hard for firms to assess their market potential. When ballpoint pens were first introduced, they leaked, skipped, and left large blotches of ink on the writing surface. Fountain pen manufacturers believed that the new technology was not a threat to existing products and did not attempt to produce ballpoint pens until substantial market share had been lost.

Another technology, the electric razor, has yet to totally replace the blade for shaving purposes. Perhaps the difference is that the manufacturers of blades have innovated by adding new features to retain customers. Manufacturers of fountain pens did not attempt to innovate until the ballpoint pen was well established.

It is quite difficult to predict the impact of a new technology on an existing product. Still, the need to monitor the environment for new technological developments is obvious. Attention must also be given to developments in industries that are not direct competitors, since new tech-

nology developed in one industry may impact companies and organizations in others.

POLITICAL AND LEGAL FACTORS

The political-legal dimension of the general environment also affects business activity. The philosophy of the political parties in power influences business practices. The legal environment serves to define what organizations can and cannot do at a particular point in time.

ATTITUDES TOWARD BUSINESS

A pro-business attitude on the part of government enables firms to enter into arrangements that would not be allowed under a more anti-business philosophy. The numerous joint ventures between U.S. and Japanese automobile manufacturers could have been termed anti-competitive by a less pro-business administration. The release of many acres of government land for business use (logging, mining) angered many environmentalists who had been able to restrict business use of the land under previous administrations.

Changes in sentiments toward smoking and its related health risks have altered the public's attitude toward the tobacco industry. These changes have been reflected in many organizations by limiting smoking to designated areas or completely prohibiting it at work. The transformation in attitude has also caused firms within the tobacco industry to modify marketing strategies, encouraging many to seek expansion opportunities abroad.

Legislation. The legal environment facing organizations is becoming more complex and affecting businesses more directly. It has become increasingly difficult for businesses to take action without encountering a law, regulation, or legal problem. A very brief listing of significant laws that affect business would include legislation in the areas of consumerism, employee relations, the environment, and competitive practices.

Many of the laws also have an associated regulatory agency. Powerful U.S. regulatory agencies include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Equal Employment Opportunity Commission (EEOC), and the Securities and Exchange Commission (SEC).

Estimates of the cost of compliance vary widely, but could well exceed $100 billion annually. Many of these costs are passed to consumers. However, costs of legal expenses and settlements may not be incurred for years and are not likely to be paid by consumers of the product or owners of the company when the violation occurred. Still, potential legal action often results in higher prices for consumers and a more conservative attitude by business executives.

Levels of Government Influence. In discussion, the term "the government" is generally meant to refer to the federal government. It is the federal government that passes and enforces legislation concerning the entire country. Actions by the federal government affect a large number of firms and are consistent across state boundaries. Environmental analysis, however, should not overlook actions by both state and local governments.

Regulations concerning many business practices differ between states. Tax rates vary widely. Laws regarding unionization (e.g., right-to-work states) and treatment of homosexual workers differ between states.

Local governments have the potential to affect business practices significantly. Some local governments may be willing to provide incentives to attract business to the area. Some may build industrial parks, service roads, and provide low-interest bonds to encourage a desirable business to move into the community.

Regulatory measures such as building codes and zoning requirements differ significantly between communities. Infrastructure such as electric and sewer services, educational facilities, and sewage treatment capabilities may not be able to accommodate the increased demand associated with certain industries, making that locale unsuitable for establishing some businesses.

ECONOMIC FACTORS

Economic factors refer to the character and direction of the economic system within which the firm operates. Economic factors include the balance of payments, the state of the business cycle, the distribution of income within the population, and governmental monetary and fiscal policies. The impact of economic factors may also differ between industries.

Balance of Payments. The balance of payments of a country refers to the net difference in value of goods bought and sold by citizens of the country. To decrease the dollar value of goods imported into a country, it is common practice to construct barriers to entry for particular classes of products. Such practices reduce competition for firms whose products are protected by the trade barriers.

Mexico has limited the number of automobiles that can be imported. The purpose of this practice is to stimulate the domestic automobile market and to allow it to become large enough to create economies of scale and to create jobs for Mexican workers. A side effect of the import restriction, however, has been an increase in the price and a decrease in the quality of automobiles available to the public.

Another potential consequence of import restrictions is the possibility of reciprocal import restrictions. Partially in retaliation to import restriction on Japanese televisions and automobiles by the United States, the Japanese have limited imports of agricultural goods from the United States.

Lowering trade restrictions as a means of stimulating the economy of a country may meet with mixed results. The North American Free Trade Agreement (NAFTA) has opened the borders between the United States, Canada, and Mexico for the movement of many manufacturers. Government officials in the United States argue the results have been positive, but many local communities that have lost manufacturing plants question the wisdom of the agreement.

As discussed in an article by Susan Schmidt in *World Trade* magazine, issues that stemmed from regulatory agencies and national security measures were barriers to free trade during the early part of the twenty-first century, demonstrating that NAFTA alone could not clear the path for companies and countries to take advantage of free trade benefits.

Business Cycle. The business cycle is another economic factor that may influence the operation of a firm. Purchases of many durable goods (appliances, furniture, and automobiles) can be postponed during periods of recession and depression, as can purchases of new equipment and plant expansions. Economic downturns result in lower profits, reductions in hiring, increased borrowing, and decreased productivity for firms adversely affected by the recession. Positive consequences of recessions may include reductions in waste, more realistic perceptions of working conditions, exit of marginally efficient firms, and a more efficient system.

Some organizations may benefit from an economic downturn. Postponed purchases may result in the need to service existing products. An owner electing to keep a used automobile rather than buying a new one may need to have it repaired, thus creating an increased demand for automobile mechanics and replacement parts. Limited job opportunities during downturns also encourage individuals unable to get satisfactory jobs to consider going to college or joining the armed services.

Income Distribution. The distribution of income may differ between economic systems. Two countries with the same mean (per capita) income levels may have dramatically different distributions of income. The majority of persons in the United States are considered middle income, with only a relatively small number of persons having exceptionally high or low incomes.

Many developing countries have citizens who are either extremely wealthy or extremely poor. Only a few persons would qualify as middle class. Therefore, although both countries had the same mean income, opportunities to market products to the middle class would be greater in the United States.

Transfer Payments. Transfer payments (e.g., welfare, social security) within the United States change the distribution of income. Transfer payments provide money to individuals in the lower income brackets and enable them to purchase goods and services they otherwise could not afford. Such a redistribution of income may not be the practice in other economic systems. Thus, large numbers of people in need of basic goods and services do not assure that those people will be able to purchase such goods and services.

Monetary and Fiscal Policies. Monetary and fiscal policies utilized by the federal government also influence business operations. Monetary policies are controlled by the Federal Reserve System and affect the size of the money supply and interest rates. Fiscal policies represent purchases made by the federal government.

For example, allocation of funds to defense means expenditures for weapons and hardware. If appropriations had gone to the Health and Human Services and Education Departments instead, much of the money would have constituted transfer payments. The primary beneficiaries of such a fiscal policy would be firms in the basic food and shelter businesses. No matter how government expenditures are reallocated, the result is lost sales and cut budgets for some companies, and additional opportunities for others.

Though unpopular in the United States, another aspect of government fiscal policy is deficit spending, which may allow government expenditures to rise, but can also influence interest rates, exchange rates, and other economic trends.

INTERNATIONAL FACTORS

A final component of the general environment is actions of other countries or groups of countries that affect the organization. Governments may act to reserve a portion of their industries for domestic firms, or may subsidize particular types of businesses to make them more competitive in the international market.

Some countries may have a culture or undergo a change in leadership that limits the ability of firms to participate in the country's economy. As with the other elements of the macroenvironment, such actions are not directed at any single company, but at many firms.

Economic Associations. As described previously, one joint effort by governments to influence business practices was NAFTA. The agreement between the United States, Canada, and Mexico was intended to facilitate free trade between the three countries. The result has been a decrease in trade barriers between them, making it easier to transport resources and outputs across national boundaries. The move has been beneficial to many businesses, and probably to the economies of all three countries. In most economic associations, preference is also given to products from member countries at the expense of products from nonmembers.

Probably the best-known joint effort by multiple countries to influence business practices is the Organization of Petroleum Exporting Countries (OPEC). The formation of OPEC, an oil cartel including most major suppliers of oil and gas, led to a drastic increase in fuel prices. Rising fuel prices had a significant effect on the demand for automobiles worldwide. The increases in oil prices also contributed to inflation all over the world. OPEC's early success encouraged countries producing other basic products (coffee beans, sugar, bananas) to attempt to control the prices of their products.

A more recent example of an economic association serving multiple countries was the International Coffee Organization (ICO). The United States rejoined the ICO in 2004 in hopes of fostering sustainability and competition across countries and the industry. The United States works with the Honduras, Mexico, and Nicaragua, among others, as part of this organization.

Intergovernmental Relations. Changing relationships between the United States and other countries may alter the ability of firms to enter foreign markets. The United States' establishment of trade relations with China in the 1970s created opportunities for many firms to begin marketing their products in China.

The rise of Ayatollah Ruhollah Khomeini to power in Iran altered the lives of many Iranian citizens. Wine, vodka, music, and other forms of entertainment were prohibited. Black markets provided certain restricted items. Other products, such as wine, began to be produced at home. Anti-American sentiments throughout the country showed the hostility of many citizens. Non-American firms thus had an opportunity to capitalize on the anti-American sentiments and to provide goods and services formerly provided by U.S. firms.

Cultural Differences. In different countries and sometimes even within a country, there are substantial differences in attitudes, beliefs, motivation, morality, superstition, and perception, as well as other characteristics. Geert Hofstede (b. 1928) developed a model in which worldwide differences in culture are categorized according to five dimensions. These dimensions include:

- Power distance—the degree of inequality among people which the population of a country considers normal.
- Individualism vs. collectivism—the degree to which people in a country prefer to act as individuals or as members of a group.

- Masculinity vs. femininity—the degree to which values like assertiveness, performance, success, and competitiveness are used to guide decisions versus values like the quality of life, warm personal relationships, service, and solidarity.

- Uncertainty avoidance—the degree to which citizens of a country prefer structured over unstructured situations, rigidity of procedures, or willingness to accept risk and potential failure.

- Time orientation—the extent to which decisions are based on long-term orientation versus short-term orientation, past versus present versus future, and punctuality.

Hofstede argues that U.S. management theories contain a number of idiosyncrasies that are not necessarily shared by managers in other cultures. Approaches to motivation and leadership, for example, differ widely throughout the world. Citizens of Japan tend to put greater importance on collective effort and working as a team member. Individual recognition is not desired. It is viewed as contradictory to being a good team member.

Similarly, in other countries, high tax rates may make bonuses and other forms of monetary compensation less attractive and less motivating than in the United States. Hofstede argues that employees and products are more readily transferred between countries sharing similar cultures.

The macroenvironment consists of forces that originate outside of an organization and generally cannot be altered by actions of the organization. Dimensions of the macroenvironment consist of sociocultural factors, technological factors, political-legal elements, economic factors, and international elements. A firm needs to study these elements of its environment, as they have the potential to affect how the organization should operate to attain and maintain its competitive advantage.

SEE ALSO *Economics; SWOT Analysis*

BIBLIOGRAPHY
Corporate Social Responsibility. Starbucks Corporation. Available from: http://www.starbucks.com/aboutus/csr.asp.

David, Michael. "Increased Productivity Can Depress Job Growth." *The Virginian-Pilot,* 30 January 2005.

Ghumann, Mushtaq. "Accountability Towards the Community." *Business Recorder,* 7 February 2005.

Hofstede, Geert. "Cultural Constraints in Management Theories." *Academy of Management Executive* 7 (1993): 81–94.

Mahoney, Sarah. "Dockers Makes a Play for a Younger, More Viral Crowd." *Marketing Daily.* 1 May 2008. Available from: http://publications.mediapost.com/index.cfm?fuseaction=Articles.showArticleHomePage&art_aid=81692

Munk, Nina. "How Levi's Trashed a Great American Brand." *Fortune,* 12 April 1999, 83–90.

Pan, Yigang, and Peter S.K. Chi. "Financial Performance and Survival of Multinational Corporations in China." *Strategic Management Journal* 20 (1999): 359–374.

———."Research and Markets: Ethics and Corporate Social Responsibility in Retail Financial Service." *Business Wire,* 2 Febrary 2005.

Schmidt, Susan M. "Think It's a Breeze Moving Goods Between the U.S. and Mexico? Think Again–Regulatory Regimes Are the Hidden Pitfalls in NAFTA and Other Free Trade Agreements." *World Trade,* January 2005, 52.

———."U.S. to Rejoin International Coffee Organization." *Tea & Trade Coffee Journal,* 20 November 2004, 60.

Visser, Wayne, Dirk Matten, Manfred Pohl, and Nick Tolhurst. *The A to Z of Corporate Social Responsibility: A Complete Reference Guide to Concepts, Codes, and Organisations.* Hoboken, NJ: Wiley, 2008.

Vogelstein, Fred. "The Barbarians Are No Longer at the Gate." *U.S. News & World Report,* 22 March 1999, 50.

MAINTENANCE

Maintenance is the combination of all technical and associated administrative actions intended to retain an item in, or restore it to, a state in which it can perform its required function. Many companies seek to gain competitive advantage with respect to cost, quality, service, and on-time deliveries. The effect of maintenance on these variables has prompted increased attention to the maintenance area as an integral part of productivity improvement. Maintenance is rapidly evolving into a major contributor to the performance and profitability of manufacturing systems. In fact, some see maintenance as the "last frontier" for manufacturing.

In their article "Make Maintenance Meaningful," P.K. Kauppi and Paavo Ylinen describe the bulk of maintenance procedures as being:

- Preventive maintenance—the prevention of equipment breakdowns before they happen. This includes inspections, adjustments, regular service, and planned shutdowns.

- Repair work—repairing equipment and troubleshooting malfunctions in an effort to return the equipment to its previous condition. These repairs may be reactive or preventive.

- Improvement work—searching for better materials and improved designs to facilitate equipment reliability. Repair work is often a part of improvement work.

As shown in Figure 1, six maintenance programs are identified within the maintenance hierarchy, each representing an increased level of sophistication.

Figure 1

Maintenance Hierarchy

Reliability-Centered Maintenance

Total Productive Maintenance

Preventative Maintenance

Predictive Maintenance

Scheduled Maintenance

Reactive Maintenance
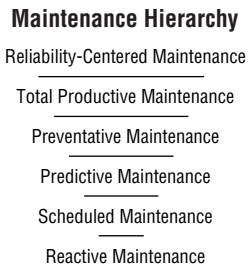
REACTIVE MAINTENANCE

Reactive maintenance (also known as corrective maintenance) involves all unscheduled actions performed as a result of system or product failure. Basically, it is an attempt to restore the system/product to a specified condition. The spectrum of activities within this level is (1) failure identification, (2) localization and isolation, (3) disassembly, (4) item removal and replacement or repair in place, (5) reassembly, and (6) checkout and condition verification.

This approach is mainly a response to machine breakdowns. Unfortunately, many manufacturers are still in a reactive mode of operation, since their main objective is to ship the product. If their manufacturing equipment breaks down, they fix it as quickly as possible and then run it until it breaks down again—an extremely unreliable process and not the best way to maximize the useful life span of assets. It leaves machine tools in a state of poor repair and can cause the production of out-of-tolerance parts and scrap. Because of its unpredictable nature it can easily cause disruptions to the production process.

SCHEDULED MAINTENANCE

Scheduled maintenance utilizes a previously developed maintenance schedule for each machine tool. While this is a broadly practiced technique in many manufacturing organizations, it does possess some distinct disadvantages. The scheduled maintenance may take place too soon, while the machine still operates well (15–20 percent of all components fail after a predictable time), or it may come too late if the machine fails before the scheduled maintenance time. In some cases, the machine may still be running but producing unacceptable parts. Scheduled maintenance can be considered a part of preventive maintenance (discussed later) known as fixed-time maintenance (FTM).

PREDICTIVE MAINTENANCE

Predictive maintenance involves performing maintenance on a machine in advance of the time a failure would occur if the maintenance were not performed. This means that one must calculate when a machine is predicted to fail. In order to do this, the firm must collect data on variables that can be used to indicate an impending failure (vibration, temperature, sound, color, etc.). This data is analyzed to approximate when a failure will occur and maintenance is then scheduled to take place prior to this time. By seeking the correct level of maintenance required, unplanned downtime is minimized.

PREVENTIVE MAINTENANCE

Preventive maintenance encompasses activities, including adjustments, replacement, and basic cleanliness, that forestall machine breakdowns. Preventive activities are primarily condition based. The condition of a component, measured when the equipment is operating, governs planned/scheduled maintenance.

Typical preventive maintenance activities include periodic inspections, condition monitoring, critical item replacements, and calibrations. In order to accomplish this, blocks of time are incorporated into the operations schedule. The purpose of preventive maintenance is to ensure that production quality is maintained and that delivery schedules are met. In addition, a machine that is well cared for will last longer and cause fewer problems.

Current trends in management philosophy such as just-in-time (JIT) and total quality management (TQM) incorporate preventive maintenance as key factors in their success. JIT requires high machine availability, which in turn requires preventive maintenance. Also, TQM requires equipment that is well maintained in order to meet required process capability.

Preventive maintenance is also seen as a measure of management excellence. It requires a long-term commitment, constant monitoring of new technology, a constant assessment of the financial and organizational tradeoffs in contracting out versus in-house maintenance, and an awareness of the impact of the regulatory and legal environment.

The resulting benefits of preventive maintenance are many. Some of them are listed below:

- **Safety.** Machinery that is not well maintained can become a safety hazard. Preventive maintenance increases the margin of safety by keeping equipment in top running condition.

- **Lower cost.** A modern and cost-effective approach to preventive maintenance shows that there is no maintenance cost optimum. However, maintenance costs will decrease as the costs for production losses decreases. No preventive maintenance action is performed unless it is less costly than the resulting failure.

- **Reduction in failures and breakdowns.** Preventive maintenance aims to reduce or eliminate unplanned

downtime, thereby increasing machine efficiency. Downtime is also reduced when the preventive maintenance process gives maintenance personnel sufficient warning so repairs can be scheduled during normal outages.

- **Extension of equipment life.** Equipment that is cared for will last longer than equipment that is abused and neglected.

- **Improved trade-in/resale value of equipment.** If the equipment is to be sold or traded in, a preventive maintenance program will help keep the machine in the best possible condition, thereby maximizing its used value.

- **Increased equipment reliability.** By performing preventive maintenance on equipment, a firm begins to build reliability into the equipment by removing routine and avoidable breakdowns.

- **Increased plant productivity.** Productivity is enhanced by the decrease in unexpected machine breakdown. Also, forecast shutdown time can allow the firm to utilize alternate routings and scheduling alternatives that will minimize the negative effect of downtime.

- **Fewer surprises.** Preventive maintenance enables users to avoid the unexpected. Preventive maintenance does not guarantee elimination of all unexpected downtime, but empirically it has proven to eliminate most downtime caused by mechanical failure.

- **Reduced cycle time.** If process equipment is incapable of running the product, then the time it takes to move the product through the factory will suffer. Taninecz found, from an *Industry Week* survey, that there is a strong correlation between preventive maintenance and cycle-time reductions as well as near-perfect on-time delivery rates. Also, approximately 35 percent of the surveyed plants who widely adopted preventive maintenance achieved on-time delivery rates of 98 percent, compared to only 19.5 percent for non-adopters.

- **Increased service level for the customer and reduction in the number of defective parts.** These have a positive direct effect on stockouts, backlog, and delivery time to the customer.

- **Reduced overall maintenance.** By not allowing machinery to fall into a state of disrepair, overall maintenance requirements are greatly decreased.

TOTAL PRODUCTIVE MAINTENANCE

Total productive maintenance (TPM) is preventive maintenance plus continuing efforts to adapt, modify, and refine equipment to increase flexibility, reduce material handling, and promote continuous flows. It is operator-oriented maintenance with the involvement of all qualified employees in all maintenance activities.

TPM has been described as preventive maintenance with these three factors added: (1) involving machine operators in preliminary maintenance activities by encouraging them to keep machines clean and well lubricated; (2) encouraging operators to report indications of incipient distress to the maintenance department; and (3) establishing a maintenance education and training program.

Developed in Japan, TPM places a high value on teamwork, consensus building, and continuous improvement. It is a partnership approach among organizational functions, especially production and maintenance. TPM means total employee involvement, total equipment effectiveness, and a total maintenance delivery system. In order to achieve this, machine operators must share the preventive maintenance efforts, assist mechanics with repairs when equipment is down, and work on equipment and process improvements within team activities.

Tennessee Eastman found that another employee, such as an equipment operator, with minimal training, could do 40 percent of the traditional maintenance mechanic's work. Another 40 percent could be performed with additional training, but still below the certified level. Only 20 percent of the maintenance tasks actually required a certified mechanic's skills. They also reported that as much as 75 percent of maintenance problems can be prevented by operators at an early stage. This frees maintenance personnel to be responsible for the tasks that require their critical skills, such as breakdown analysis, overhaul, corrective maintenance, and root cause analysis. This places maintenance personnel in a "consultant" role with the operators allowing them to:

- Help the operator diagnose problems and restore equipment to like-new condition.

- Use appropriate technologies and standards to verify that the equipment is in like-new condition after repair, overhaul, or replacement.

- Use this knowledge to assess the root cause of the problem so that changes may be made to the design, operation, or maintenance practices in the future.

- Work with purchasing, engineering, operations, and maintenance to modify procurement standards to assure maximum reliability in future equipment.

In order for this to work, the firm must have an organizational culture which supports a high level of employee involvement. Businesses must be willing to provide the necessary training in order to allow production personnel to perform the required tasks.

TPM's focus is on elimination of the major losses or inefficiencies incurred in production activities. These

losses include those due to obstruction of equipment efficiency, manpower efficiency, and material and energy efficiency. Based on their link to corporate goals, targets for eliminating or reducing these losses are developed.

Just as in activity-based cost accounting where cost drivers are identified, the objective of TPM is to identify variables that can demonstrate improved performance. All major equipment losses are functionally related to availability, performance, efficiency, and/or quality rate so the improvement resulting from the maintenance system can be measured by its impact on overall equipment effectiveness (see below).

Beneficial results of TPM include:

- It maximizes overall equipment effectiveness and overall efficiency.
- It takes the guesswork out of determining which machine needs major repairs or rebuilding.
- It provides objectivity by converting the operator's intuition into quantifiable values.
- It pinpoints exact maintenance requirements. The operator carries out only the needed corrective actions, so no unnecessary work, beyond routine maintenance, is done.
- It rapidly verifies the effectiveness of major corrective work.
- It helps operators improve their job skills.
- It motivates operators by involving them in maintenance of their own machines and in team-based concepts.
- It gives operators ownership of making the project a success by involving them in the process.
- It enables the development of a preventive maintenance program for the lifecycle of the equipment.
- It gets everyone involved in equipment design and selection, resulting in a better understanding of why certain decisions and trade-offs are necessary.
- It results in equipment and maintenance management (inherent in a reliability strategy).
- It maximizes capacity.
- It minimizes costs.
- It improves product quality.
- It improves safety.
- It continually improves the manufacturing process.

As a final note on TPM, another school of thought holds that TPM can be adopted by continuous diagnostic monitoring of a machine's conditions and establishing a trend line for it. Trend lines approaching or veering into the domain that identifies poor operating conditions will trigger maintenance action.

RELIABILITY-CENTERED MAINTENANCE

It has been assumed that preventive maintenance programs help to ensure reliability and safety of equipment and machinery. However, tests performed by airlines in the mid-1960s showed that scheduled overhaul of complex equipment had little or no positive effect on the reliability of the equipment in service. These tests revealed the need for a new concept of preventive maintenance, which later became known as reliability-centered maintenance (RCM).

The concept of RCM is rooted in a 1968 working paper prepared by the Boeing 747 Maintenance Steering Group. A refined version appeared in 1970. Continued studies at the Department of Defense led to the 1986 publication of the "Reliability Centered Maintenance Requirements for Naval Aircraft, Weapons Systems and Support Equipment," a set of maintenance standards and procedures that certain military maintenance personnel were expected to follow. The RCM methodology was further developed and found application not only in the military and aviation, but also in the energy, manufacturing, foundry, and transport industries.

According to Bulmer, the RCM process can be considered as three separate but associated analyses: failure mode and effects analysis, consequence analysis, and task analysis. These analyses consider the specific characteristics and consequences of a failure and attempt to arrive at the optimal solution based on this information.

OVERALL EQUIPMENT EFFECTIVENESS

Total productive maintenance provides a systematic procedure for linking corporate goals to maintenance goals. This procedure calls for the consideration of external and internal corporate environments, and then the development of a basic maintenance policy congruent with the environments. Next key points for maintenance improvement are identified, which result in the definition of target values for maintenance performance. These values, referred to as overall equipment effectiveness (OEE), are a function of equipment availability, quality rate, and equipment performance efficiency, and provide a starting point for developing quantitative variables for relating maintenance measurement and control to corporate strategy.

Essentially, OEE offers a measurement tool that helps identify the real areas of opportunity within an operation. These areas have been termed the "six big losses." OEE

allows the firm to break these losses into smaller components to better evaluate the impact the maintenance program is making on the operation. The six losses are:

1. Breakdowns from equipment failure (unplanned downtime)

2. Setup and adjustments from product changes and minor adjustments necessary to get the equipment operating properly after the line change

3. Idling and minor stoppages due to abnormal operation of the equipment causing momentary lapses in production, but not long enough to track as downtime

4. Reduced speeds, the discrepancy between design and actual speed the equipment operates

5. Process defects due to scrapped production and defects needing rework

6. Reduced yield and lost materials during the manufacturing process, from start-up to end of production run

If a company has an OEE of 85 percent or more, then it is considered to be a world-class company.

TRENDS IN MAINTENANCE

Two major trends in the development of maintenance management research have been identified: (1) emerging developments and advances in maintenance technology, information and decision technology, and maintenance methods; and (2) the linking of maintenance to quality improvement strategies and the use of maintenance as a competitive strategy.

The first major trend has to do with the impact of artificial intelligence techniques, such as expert systems and neural networks, on the formation of maintenance knowledge in industrial organizations. There is a diverse application of expert systems within the maintenance area. A number of these systems and their applications are listed below:

- CATS—an expert maintenance system for detecting sudden failures in diesel-electric locomotive systems.

- INNATE—an expert system used for electronic circuit diagnosis.

- FSM—an expert system used by Boeing for continuous condition monitoring of aircraft alarms.

- RLA—an expert system developed by Lockheed for repair-level analysis for major parts in an aerospace system.

- GEMS-TTS—an expert system used by AT&T maintenance specialists to isolate faults in communication links.

- TOPAS—an expert system that diagnoses transmission and signaling problems in real time that may arise on switched circuits.

- CHARLEY—an expert system used by General Motors to diagnose problems with broken machine tools and to instruct less experienced individuals by providing explanations.

- XCON—an expert system developed by Digital Equipment Corporation (now part of Compaq) for product configuration.

The second major trend is typified by the emergence of total productive maintenance, which must be incorporated into the firm's strategy. In the quest for world-class manufacturing standards, many industries are appreciating the need for efficient maintenance systems that have been effectively integrated with corporate strategy. It is vital that maintenance management becomes integrated with corporate strategy to ensure equipment availability, quality products, on-time deliveries, and competitive pricing. Managerial attitudes have changed toward maintenance because of the emergence of new management philosophies. In addition, social trends such as lack of capital, fluctuations in currencies, competition, quality, and environmental consciousness have also encouraged a new focus on maintenance.

Maintenance continues to be a major area of concern for manufacturers and other forms of business. A study of some seventy manufacturing plants found that over 50 percent of the maintenance work performed by these firms was reactive (run to failure, emergency breakdown). The balance of maintenance work was preventive or period based (25%), predictive or condition based (15%), and proactive or root-caused based (10%). A strong correlation has been found to exist between manufacturing cost reduction and preventive/predictive maintenance. Over a five-year period a study group of companies found that productivity improvements correlated strongly with a number of variables, one of which was preventive/predictive maintenance.

Maintenance Repairs and Inventory Management. Maintenance repair and operations (MRO) inventory handling is one of the most important maintenance processes in business organizations because it is a liability that must be accounted for in management reports of the organization. Since MRO inventory management is an expense (rather than an investment) to business organizations, managers do not give much attention towards supervision of the movements of products that are consumed internally within the organization. However, failure to track the in-house inventory activities leads to mismatch between stocking estimates and the actual types and quantities of stock items required to sustain the short-term and long-term operations of a business organization.

There are various strategies that can be applied to ensure efficiency in the management of MRO inventory. The most commonly used strategy involves assigning stocked products in the MRO inventory into different functional categories. For example, the management can split the MRO inventory into routine maintenance products, non-routine maintenance products which are used on regular predetermined schedules, and unpredictable products of emergency nature. Proper MRO inventory management enables business organizations to control repair and maintenance costs by stocking and tracking only those items that are required by the company.

The continued advancement of information technology has led to increased use of automated systems in (MRO) inventory handling practices in business organizations. Both large scale and small scale manufacturers are gradually optimizing the use of Computer Maintenance Management System (CMMS), a software program that facilitates the automation of logistical procedures in the management of operations and maintenance activities in manufacturing firms. CMMS adoption is a transformational function that involves software installation, system configuration, training of end users, and system implementation.

The implementation phase of CMMS in the organization requires the management to develop appropriate oversight measures to ensure that all personnel who are affected by the system have deep understanding of the procedures that concern changes introduced in the routine work flows, data-capturing processes, report processing requirements, and performance logistics by the aided planning of maintenance. Successful incorporation of CMMS into the MRO inventory practices of a firm leads to efficiency in the performance of a firm's maintenance procedures including preventive maintenance, repair work, and improvement work, as well as routine activities such as inventory control and asset management.

Mike Laskiewicz recommends that organizations recognize maintenance as a key department that needs to be well managed. In addition, the maintenance department should be led by a strong-minded individual who is a good motivator, technically competent, experienced and familiar with advanced industry practices. Finally Laskiewicz notes that maintenance planning must be a top priority.

SEE ALSO *Continuous Improvement; Lean Manufacturing and Just-in-Time Production; Operations Strategy; Organizational Culture*

BIBLIOGRAPHY
Chan, F.T.S., H.C.W. Lau, R.W.L. Ip, H.K. Chan, and S. Kong. "Implementation of Total Productive Maintenance: A Case Study." *International Journal of Production Economics* 95 (2005): 71.

Computer Maintenance Management System Management System. *O&M Best Practices.* Available from: http://72.14.205.104/search?q=cache:vAPeGrW2FnwJ:www1.eere.energy.gov/femp/pdfs/OM_4.pdf+Computerized+Maintenance+Management+System&hl=en&ct=clnk&cd=3.

Cox, James F., John H. Blackstone, Jr., and Michael S. Spencer, eds. *APICS Dictionary.* 8th ed. Falls Church, VA: APICS, 1995.

Laskiewicz, Mike. "4 Paths to Engineering, Maintenance Integration." *Control Engineering* 52, no. 2 (2005): 10.

Lee, Hsu-Hua. "A Cost/Benefit Model for Investments in Inventory and Preventive Maintenance in an Imperfect Production System." *Computers and Industrial Engineering* 48, no. 1 (2005): 55.

Murphy, Frank. "Once Organized, a Storeroom Must Be Run Correctly". *Facilities Engineering Journal,* June 2008. Available from: http://www.fmlink.com/ProfResources/Magazines/article.cgi?AFE:afe061208b.html.

Oke, S.A. "An Analytical Model for the Optimisation of Maintenance Profitability." *International Journal of Productivity and Performance Management* 54, no. 1/2 (2005): 113—134.

Taninecz, George. "Best Practices and Performances." *Industry Week,* 1 December 1997, 28—43.

Wen-Jihn, Chen. "Minimizing Total Flow Time and Maximum Tardiness with Periodic Maintenance." *Journal of Quality Maintenance Engineering,* 13 No. 3, 2007: 293—303.

Wireman, Terry. *Preventive Maintenance.* New York: Industrial Press, 2007.

MAKE-OR-BUY DECISIONS

The make-or-buy decision is the act of making a strategic choice between producing an item internally (in-house) or buying it externally (from an outside supplier). The buy side of the decision also is referred to as outsourcing. Make-or-buy decisions usually arise when a firm that has developed a product or part—or significantly modified a product or part—is having trouble with current suppliers, or has diminishing capacity or changing demand.

Make-or-buy analysis is conducted at the strategic and operational level. The strategic level is the more long-range of the two. Variables considered at the strategic level include analysis of the future, as well as the current environment.

Issues like government regulation, competing firms, and market trends all have a strategic impact on the make-or-buy decision. Of course, firms should make items that reinforce or are in-line with their core competencies. These are areas in which the firm is strongest and which give the firm a competitive advantage.

The increased existence of firms that utilize the concept of lean manufacturing has prompted an increase in outsourcing. Manufacturers are tending to purchase subassemblies rather than piece parts, and are outsourcing activities ranging from logistics to administrative services.

In their 2003 book *World Class Supply Management,* David Burt, Donald Dobler, and Stephen Starling present a rule of thumb for outsourcing. It prescribes that a firm

outsource all items that do not fit one of the following three categories: (1) the item is critical to the success of the product, including customer perception of important product attributes; (2) the item requires specialized design and manufacturing skills or equipment and the number of capable and reliable suppliers is extremely limited; and (3) the item fits well within the firm's core competencies, or within those the firm must develop to fulfill future plans. Items that fit under one of these three categories are considered strategic in nature and should be produced internally if at all possible.

Make-or-buy decisions also occur at the operational level. Analysis in separate texts by Burt, Dobler, and Starling, as well as Joel Wisner, G. Keong Leong, and Keah-Choon Tan, suggest these considerations that favor making a part in-house:

- Cost considerations (less expensive to make the part)
- Desire to integrate plant operations
- Productive use of excess plant capacity to help absorb fixed overhead (using existing idle capacity)
- Need to exert direct control over production and/or quality
- Better quality control
- Design secrecy is required to protect proprietary technology
- Unreliable suppliers
- No competent suppliers
- Desire to maintain a stable workforce (in periods of declining sales)
- Quantity too small to interest a supplier
- Control of lead time, transportation, and warehousing costs
- Greater assurance of continual supply
- Provision of a second source
- Political, social, or environmental reasons (union pressure)
- Emotion (e.g., pride)

Factors that may influence firms to buy a part externally include:

- Lack of expertise
- Suppliers' research and specialized know-how exceeds that of the buyer
- Cost considerations (less expensive to buy the item)
- Small-volume requirements
- Limited production facilities or insufficient capacity

- Desire to maintain a multiple-source policy
- Indirect managerial control considerations
- Procurement and inventory considerations
- Brand preference
- Item not essential to the firm's strategy

The two most important factors to consider in a make-or-buy decision are cost and the availability of production capacity. Burt, Dobler, and Starling warn that "no other factor is subject to more varied interpretation and to greater misunderstanding."

Cost considerations should include all relevant costs and be long-term in nature. Obviously, the buying firm will compare production and purchase costs. Burt, Dobler, and Starling provide the major elements included in this comparison. Elements of the "make" analysis include:

- Incremental inventory-carrying costs
- Direct labor costs
- Incremental factory overhead costs
- Delivered purchased material costs
- Incremental managerial costs
- Any follow-on costs stemming from quality and related problems
- Incremental purchasing costs
- Incremental capital costs

Cost considerations for the "buy" analysis include:

- Purchase price of the part
- Transportation costs
- Receiving and inspection costs
- Incremental purchasing costs
- Any follow-on costs related to quality or service

It should be noted that six of the costs to consider are incremental. By definition, incremental costs would not be incurred if the part were purchased from an outside source.

If a firm does not currently have the capacity to make the part, incremental costs will include variable costs plus the full portion of fixed overhead allocable to the part's manufacture. If the firm has excess capacity that can be used to produce the part in question, only the variable overhead caused by production of the parts are considered incremental. That is, fixed costs, under conditions of sufficient idle capacity, are not incremental and should not be considered as part of the cost to make the part.

While cost is seldom the only criterion used in a make-or-buy decision, simple break-even analysis can be an

effective way to quickly surmise the cost implications within a decision. Suppose that a firm can purchase equipment for in-house use for $250,000 and produce the needed parts for $10 each. Alternatively, a supplier could produce and ship the part for $15 each. Ignoring the cost of negotiating a contract with the supplier, the simple break-even point could easily be computed:

$$\$250,000 + \$10Q = \$15Q$$
$$\$250,000 = \$15Q - \$10Q$$
$$\$250,000 = \$5Q$$
$$50,000 = Q$$

Therefore, it would be more cost effective for a firm to buy the part if demand is less than 50,000 units, and make the part if demand exceeds 50,000 units. However, if the firm had enough idle capacity to produce the parts, the fixed cost of $250,000 would not be incurred (meaning it is not an incremental cost), making the prospect of making the part too cost efficient to ignore.

Stanley Gardiner and John Blackstone's 1991 paper in the *International Journal of Purchasing and Materials Management* presented the contribution-per-constraint-minute (CPCM) method of make-or-buy analysis, which makes the decision based on the theory of constraints. They also used this approach to determine the maximum permissible component price (MPCP) that a buyer should pay when outsourcing. In 2005 Jaydeep Balakrishnan and Chun Hung Cheng noted that Gardiner and Blackstone's method did not guarantee a best solution for a complicated make-or-buy problem. Therefore, they offered an updated, enhanced approach using spreadsheets with built-in liner programming (LP) capability to provide "what if" analyses to encourage efforts toward finding an optimal solution.

Firms have started to realize the importance of the make-or-buy decision to overall manufacturing strategy and the implication it can have for employment levels, asset levels, and core competencies. In response to this, some firms have adopted total cost of ownership (TCO) procedures for incorporating non-price considerations into the make-or-buy decision.

SEE ALSO *Break-Even Point*

BIBLIOGRAPHY
Balakrishnan, Jaydeep, and Chun Hung Cheng. "The Theory of Constraints and the Make-or-Buy Decision: An Update and Review." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 41, no. 1 (2005): 40–47.
Burt, David N., Donald W. Dobler, and Stephen L. Starling. *World Class Supply Management: The Key to Supply Chain Management.* 7th ed. Boston: McGraw-Hill/Irwin, 2003.
Gardiner, Stanley C., and John H. Blackstone, Jr. "The 'Theory of Constraints' and the Make-or-Buy Decision." *International Journal of Purchasing & Materials Management* 27, no. 3 (1991): 38–43.
Moschuris, Socrates J. "Triggering mechanisms in make-or-buy decisions: an empirical analysis." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply.* 43, no. 1 (2007): 40–50.
Parmigiani, Anne E. "Why Do Firms Both Make and Buy? An Investigation of Concurrent Sourcing." *Strategic Management Journal.* 28 (2007): 285–311.
Wisner, Joel D., G. Keong Leong, and Keah-Choon Tan. *Principles of Supply Chain Management: A Balanced Approach.* Mason, OH: Thomson South-Western, 2005.

MANAGEMENT: ART VS. SCIENCE

SEE *The Art and Science of Management*

MANAGEMENT AUDIT

Typically, a *management audit* is used to examine and appraise the efficiency and effectiveness of management in carrying out its activities. Areas of auditor interest include the nature and quality of management decisions, operating results achieved, and risks undertaken.

The management audit focuses on results, evaluating the effectiveness and suitability of controls by challenging underlying rules, procedures, and methods. Management audits, which are generally performed internally, are both compliance reviews and goals-and-effect analyses. When performed correctly, they are potentially the most useful of evaluation methods because they result in change.

The management audit is a process of systematically examining, analyzing, and appraising management's overall performance. The appraisal is composed of ten categories, examined historically and in comparison with other organizations. The audit measures a company's quality of management relative to those of other companies in its particular industry, as well as the finest management in other industries. The ten categories of the management audit are: (1) economic function, (2) corporate structure, (3) health of earnings, (4) service to stockholders, (5) research and development, (6) directorate analysis, (7) fiscal policies, (8) production efficiency, (9) sales vigor, and (10) executive evaluation. These categories do not represent single functions of management.

ECONOMIC FUNCTION

The economic function category in the management audit assigns to management the responsibility for the company's importance to the economy. In essence, the public value of the company is determined. The value is based on what the company does, what products or services it sells, and how it goes about its business in a moral and ethical sense. It

Exhibit 1

Replacement Chart for the Position of District Manager

Candidates	S. Jones	B. Smith	H. Johnson
Performance in present job	4	3	5
When qualified to advance	2 yrs	2 yrs	Now
Advancement potential score	85	78	87
Rank	2	3	1

includes the company's reputation as well as management's view of the purpose of the company.

The public is defined in this sense not only as the consumers of the company's products or services and its shareholders, but also a number of groups that the company must seek to satisfy. These groups include its employees, suppliers, distributors, and the communities in which it operates. A company cannot have achieved maximum economic function unless it has survived trade cycles, met competition, developed and replaced management, and earned a reputation among its various publics.

CORPORATE STRUCTURE

The corporate structure review evaluates the effectiveness of the structure through which a company's management seeks to fulfill its aims. An organization's structure must strengthen decision-making, permit control of the company, and develop the areas of responsibility and authority of its executives. These requirements must be met regardless of the type of company. Companies that have established product divisions or other forms of organization have maximized the delegation of authority, but have not reduced the need for a clear understanding of authority.

Companies are generally decentralized after the lines of authority have been established; but even large companies have endured conflicts as the result of a breakdown in the acceptance of authority. An example of this is General Motors in the early 1920s, when the company endured an $85 million inventory loss because division leaders did not accept the authority of principal executives.

HEALTH OF EARNINGS

The health of earnings function analyzes corporate income in a historical and comparative aspect. The question this function seeks to answer is whether assets have been employed for the full realization of their potential. This can be assessed by a study of the risk assumed in the employment of resources, in the profit returns upon employment, and the distribution of assets among various categories. The actual value of the assets may not be able to be determined, but a company can trace the cost of

acquisitions, rate of depreciation, and the extent to which assets have been fully profitable or not. The information needed for this category can usually be found within the company's annual reports.

SERVICE TO STOCKHOLDERS

The evaluation of a company's service to its shareholders can be assessed in three areas: (1) the extent to which stockholders' principal is not exposed to unnecessary risks; (2) whether the principal is enhanced as much as possible through undistributed profits; and (3) whether stockholders receive a reasonable rate of return on their investment through the form of dividends.

The evaluation also covers the quality of service provided by the company to its stockholders, mainly in the form of information and advice about their holdings. Although companies and industries vary widely on the amount of earnings they can pay out in the form of dividends, the rate of return and capital appreciation are the most important indicators of fairness to stockholders.

RESEARCH AND DEVELOPMENT

The evaluation of research and development is essential because it is often responsible for a company's growth and improvement in its industry. Analyzing research results can show how well research dollars have been utilized, but it does not show whether management has realized the maximum from its potential. Just like health of earnings, research should be examined from a historical and comparative standpoint in dollars expended; the number of research workers employed; the ratio of research costs and staff to total expenses; and new ideas, information, and products turned out. The examination of these figures compared with past results show management's willingness to employ research for future growth and health.

The American Institute of Management's evaluation attempts to determine what part of the company's past progress can properly be credited to research and how well research policies are preparing the company for future progress.

DIRECTORATE ANALYSIS

Directorate analysis covers the quality and effectiveness of the board of directors. Three principal elements are considered in the evaluation of the board. First, the quality of each director is assessed along with the quality and quantity of the contributions he or she makes to the board. Second, how well the directorate works together as a team is evaluated. Third, the directors are assessed to determine if they truly act as trustees for the company and act in the shareholders' best interest. This can best be examined in areas where a conflict of interest exists between a company's executives and its owners and public. One of the best areas to evaluate is corporate incentives. The manner in which a board handles conflicts of compensation provides a good key to its value.

FISCAL POLICY

The fiscal policy function of the management audit expresses the past and present financial policies. This function includes the company's capital structure, its organizations for developing fiscal policies and controls, and the application of these policies and controls in different areas of corporate activity.

PRODUCTION EFFICIENCY

Production efficiency is an important function for manufacturing companies as well as non-manufacturing companies. Production efficiency is divided into two parts. The first part, machinery and material management, evaluates the mechanical production of the company's products. The second aspect, manpower management, includes all personnel policies and practices for non-sales and non-executive employees developed by management. Only when both parts are analyzed can an overall evaluation of production be effectively performed.

SALES VIGOR

Sales vigor can be evaluated even though sales practices vary widely among industries. This can be accomplished after marketing goals have been determined and assessed. The goals must be assessed in terms of the overall goals of the company. Historical and comparative data are then analyzed to evaluate how well past sales potential has been realized and how well present company sales policies prepare the organization to realize future potential.

EXECUTIVE EVALUATION

Executive evaluation is the most important function of the management audit. The other nine functions indirectly evaluate the organization's management, since they represent the results of management's decisions and actions. This function addresses the quality of the executives and their management philosophy.

The American Institute of Management has found that the three essential elements in a business leader are ability, industry, and integrity. These elements provide a framework for the executive's evaluation in the management audit and should also be the criteria used in selecting and advancing executives. As a group, executives must regard the continuity of the organization as an important goal, assuring it by sound policies of executive selection, development, advancement, and replacement.

The most important management audit activity is an internal audit function. Each enterprise must have an independent source for developing and verifying controls, above and beyond what the external auditors might do in a financial audit. The internal audit function provides managers with the most appropriate avenue for evaluating the achievements of an organization in terms of operational efficiency, regulatory compliance, and financial success. Kaggerman, Kinney, and Kuting note that as a key component of the internal monitoring systems in organizations, an internal audit consists of predetermined measures aimed at securing assets and guaranteeing efficiency of the accounting systems of organizations.

The importance of the internal audit function in organizations is further demonstrated by the formulation of standards and regulatory frameworks for implementing internal controls in business organizations in the United States. The Sarbanes-Oxley Act and the New York Stock Exchange Listing Standards are some of the regulatory standards for internal controls designed to protect the financial interests of the organizations and investors.

The Sarbanes-Oxley Act provides a regulatory benchmark against which managers can compare the results of the internal policies of organizations. The Act was enacted by the U.S. Congress following the unearthing of grand accounting scandals in major U.S companies in the beginning of the twenty-first century. The internal audit section of the Sarbanes-Oxley Act requires managers to validate financial statements as well as ascertain and report the validity of internal controls over the organization's financial records. The internal audit function is also a compulsory prerequisite requirement for all companies listed in the New York Stock Exchange.

The functions of the management audit remain the same regardless of the type of business. Management audit is a very important exercise that managers can use to analyze the successes and failures of the overall objectives of a business organization. Regular and clearly defined management audits enable managers to identify risk factors that inhibit productivity in the organization and develop appropriate strategies for intervening against such risks. In order to get good results, companies must

observe principles of sound management; the degree to which they succeed can be appraised by systems such as the one outlined here.

SEE ALSO *Effectiveness and Efficiency*

BIBLIOGRAPHY

Craig-Cooper, Michael, and Philippe De Backer. *The Management Audit: How to Create an Effective Management Team.* Alexandria, VA: Financial Times Pitman Publishing, 1993.

Kaggerman, Henning, William Kinney, Karlheinz Kuting, and Claus-Peter Weber, eds. *Internal Audit Handbook: Management with the SAP-Audit Roadmap.* Springer-Verlag Berlin and Heidelberg GMBH & Co., 2006.

Maizis, P. "Evaluating Observations vs. Deviations." *BNET.* 20 April 2008. Available from: http://www.asqsandiego.org/articles/auditdecisionmaking.htm.

Sayle, Allan J. *Management Audits: The Assessment of Quality Management Systems.* Brighton, MI: Allan Sayle Associates, 1997.

Sobel, Paul J. *Auditor's Risk Management Guide: Integrating Auditing and ERM.* Chicago: CCH, Inc., 2007.

Torok, Robert M., and Patrick J. Cordon. *Operational Profitability: Conducting Management Audits.* Hoboken, NJ: John Wiley & Sons Inc., 1997.

MANAGEMENT AWARDS

One indicator of the growing recognition of management as a field of great importance has been the proliferation of prizes that various governments award their most outstanding organizations. Such official recognition of management practice, quality, and contribution to business reflects the belief at the highest levels that good management practice can be learned and nurtured through promoting awareness of best practices and innovative techniques.

THE FIVE MAJOR AWARDS

The five most prestigious management awards are Japan's Deming Prize, the United States' Malcolm Baldrige National Award, the EFQM Excellence Award (formerly the European Quality Award), the Canada Awards for Excellence, and the Akao Prize.

The first widely esteemed management award, Japan's Deming Prize, was only established in 1950. For nearly three decades, the Deming Prize stood essentially alone as a major prize for business management practice.

With the enormous success of Japanese industry in the late twentieth century, interest in Japanese business practices grew, including Japan's recognition of business successes. By the 1980s, Japan's success at international trade was admired worldwide, and Japanese business began to find emulators. Subsequently, the United States and Europe set up their own equivalents to the Deming

Prize to honor their own businesses. The United States established the Malcolm Baldrige National Quality Award in 1989, and soon after the twelve nations of the European Community (now the European Union) jointly created the European Quality Awards in 1990, awarding the first recipient in 1992.

The Deming Prize. The Japanese Union of Scientists and Engineers (JUSE) created the first major management award, the Deming Prize, to recognize "contributions to quality and dependability of product." The award is still generally held as the most prestigious of all management awards and is generally recognized as the most highly esteemed business award offered in Japan. The JUSE instituted the award in 1950 and began awarding the prize annually in 1951.

Interestingly, this most significant of Japan's business awards honors an American, Dr. W. Edwards Deming. Many Japanese government and academic leaders credit Deming with revolutionizing Japanese postwar industry through his advocacy in Japan of quality control and managerial efficiency.

The JUSE's Deming Prize Committee administers two types of awards honoring Deming: the Deming Prize and the Deming Application Prize. The Deming Prize is given to a person or group of people who have advanced the practice and furthered awareness of total quality control (TQC). The Deming Application Prize, in turn, goes only to companies based on successes attributable to implementing TQC.

Beginning in 1970, the JUSE began to offer the Japan Quality Control Medal. Only those who have formerly won a Deming Application Prize five years or more earlier are eligible for the Quality Control Medal. The medal is intended to upgrade the quality control of former prize recipients. To this end, the criteria for the Quality Control Medal remain the same as those for the Deming Application Prize, and the medal is awarded at the same time as the other Deming Prize awards. The current aim of the examination is to find out how well a company implements total quality control by assessing its quality-assurance policies and activities, and by measuring the company's results in the areas of productivity improvement, quality improvement, cost reduction, expanded sales, and increased profits.

The Deming Institute also offers a Quality Control Award for specific parts of an organization. Originally titled the Quality Control Award for Factories, it was later renamed the Quality Control Award for Operations Business Units. Mitsubishi's Fobe shipyard won the first award in 1973. Historically, this award has gone to manufacturing operations, such as specific plants of companies like Nissan or the Japan Steel Works. However, Suntory's Yamanashi Winery won in 1990, and in 2002 and 2003, Indian operations won the award.

Non-Japanese companies were allowed to apply for and receive the Deming Prize starting in 1984; the categories that remain unavailable to non-Japanese companies include the individual prize and the factory award. In 1989, Florida Light and Power became the first U.S. company to be named.

Though historically Japanese companies have been winners of the Deming prizes, a slight, though growing, presence of international winners hints at the growing globalization of the business scene. In 2002, the Sanden Corporation's Sundaram-Clayton Brakes Division in India won the Japan Quality Medal. Since then, a Thai company as well as another Indian company have won the award.

Malcolm Baldrige National Quality Award. The U.S. Congress created the Malcolm Baldrige National Quality Award in 1987 largely as a counterpart to Japan's Deming Prize. The specific goal of the Baldrige Award is to heighten U.S. awareness of TQM and to formally recognize successful quality management systems. The award is named for the U.S. Secretary of Commerce from 1981 to 1987. Baldrige was actually helping draft the creation of the award at the time of his death in a rodeo accident.

The U.S. Commerce Department's National Institute of Standards and Technology (NIST) administers the Baldrige Award. The NIST presents up to two awards each in three divisions: manufacturing, service, and small business. The NIST gave its first awards in 1988.

The Baldrige Award judges results companies have shown through management practices in seven specific areas. These are (1) leadership, (2) information and analysis, (3) strategic planning, (4) human resource focus, (5) process management, (6) business results and company performance, and (7) customer focus and satisfaction.

In addition to evaluating traditional for-profit businesses in the United States, the Baldrige Award features several different categories for judging, each with their own award. They are: (1) small business, (2) healthcare, and (3) nonprofit organizations. Like the Deming Prize, the award may be won by a foreign-owned company, but unlike the Deming Prize only those foreign-owned companies with more than 50 percent of their employees or physical assets located in the United States are eligible.

In addition to its more parochial focus, the Baldrige differs from the Deming Prize in three significant ways. First, the Baldrige Award emphasizes customer perceptions and the bottom line emphasizing clear-cut results through its seven specific areas. This makes the Baldrige more objective-oriented than the more systemic focus of the Deming Prize.

Second, while the NIST is an independent agency, the Baldrige relies on a wide array of professional groups to decide on its winners, while from its inception the Deming Prize has relied solely on the JUSE. The Baldrige is consequently able to draw on a wider range of expertise among its judges than the Deming Prize, but may be more open to charges of conflict of interest among the reviewers.

Finally, the Baldrige Award has a stated objective of sharing information while the Deming Prize does not. Consequently, the Baldrige is more likely to make known to other companies how the winners have achieved their success so that others may emulate them; the Deming Prize is more proprietary, allowing winners more readily to keep company secrets if they wish, thus widening the field of companies that may wish to participate but simultaneously limiting the benefit to other companies and to the dissemination of TQM principles in general.

The EFQM Excellence Awards. By 1990, the European Community (now the European Union) felt that it had fallen behind Japan and the United States in the recognition of quality management. In that year, the European Foundation for Quality Management (EFQM), with support from the European Organization for Quality and the European Commission, set about to create its own Deming or Baldrige equivalent, The European Quality Awards. The first winners were announced in October 1992. The award was later renamed the EFQM Excellence Award.

The initial awards favored larger, for-profit companies, so by 1996 the European Commission began to give out additional awards for public sector organizations and for small- to mid-sized enterprises. The awards also have a category for operational units of companies, such as factories, research units, or assembly plants.

The EFQM Excellence Awards, regardless of category, judges applicants on nine criteria: (1) leadership, (2) people management, (3) policy and strategy, (4) resource management, (5) process management, (6) customer satisfaction, (7) people satisfaction (defined as the perception of people toward the organization), (8) impact on society, and (9) business results.

While the categories essentially copy those of the Baldrige Award, the emphasis on people's perceptions of the organization and of the organization's impact on society are unique to the European Quality Awards and add a societal element lacking in either the Deming or Baldrige Awards. The EFQM Excellence Awards also differ from the Deming and Baldrige, as noted earlier, in the various categories for eligible organizations. The EFQM Excellence Awards also differ in the nature of their awards jury, which is made up of business leaders as well as academics. Finally, by its nature, the European Union is more international than either Japan or the United States, and from the start, the award has been open to companies outside the European Union. Still, the

Chart 1
The European Model for Small and Medium Sized Enterprises

People Management 90 Points (9%)		People Satisfaction 90 Points (9%)
Leadership 100 Points (10%)	Strategy & Planning 80 Points (8%)	Quality System & Processes 140 Points (14%)	Customer Satisfaction 200 Points (20%)	Business Results 150 Points (15%)
	Resources 90 Points (9%)		Impact on Society 60 Points (6%)

Enablers - 500 points, 50% ←→ Results - 500 points, 50%

award is limited to those companies that have at least 50 percent of their activities in Europe. 2007 winners included companies from Northern Ireland, Spain, and Italy.

Applications to the program are examined by a team of six assessors, each of whom undergo training to ensure a high level of consistency in scoring. Assessors include some academics and quality professionals, but most are drawn from the ranks of experienced practicing managers from European countries. The application is assessed and scored on a scale from 0 to 1,000 points. Chart 1 illustrates the scoring system for the small- and medium-sized company award. The awards committee also looks for systematic change throughout an organization. The award's brochure states that an organization should demonstrate "systematic improvement" for a minimum of five years.

The Canada Awards for Excellence. After Japan established the Deming Prize, Canada was the next major industrialized nation to establish an award honoring managerial practice. Even then, it was not until 1983 that the federal government of Canada created the Canada Awards for Excellence. For the first ten years, the Canada Awards for Excellence were administered by the Canadian government directly. In 1993, Canada handed the administration of the award over to the National Quality Institute, a Canadian nonprofit organization.

From the beginning, the Canada Awards for Excellence differed from the Deming Prizes in significant ways that in some respects laid the foundation of the Baldrige and European Quality Awards. The Canada Awards for Excellence were from their inception more results-oriented than the Deming Prize and in this respect served as a blueprint for the Baldrige Award's results orientation. Indeed, the Canada Awards for Excellence have been judging nominees on their "Seven Drivers" as the criteria for excellence six years before the first Baldrige Award was given for its seven factors. Indeed, most of the Canadian Awards' Seven Drivers are the same as what the Baldrige Award would later adopt. The Canadian Seven Drivers are (1) leadership, (2) planning, (3) customer focus, (4) people focus, (5) process management, (6) supplier focus, and (7) organizational performance.

Similarly, the Canada Awards for Excellence foreshadowed the broader reach of the European award program. From their beginning, the Canadian Awards have been open to both public and private sector organizations that contribute to the nation's economic success. In this respect, the Canada Awards for Excellence foreshadow the decision in Europe over a decade later to expand the scope of the European Quality Awards from solely for-profit companies to include public sector organizations.

In many respects, the Canada Awards for Excellence are as significant as their better known counterparts in Japan, the United States, and Europe, but remain more limited in scope simply because of Canada's relatively small population. Still, the Canada Awards for Excellence are highly

Figure 1
Major Management Prizes

Prize	Year Established	Administering Organization
Deming Prize	1951	Japanese Union of Scientists and Engineers (JUSE)
Franze Edelman Award for Management Science Achievement	1975	Institute for Operations Research and the Management Sciences
Canada Quality Awards for Excellence	1983	National (Canadian) Quality Institute (since 1993)
Shingo Prize for Excellence in Manufacturing	1988	National (US) Association of Manufacturers
Malcolm Baldridge National Quality Award	1989	National Institute of Standards and Technology (NIST); US Department of Commerce
European Quality Awards	1990	European Foundation for Quality Management
ESCAP Human Resources Development Award	1990	United Nations Economic and Social Commissions for Asia and the Pacific (ESCAP)
INFORMS Award	1991	Institute for Operations Research and the Management Sciences
EUCUSA Award	1997	European Customer Satisfaction Association
Canada Healthy Workplace Award	1999	National (Canadian) Quality Institute

regarded within Canada itself, and since their founding over 300 people and organizations have received the award.

Until 1999, Canada offered only one Award for Excellence: the Quality Award. Beginning in 1999, Canada broke new ground by offering a second award previously unprecedented elsewhere in national awards, the Healthy Workplace Award. The Healthy Workplace Award recognizes organizations that "promote, encourage, support and offer exemplary health-related programs in the workplace," judging the organization in five areas: (1) leadership, (2) planning, (3) people focus, (4) process management, and (5) outcomes.

Akao Prize. In 1996, the QFD (or Quality Function Deployment) Institute established the Akao Prize to recognize individuals who have made an "outstanding contribution to the advancement of QFD." The award roughly follows the pattern of the Deming award but differs from other quality awards not only in focusing exclusively on QFD, but in recognizing only individuals, and not organizations as a whole. The prize was named for Dr. Yoji Akao, himself a Deming Award winner and one of the seminal developers of the field of QFD. Dr. Akao sits on the awards committee and personally hands out the award at the annual ceremony.

Unlike other prominent management awards, the Akao Prize has had an international character since its inception. The first recipients were from both Japan and the United States. Since 1996, the prize has been awarded to individuals from countries such as Sweden, Germany, Australia, and Mexico.

OTHER QUALITY AWARDS

The success of the major awards in attracting attention to management excellence in Japan, the United States, the European nations, and Canada has promoted widespread interest in other nations as well as state awards within the United States, provincial awards within Canada, and individual national awards within Europe (as shown in Figure 1).

Australia. Australia established its Australian Quality Awards for Business Excellence in 1991. The award is somewhat unique in that it has four tiers of recognition, nurturing companies to maintain ongoing quality management excellence. The first tier is the Business Improvement Level, giving first-level recognition for Progress or Foundation in Business Excellence. The next level, The Australian Quality Award for Business Excellence, is a best practices achievement award. The third level is the Australian Quality for Business Excellence Gold Award, open only to past award winners and intended to demonstrate ongoing improvement. The highest level is the Australian Quality Prize,

Table 1
Award Websites

American Society for Training and Development
http://www.astd.org/astd

Australian Business Excellence Awards
http://www.sai-global.com/AWARDS

Connecticut Quality Improvement Award
http://www.ctqualityaward.org/

The ESCAP Human Resources Development Award
http://www.escap-hrd.org/

European Foundation for Quality Management
http://www.efqm.org

Malcolm Baldridge National Quality Award
http://www.quality.nist.gov/

National Quality Institute of Canada
http://www.nqi.ca/CAEAwards/default.aspx or
http://www.nqi.ca/

President's Quality Award
http://www.opm.gov/pqa/

Shingo Prize
http://www.shingoprize.org

QFD Institute Akao Prize
http://www.qfdi.org/akaoprize.htm

UK Quality Award for Business Excellence
http://www.quality-foundation.co.uk/

Figure 2
The Hierarchy of Recognition
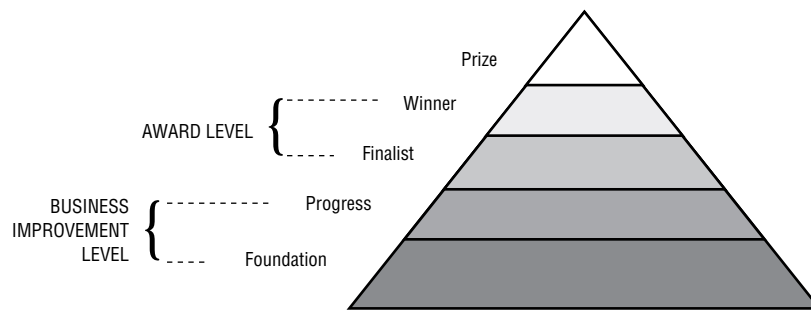
which is also open only to former winners and represents best practices internationally throughout the company.

At the awards, organizations can receive kudos via recognition either as a finalist or a winner. Figure 2 depicts the hierarchy of recognition. Winners gain the right to use the Australian Quality Awards for Business Excellence logo for three years.

New Zealand. The New Zealand Quality Foundation established the New Zealand Excellence Award in the late 1990s. Like its Australian counterpart, it is a tiered award, although with three rather than four tiers.

Europe. Several European countries have national prizes honoring business excellence and quality management in their nation. Among these are Denmark's *Den Danske Kvalitets Pris* (the Danish Quality Award), the Dutch *Nederlandse Kwaliteitprijs* (Netherlands Quality Award), Ireland's Business Excellence Award, and Switzerland's *Esprix* award, also known as the *Schweizer Qualitätspreis für Business Excellence* (Swiss Quality Award for Business Excellence). The United Kingdom Quality Award for Business Excellence, established in 1994 by the president of the U.K. Board of Trade, was extended beyond for-profit organizations in 1995 to include categories not only for public organizations but, somewhat uniquely, also for voluntary services.

Even some regions within European nations (for example, Northern Ireland within the United Kingdom, and Flanders within Belgium) have begun to offer their own quality management prizes. Most of these competitions use the same guidelines as those used in the European Quality Awards.

United States. Soon after the introduction of the Baldrige awards, a majority of the states began to offer their own awards. The oldest of these was the Connecticut Quality

Improvement Award, begun in 1987, and so actually preceding the Baldrige Award by a year. Yet within ten years, Connecticut was just one of forty-one states offering their own awards for excellence, most based at least in part on the Baldrige Award criteria. Several of these awards modified the Baldrige qualifications to include government, educational, or nonprofit organizations. Several awards from the larger states such as the Texas Quality Award and California's Eureka Award for Quality have tiered levels similar to the Australian Quality Awards described above.

Also notable is the Massachusetts Quality Award, established in 1992. The Massachusetts award is named for Armand Feigenbaum, the Massachusetts native whose book *Total Quality Control* (1951) founded the TQM movement. Most of the state awards are at least partially and usually entirely government funded. Maine's Margaret Chase Smith Maine State Quality Award, however, is unique in that it is entirely privately funded, which its organizers argue makes it freer from political considerations.

In addition to state-sponsored awards, several federal departments offer quality awards. For example, the U.S. Department of Energy Quality Accomplishment Award, begun in 1995, uses the Baldrige Award as its guidelines. The DOE Quality Accomplishment Award is administered by the Department of Commerce (and so independent of the DOE itself).

Similarly, the federal Office of Personnel Management annually offers the President's Award for Quality. The OPM's President's Award also uses the Baldrige Award criteria. The award recognizes federal agencies that have successfully implemented total quality management programs.

Canada. In addition to the national Canada Awards for Excellence, the provinces of Manitoba and British Columbia offer their own awards. Additionally, Ontario's Durham region also offers its own award.

OTHER COUNTRIES

The Singapore Productivity and Standards Board in 1994 began the Singapore Quality Award to recognize organizations in Singapore for outstanding quality management practices and to enhance Singapore's competitiveness in the global market. Its model uses seven categories for comparing best practices and performances.

In 1995 the Japan Productivity Center for Socio-Economic Development established the Japan Quality Award to be awarded to companies excelling through strong customer focus, competitiveness, employee orientation and social responsibility.

The Costa Rica Excellence Award, a joint effort of the Costa Rican Chamber of Industries and Baxter, Firestone, and Intel, evaluates companies using the parameters of ISO 9000 and ISO 14000 standards.

The South African Excellence Award focuses on companies attaining customer satisfaction and is awarded by the South African Excellence Foundation.

The Jordan's King Abdullah II Award for Excellence is the highest level recognition for companies in Jordan. It is aimed at increasing competitiveness by promoting quality awareness, performance, and achievement.

Other management national awards include the Dubai International Award for Best Practices and the Rajiv Gandhi National Quality Awards in India.

AWARDS FOR OTHER MANAGEMENT AREAS

Many awards exist for other areas besides quality management. These awards range from teamwork issues to customer satisfaction and from manufacturing excellence to operations research management.

AQP National Team Excellence Award. The Association for Quality and Participation annually awards teams within organizations for improving quality through participative teamwork for problem-solving, innovation, or improvement of an existing product, service, or process. The focus of the award is primarily for the United States.

The INFORMS Prize. Since 1991, The Institute for Operations Research and the Management Sciences (INFORMS) has annually awarded their INFORMS Prize to a selected organization for pioneering efforts in the innovation of operations research/management sciences. In 1994, the award took its present name; from 1991 to 1994 the prize had been known as the ORSA Prize.

Franz Edelman Award. In addition to the INFORMS Prize, the Institute for Operations Research and the Management Sciences has, since 1975, annually given out the Franz Edelman Award for Management Science Achieve-

ment to reward "outstanding examples of management science and operations research practice in the world." Though several Edelman Awards are given each year, the first-place prize carries a substantial $10,000 purse.

Frank P. Ramsey Medal. The Decision Analysis Society awards the Frank P. Ramsey Medal annually to recognize major contributions to the field of decision analysis. The medal is the most recognized decision-analysis award and takes its name from the Cambridge University probability expert who helped found the field.

Shingo Prize. In 1988, the National Association of Manufacturers established the Shingo Prize for Excellence in Manufacturing. The Shingo Prize is administered by the NAM through the Utah State University College of Business, but is not linked substantively to the state of Utah. Also, while the prize has traditionally been awarded to U.S. companies, it is open to Canadian and Mexican manufacturers as well. The prize honors manufacturers for excellence in productivity and process improvement, quality enhancement, and customer satisfaction. The Shingo Prize rewards "focused improvements in core manufacturing processes, implementing lean, just-in-time philosophies and systems, eliminating waste, and achieving zero defects, while continuously improving products and costs."

EUCUSA Award. The European Customer Satisfaction Association (EUCUSA) began in 1997 to give awards annually to recognize European organizations and companies for achievements in improving customer satisfaction. The award categories are for large and small enterprises, nonprofit organizations, and cities or communities.

Ishikawa Prize. The Ishikawa Prize has been awarded annually since 1970 to recognize companies that have applied new methods or systems of management. The award is given by the same organization that gives the Deming Prize, the JUSE. Ichiro Ishikawa, for whom the award is named, was the first chairman of the JUSE's Board of Directors.

ESCAP Award. The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), in accordance with the Jakarta Plan of Action on Human Resources Development, created the ESCAP Human Resources Development Award in 1990. The award is open to organizations in over fifty Asian or Pacific Island nations or territories belonging to the United Nations. The award annually recognizes exceptional work in the field of human resources development (HRD). In addition to the annual honoring ceremony in Bangkok, the winner receives $30,000 for the continuance of their project.

The ESCAP HRD Award has a theme each year. Some years the theme is less closely related to business

initiatives than in others. For example, the theme in 1990 emphasized environmental management; the theme in 1992, drug abuse management; and the theme in 1998, education. Still, in most years, the award has recognized HRD for business initiatives. For example, the theme in 1994 was for "Human Resource Development for Women in Extreme Poverty," which was won by the Dhaka Ahsania Mission of Bangladesh. Similarly, the theme in 1995 had a primarily business focus, "HRD for Productive Employment of Youth," and was won by the "Barefoot College" of India's Social Work and Research Centre. In 1996 the theme was "People's Participation in Community Development," won by the Sungi Development Foundation of Pakistan; and in 1997, the theme was "Empowering the Urban Poor," won by Thailand's Human Development Centre.

SHRM Awards for Professional Excellence. The Society for Human Resource Management annually gives out four Awards for Professional Excellence. The four categories are for educators and for large, medium, and small organizations.

ASTD Awards. The American Society for Training and Development offers several awards in three different categories annually. The three categories are (1) Advancing Workplace Learning and Performance; (2) Excellence in Practice; and (3) Advancing ASTD's Vision.

The Advancing Workplace Learning and Performance Awards category includes awards for Distinguished Contribution, for Lifetime Achievement, for Champion of Workplace Learning and Performance, for Research, for Dissertation, and for Public Policy. Recipients have been of very high caliber, including in 1997 alone such figures as management authors Peter Senge and Peter Drucker, General Electric CEO Jack Welch, Senator Patrick Moynihan (New York), Senator William Roth (Delaware), Congressman Clay Shaw (Florida), and Congressman Sander Levin (Michigan).

The Excellence in Practice Awards category covers contributions in applied training in development in different areas including learning technologies, performance improvement, managing change, valuing differences, career development, organizational learning, and technical training. The Vision Awards category covers contributions to the ASTD as an organization.

SEE ALSO *Quality and Total Quality Management; Quality Gurus*

BIBLIOGRAPHY
Baldridge National Quality Program. Available from: http://www.quality.nist.gov/.
Brown, M.G. *Baldrige Award Winning Quality: How to Interpret the Baldrige Criteria for Performance Excellence.* 13th ed. Portland, OR: Productivity Press Inc, 2004.

EFQM. Availble from http://www.efqm.org/

Funk, V. "Quality Awards Listing." *Quality Progress* 37, no. 8 (2004): 54–58.

Gabor, A. *The Man Who Discovered Quality: How W. Edwards Deming Brought the Quality Revolution to America: The Stories of Ford, Xerox, and GM.* New York: Times Books, 1990.

Hui, K.H., and T.K. Chuan. "Nine Approaches to Organizational Excellence." *Journal of Organizational Excellence* 22, no. 1 (2002): 53–65

Khoo, H.H., and K.C. Tan. "Managing for Quality in the USA and Japan: Differences between the MBNQA, DP and JQA." *TQM Magazine* 15, no. 1 (2003): 14–24.

Russian Americans Chamber of Commerce for the Greater Philadelphia Area. Available from: http://www.rachamber.com/images/International_Business_Award.pdf.

Stading, G.L., and R.J. Vokurka. "Building Quality Strategy Content Using the Process from National and International Quality Awards." *TQM & Business Excellence* 14, no. 8 (2003): 931–946.

Tan, K.C. et al. "Factors Affecting the Development of National Quality Awards." *Business Excellence* 7, no. 3 (2003): 37–45.

Vukurka, R.J. "A Comparative Analysis of National and Regional Quality Awards." *Quality Progress* 33, no. 8 (2000): 41–49.

W. Edwards Deming Institute. Available from: http://deming.org/.

MANAGEMENT CONTROL

Management control describes the means by which the actions of individuals or groups within an organization are constrained to perform certain actions while avoiding other actions in an effort to achieve organizational goals. Management control falls into two broad categories—regulative and normative controls—but within these categories are several types.

The following section addresses regulative controls including bureaucratic controls, financial controls, and quality controls. The second section addresses normative controls including team norms and organization cultural norms.

Table 1
Types of Control

Regulative Controls	Normative Controls
Bureaucratic Controls	Team Norms
Financial Controls	Organizational Cultural Norms
Quality Controls	

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Table 2

Definition and Examples of Regulative Controls

Type of Regulative Control	Definition	Example
Bureaucratic Controls	Policies and operating procedures	Employee handbook
Financial Controls	Key financial targets	Return on investment
Quality Controls	Acceptable levels of product or process variation	Defects per million

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REGULATIVE CONTROLS

Regulative controls stem from standing policies and standard operating procedures, leading some to criticize regulative controls as outdated and counterproductive. As organizations have become more flexible in recent years by flattening organizational hierarchies, expanding organizational boundaries to include suppliers in inventory management and customers in new product development, forging cooperative alliances with competitors, and developing virtual organizations in which employees are geographically dispersed and may meet only a few time each year, critics point out that regulative controls may prevent rather than promote goal attainment.

There is some truth to this. Customer service representatives at Holiday Inn are limited in the extent to which they can correct mistakes involving guests. They can move guests to a different room if there is excessive noise in the room next to the guest's room. In some instances, guests may get a gift certificate for an additional night at another Holiday Inn if they have had a particularly bad experience. In contrast, customer service representatives at Tokyo's Marriott Inn have the latitude to take up to $500 off a customer's bill to solve complaints.

The actions of customer service representatives at both Holiday Inn and Marriott Inn must follow policies and procedures, yet those at Marriott are likely to feel less constrained and more empowered by Marriott's policies and procedures compared to Holiday Inn customer service representatives. The key in terms of management control is matching regulative controls such as policies and procedures with organizational goals such as customer satisfaction. Each of the three types of regulative controls discussed in the next few paragraphs has the potential to align or misalign organizational goals with regulative controls. The challenge for managers is striking the right balance between too much control and too little.

BUREAUCRATIC CONTROLS

Bureaucratic controls stem from lines of authority and this authority comes with one's position in the organizational hierarchy. The higher up the chain of command, the more an individual will have authority to dictate policies and procedures. Bureaucratic controls have gotten

a bad name and often rightfully so. Organizations placing too much reliance on chain of command authority relationships inhibit flexibility to deal with unexpected events. However, there are ways managers can build flexibility into policies and procedures that make bureaucracies as flexible and as able to quickly respond to customer problems as any other form of organizational control.

Consider how hospitals, for example, are structured along hierarchical lines of authority. The Board of Directors is at the top, followed by the CEO and then the Medical Director. Below these top executives are vice presidents with responsibility for overseeing various hospital functions such as human resources, medical records, surgery, and intensive care units. The chain of command in hospitals is clear; a nurse, for example, would not dare increase the dosage of a heart medication to a patient in an intensive care unit without a physician's order. Clearly, this has the potential to slow reaction times—physicians sometimes spread their time across hospital rounds for two or three hospitals and also their individual office practice. Yet, it is the nurses and other direct care providers who have the most contact with patients and are in the best position to rapidly respond to changes in a patient's condition.

The question bureaucratic controls must address is: How can the chain of command be preserved while also building flexibility and quick response times into the system? One way is through standard operating procedures that delegate responsibility downward. Some hospital respiratory therapy departments, for example, have developed standard operating procedures (in health care terms, therapist-driven protocols or TDPs) with input from physicians.

TDPs usually have branching logic structures requiring therapists to perform specific tests prior to certain patient interventions to build safety into the protocol. Once physicians approve a set of TDPs, therapists have the autonomy to make decisions concerning patient care without further physicians' orders as long as these decisions stay within the boundaries of the TDP. Patients need not wait for a physician to make the next set of rounds or patient visits, write a new set of orders, enter the orders on the hospitals intranet, and wait for the manager of respiratory therapy to schedule a therapist to perform the intervention. Instead, therapists can respond

immediately because protocols are established that build in flexibility and fast response along with safety checks to limit mistakes.

Bureaucratic control is thus not synonymous with rigidity. Unfortunately, organizations have built rigidity into many bureaucratic systems, but this need not be the case. It is entirely possible for creative managers to develop flexible, quick-response bureaucracies.

FINANCIAL CONTROLS

Financial controls include key financial targets for which managers are held accountable. These types of controls are common among firms that are organized as multiple strategic business units (SBUs). SBUs are product, service, or geographic lines having managers who are responsible for the SBU's profits and losses. These managers are held responsible to upper management to achieve financial targets that contribute to the overall profitability of the corporation.

Managers who are not SBU executives often have financial responsibility as well. Individual department heads are typically responsible for keeping expenses within budgeted guidelines. These managers, however, tend to have less overall responsibility for financial profitability targets than SBU managers.

In either case, financial controls place constraints on spending. For SBU managers, increased spending must be justified by increased revenues. For departmental managers, staying within budget is typically one key measure of periodic performance reviews. The role of financial controls, then, is to increase overall profitability as well as to keep costs in line. To determine which costs are reasonable, some firms will benchmark other firms in the same industry. Such benchmarking, while not always direct comparison, provides at least some evidence to determine whether costs are in line with industry averages.

QUALITY CONTROLS

Quality controls describe the extent of variation in processes or products that is considered acceptable. For some companies, zero defects–no variation at all–is the standard. In other companies, statistically insignificant variation is allowable.

Quality controls influence the ultimate product or service outcome offered to customers. By maintaining consistent quality, customers can rely on a firm's product or service attributes, but this also creates an interesting dilemma. An overemphasis on consistency where variation is kept to the lowest levels may also reduce response to unique customer needs. This is not a problem when the product or service is relatively standardized such as a McDonald's hamburger, but may pose a problem when customers have nonstandard situations for which a one-size-fits-all solution is inappropriate. Wealth managers, for example, may create investment portfolios tailored to a single client, but the process used to implement that portfolio, such as stock market transactions, will be standardized. Thus, there is room within quality control for both creativity (such as wealth portfolio solutions), and standardization (such as stock market transactions).

NORMATIVE CONTROLS

Rather than relying on written policies and procedures as in regulative controls, normative controls govern employee and managerial behavior through generally accepted patterns of action. One way to think of normative controls is in terms of how certain behaviors are appropriate and others are less appropriate. For instance, a tuxedo might be the appropriate attire for an American business awards ceremony, but totally out of place at a Scottish awards ceremony, where a formal kilt may be more in line with local customs. However, there would generally be no written policy regarding disciplinary action for failure to wear the appropriate attire, thus separating formal regulative controls from the more informal normative controls.

TEAM NORMS

Teams have become commonplace in many organizations. Team norms are the informal rules that make team members aware of their responsibilities to the team. Although the task of the team may be formally documented and

Table 3
Definition and Examples of Normative Controls

Type of Normative Control	Definition	Example
Team Norms	Informal team rules and responsibilities	Task delegation based on team member expertise
Organizational Cultural Norms	Shared organizational values, beliefs, and rituals	Collaboration may be valued more than individual "stars"

communicated, the ways in which team members interact are typically developed over time as the team goes through phases of growth. Even team leadership must be informally agreed upon; at times, an appointed leader may have less influence than an informal leader. If, for example, an informal leader has greater expertise than a formal team leader, team members may look to the informal leader for guidance requiring specific skills or knowledge. Team norms tend to develop gradually, but once formed, can be powerful influences over behavior.

ORGANIZATIONAL CULTURE NORMS

In addition to team norms, norms based on organizational culture are another type of normative control. Organizational culture involves the shared values, beliefs, and rituals of a particular organization. The Internet search firm, Google, Inc. has a culture in which innovation is valued, the belief that the work of the organization is important is shared among employees, and teamwork and collaboration are common. In contrast, the retirement specialty firm, VALIC, focuses on individual production for its sales agents, de-emphasizing teamwork and collaboration in favor of personal effort and rewards. Both of these examples are equally effective in matching norms with organizational goals; the key is thus in properly aligning norms and goals.

The broad categories of regulative and normative controls are present in nearly all organizations, but the relative emphasis of each type of control varies. Within the regulative category are bureaucratic, financial, and quality controls. Within the normative category are team norms and organization cultural norms. Both categories of norms can be effective and one is not inherently superior to the other. The managerial challenge is to encourage norms that align employee behavior with organizational goals.

SEE ALSO *Organizational Culture; Quality and Total Quality Management; Teams and Teamwork*

BIBLIOGRAPHY

Berry, Leonard L. "The Collaborative Organization: Leadership Lessons from Mayo Clinic." *Organizational Dynamics* 33, no. 3 (2004): 228–242.

Besterfield, Dale H. *Quality Control.* 8th ed. Upper Saddle River, NJ: Prentice Hall, 2008.

Lalich, J. "Watch Your Culture." *Harvard Business Review* 82, no. 1 (2004): 34–39.

Merchant, Kenneth, and Wim Van Der Stede. *Management Control Systems: Performance Measurement, Evaluation and Incentives.* 2nd ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Rollag, K., S. Parise, and R. Cross. "Getting New Hires Up to Speed Quickly". *MIT Sloan Management Review* 46, no. 2 (2005): 35–41.

MANAGEMENT AND EXECUTIVE DEVELOPMENT

Manager effectiveness has an enormous impact on a firm's success. Therefore, companies must provide instruction for managers and high-potential management candidates in order to help them perform current and future jobs with the utmost proficiency. Management development has long been an important component of corporate strategic planning. In fact, many companies consider the identification and development of next-generation managers to be their top human resource challenge.

Management development is important for new managers because these individuals need instruction on how to perform their new supervisory jobs. Even so, companies often allow employees to make the transition to management with little or no training, leaving them with feelings of frustration, inadequacy, and dismay. More experienced managers also benefit from management development. A majority of first-line managers have their sights set on higher-level management jobs. Given these ambitions, companies need to provide lower-level and mid-level managers with formal development programs in order to help them climb the corporate ladder.

Effective management instruction programs are able to bridge gaps between what individuals already know and what they need to know for their new positions. Managers need different skills at each managerial level. The instructional programs needed to produce these skills are shown in Table 1.

A variety of approaches are used to teach these subjects. Some are in traditional classroom-type settings, while others

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Table 1

Instructional Needs at Different Managerial Levels

First-line managers need training in
- basic supervision
- motivation
- career planning
- performance feedback

Middle managers need training in
- designing and implementing effective group and intergroup work and information systems
- defining and monitoring group-level performance indicators
- diagnosing and resolving problems within and among work groups
- designing and implementing reward systems that support cooperative behavior

Executives need training in
- broadening their understanding of how factors such as competition, world economies, politics, and social trends influence the effectiveness of the organization

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are taught outside of the classroom via career resource centers, job rotation, mentoring, and special projects.

CLASSROOM INSTRUCTION

Classroom training takes place within the organization or outside at seminars and universities. The subjects typically covered in these programs are briefly described in Table 2.

Lecture. Most training experts criticize lectures because they are passive learning devices, focusing on one-way communication to learners who do not have the opportunity to clarify material. Lectures generally fail to gain and maintain learner attention unless they are given by someone who is able to make the material meaningful and promote questions and discussions. Lectures are most appropriate for situations where simple knowledge acquisition is the goal (e.g., describing company history during a new employee orientation session). However, lectures are not well suited to serve as the sole training method for teaching management skills, because the format does not provide trainees with feedback or the opportunity for practice.

Case Method. As the name suggests, the case method requires management trainees to analyze cases or scenarios depicting realistic job situations. Cases often are structured like a play that opens in the middle of a story and uses flashbacks to describe the action that led up to the opening scene, where an employee has just made a key decision. The rest of the case lays out the documentation and data available to the decision maker at the time of the decision. Questions are posed at the end of the case that ask the trainees to analyze the situation and recommend a solution. For instance, trainees may be asked to state the nature of the problem, identify the events that led to the problem, and indicate what the individual should do to resolve the problem.

The case method rests on the assumption that people are most likely to retain and use what they learn if they reach an understanding through "guided discovery." Trainers act as guides or facilitators. Cases typically do not have right or wrong answers. Therefore, the aim of the method is not to teach trainees the "right" answer, but rather to teach them how to identify potential problems and recommend realistic actions.

Critics of this method balk at the lack of direction trainees receive when analyzing a case. What if they arrive at a poor decision? Moreover, trainees do not get the opportunity to practice their skills. For instance, after analyzing a case involving a subordinate who has repeatedly arrived at work late, the trainees may conclude that the manager should have said something sooner and must now provide counsel. However, the case method does not afford trainees the opportunity to practice their counseling skills.

Role-playing. As an instructional technique, role-playing presents a hypothetical problem involving human interaction. Trainees spontaneously act out that interaction face-to-face. Participants are then given feedback by the trainer and the rest of the group on their performance so they may gain insight regarding the impact of their behavior on others. The issues addressed during feedback typically revolve around these types of questions:

- What was correct about the participant's behavior?
- What was incorrect about the participant's behavior?
- How did the participant's behavior make the other participants feel?
- How could the trainee have handled the situation more effectively?

Role-playing may be used to develop skill in any area that involves human interaction. The method is most often used for teaching human relations skills and sales techniques. Role-playing provides management trainees with an opportunity to practice the skill being taught, thus going beyond the case method, which merely requires the trainee to make a decision regarding how to handle a situation. These two methods are often used in

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Table 2

Content Areas of Classroom Instruction

Job Duties and Responsibilities. Trainees learn what they must do to fulfill the company's expectations of them.

Policies and Procedures. Trainees learn company policies and procedures.

Employee Familiarization. Trainees become familiar with the job functions of their employees. The training provides specific instructions on how to review job descriptions, performance standards, personnel files, and so forth.

Attitudes and Confidence. The training attempts to establish new attitudes toward the job employees, and the manager, and to build the confidence necessary for managers to be effective on the job.

Handling Employee Interactions. Trainees are taught how to handle interpersonal problems effectively through such techniques as behavior modeling.

Career Development. Trainees learn about career opportunities in higher levels of management and how they may advance in the future.

General Management Training. These courses typically cover labor relations, management theory and practice, labor economics, and general management functions.

Human Relations/Leadership Programs. These topics are narrower than general management programs. They focus on the human relations problems of leadership, supervision, attitude toward employees, and communication.

Self-Awareness Program. The content of these programs is understanding one's own behavior and how that behavior is viewed by others, identifying the so-called games people play, and learning about one's strengths and weaknesses.

Problem-Solving/Decision-Making Programs. The emphasis is on teaching generalized problem-solving and decision-making skills that would be applicable to the wide range of work problems that managers encounter.

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conjunction with one another. That is, after analyzing a case and recommending a solution, trainees are asked to act out the solution in the form of a role-play.

Critics of the role-playing method point out that role-players are often given little guidance beforehand on how to handle transactions. This may cause them to make mistakes, resulting in embarrassment and a loss of self-confidence. When their mistake-ridden role-play is finished, they sit, never getting the opportunity to do it correctly.

Behavior Modeling. Behavior modeling is based on the idea that workers learn best when they see how a task should be performed and then practice the task with feedback until they are competent. This method is similar to role-playing in that the trainees act out situations playing certain roles. However, the methods differ in two important ways. First, behavior modeling teaches trainees a preferred way to perform a task. Second, the interactions occurring during behavior modeling are practice sessions, not role plays. The trainees practice only the right way. If the trainees make a mistake, the trainer immediately corrects them and asks them to repeat the step correctly.

A behavior modeling program typically consists of the following steps:

1. **Present an overview of the material.** This usually consists of a brief lecture that describes training objectives and the importance of the skill to be learned.

2. **Describe the procedural steps.** The trainee learns the one best way (or at least an effective way) to handle a situation. Case and role-playing methods, on the other hand, stress the variety of effective ways to handle a situation and do not emphasize any one particular approach.

3. **Model or demonstrate the procedural steps.** The trainee is shown a "model" of how the task is to be performed correctly. The model usually is presented in the form of a videotape or live demonstration.

4. **Allow guided practice.** Trainees then practice the modeled behaviors. As previously stated, these sessions are similar to role-plays, except that trainees are given feedback by the instructor (or classmates) during the skill practice session, rather than after. This procedure forces trainees to correct mistakes as soon as they are made, assuring them an opportunity to practice the correct way of performing the task. Practice sessions start with simple problems similar to those depicted in the model. Later practice sessions are made more realistic by adding complexity to the situation.

5. **Provide on-the-job reinforcement.** Participants' managers often go through identical training programs to ensure that they will understand what their employees are learning and, hence, support these new behaviors on the job.

Behavior modeling, first introduced in the mid-1970s, was very popular by the mid-1990s and continues to be widely used in the twenty-first century. Research examining its effectiveness has consistently shown favorable outcomes. Behavior modeling works because it successfully incorporates each of the aforementioned learning principles: it captures and maintains trainees' attention and provides ample opportunity for practice and feedback.

Recent developments in behavior modeling have led to more action-oriented approaches that synthesize formal training programs and on-the-job learning. Action learning emphasizes learning by doing. It involves bringing together trainers and trainees to analyze actual work problems; they continue meeting as actions are implemented, learning from the results and making mid-course corrections. In their 2007 book on action learning, authors Judy O'Neil and Victoria J. Marsick point out, "As much as adult learners can absorb in a classroom, they learn and retain a lot more on the job."

NONCLASSROOM METHODS

Nonclassroom methods include career resource centers, job rotation, coaching and mentoring, and special assignments.

Career Resource Centers. Some organizations make learning opportunities available to interested candidates by establishing career resource centers, which usually include an in-house library with relevant reading material along with computer and Internet resources for additional materials. In some companies, candidates simply are given recommended readings lists. Other companies provide management candidates with comprehensive career-planning guides that contain company-related information about available resources, career options, and counseling contacts. These individuals also may be given workbooks that provide written assignments.

Job Rotation. Job rotation exposes management trainees to various organizational settings by rotating them through a number of departments. Thus, trainees have an opportunity to gain an overall perspective of the organization and learn how various parts interrelate. Additionally, they face new challenges during these assignments that may foster new skill development.

Trainees usually have full management responsibility during these assignments. For example, in one hospital new department supervisors rotate through all major departments on a monthly basis, serving in a managerial capacity during their "tours." Although they often learn a lot from such training, they also may make harmful mistakes during their learning period because they lack knowledge of the functional area that they are supervising.

Coaching and Mentoring. Coaching is a method of management development that is conducted on the job, in which experienced managers or peers advise and guide trainees in solving managerial problems. Typically, less experienced managers are coached by their direct supervisor or a coworker on their specific performance of managerial tasks. An upper-level manager is likely to coach several lower-level managers at once, offering feedback, helping them to find expert advice, and providing resources.

Mentoring is different from coaching in several ways. Mentors are experienced supervisors who establish close, one-on-one relationships with new managers, called protégés. A mentor usually is someone two or three levels higher in the organization than the protégé who teaches, guides, advises, counsels, and serves as a role model; the mentor is not necessarily the protégé's direct supervisor. Mentoring can help the protégé to form common values with the organization's senior leadership and better understand his or her role in the company. Additionally, protégés are often advocated for and protected by a mentor. A mentor may ensure that the protégé is assigned high-visibility projects, or even change negative opinions about the protégé that may be held by others in the company. While a coach focuses on job-specific advice, a mentor is likely to give advice on a broader range of topics related to the protégé's career success.

Special Assignment. Companies sometimes assign special, nonroutine job duties to trainees in order to prepare them for future assignments. One such special project is called action learning, which derives its name from the fact that the trainees can learn by doing. Candidates are given real problems generated by management. Trainees might be given a written assignment that specifies objectives, action plans, target dates, and the name of the person responsible for monitoring the completion of the assignment. For instance, trainees might be asked to study the company's budgeting procedures and submit a written critique.

Another type of special project is the task force, where trainees are grouped together and asked to tackle an actual organizational problem. For example, the task force may be asked to develop a new performance appraisal form, solve a quality problem, or design a program to train new employees. Trainees not only gain valuable experience by serving on a task force, they also have the opportunity to improve their visibility to others within the organization.

MANAGEMENT SUCCESSION PLANNING

Most organizations base their management development and training efforts on succession planning, a systematic process of defining future management requirements and identifying the candidates who best meet them. Unfortu-

nately, many companies take a very informal approach to succession planning. Identification of high-potential candidates is largely subjective, based on the opinions of the nominating managers, who choose "fast-track" or "superstar" employees with little consideration of the actual requirements of future positions. Research has found that promotions within the management ranks are often based on employee behaviors that have no bearing on managerial effectiveness. Typically, networking had the greatest influence on managerial promotions, even though networking made no contribution to actual performance. Additionally, ill-conceived succession planning activities can have disastrous consequences; as many as 30 percent of all newly placed executives are unprepared for their jobs and ultimately fail to meet company expectations.

Elements of an effective succession planning program involve human resource planning, defining qualifications for positions, identifying career paths, and developing replacement charts. The first step in succession planning is human resource planning, in which forecasting is used to determine projected staffing needs for the next several years. Based on these needs, management succession plans should specify key management positions for which staffing should be targeted. Succession plans should next define pertinent individual qualifications needed for each targeted position, which are based on information derived from a job analysis. A firm then identifies individuals with high potential for promotion into or through the management ranks. This is accomplished by assessing employee abilities and career interests through records of career progress, experience, past performance, and self-reported interests regarding future career steps.

Following the above steps, an organization identifies a career path for each high-potential candidate (i.e., those who have the interest and ability to move upward in the organization). A career path typically appears as a flow chart, indicating the sequencing of specific jobs that may lead one up the organizational ladder to a targeted job. The final step is to develop replacement charts that indicate the availability of candidates and their readiness to step into the various management positions. Such charts usually are depicted as diagrams superimposed onto the organizational chart. These show possible replacement candidates, in rank order, for each management position. Rank orders are often based on the candidates' overall potential scores, derived on the basis of their past performance, experience, test scores, and so on.

SEE ALSO *Employee Evaluation and Performance Appraisals; Human Resource Management*

BIBLIOGRAPHY
Blanchard, P. Nick, and James W. Thacker. *Effective Training: Systems, Strategies, and Practices.* 3rd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2006.

Goldstein, Irwin L., and J. Kevin Ford. *Training in Organizations.* 4th ed. Belmont, CA: Wadsworth Group, 2002.

Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage.* 4th ed. Cincinnati: South-Western College Publishing, 2006.

Noe, Raymond A. *Employee Training and Development.* 4th ed. Boston: Irwin/McGraw-Hill, 2006.

O'Neil, Judy, and Victoria J. Marsick. *Understanding Action Learning.* New York: American Management Association, 2007.

MANAGEMENT FUNCTIONS

The functions of management uniquely describe managers' jobs. The most commonly cited functions of management are planning, organizing, leading, and controlling, although some identify additional functions. The functions of management define the process of management as distinct from accounting, finance, marketing, and other business functions. These functions provide a useful way of classifying information about management, and most basic management texts since the 1950s have been organized around a functional framework.

DEVELOPMENT OF THE FUNCTIONAL APPROACH TO MANAGEMENT

Henri Fayol was the first person to identify elements or functions of management in his classic 1916 book *Administration Industrielle et Generale.* Fayol was the managing director of a large French coal-mining firm and based his book largely on his experiences as a practitioner of management. Fayol defined five functions, or elements of management: planning, organizing, commanding, coordinating, and controlling. Fayol argued that these functions were universal, in the sense that all managers performed them in the course of their jobs, whether the managers worked in business, military, government, religious, or philanthropic undertakings.

Fayol defined planning in terms of forecasting future conditions, setting objectives, and developing means to attain objectives. Fayol recognized that effective planning must also take into account unexpected contingencies that might arise and did not advocate rigid and inflexible plans. Fayol defined organizing as making provision for the structuring of activities and relationships within the firm and also the recruiting, evaluation, and training of personnel.

According to Fayol, commanding as a managerial function concerned the personal supervision of subordinates and involved inspiring them to put forth unified effort to achieve objectives. Fayol emphasized the importance of managers understanding the people who worked for them, setting a good example, treating subordinates in a manner consistent with firm policy, delegating, and communicating through meetings and conferences.

Fayol saw the function of coordination as harmonizing all of the various activities of the firm. Most later experts did not retain Fayol's coordination function as a separate function of management but regarded it as a necessary component of all the other management functions. Fayol defined the control function in terms of ensuring that everything occurs within the parameters of the plan and accompanying principles. The purpose of control was to identify deviations from objectives and plans and to take corrective action.

Fayol's work was not widely known outside Europe until 1949, when a translation of his work appeared in the United States. Nevertheless, his discussion of the practice of management as a process consisting of specific functions had a tremendous influence on early management texts that appeared in the 1950s.

Management pioneers such as George Terry, Harold Koontz, Cyril O'Donnell, and Ralph Davis all published management texts in the 1950s that defined management as a process consisting of a set of interdependent functions. Collectively, these and several other management experts became identified with what came to be known as the process school of management.

According to the process school, management is a distinct intellectual activity consisting of several functions. The process theorists believe that all managers, regardless of their industry, organization, or level of management, engage in the functions of management. The process school of management became a dominant paradigm for studying management and the functions of management became the most common way of describing the nature of managerial work.

CRITICISM OF THE FUNCTIONAL APPROACH TO MANAGEMENT

By the early 1970s, some experts suggested that the functions of management as described by Fayol and others of the process school of management were not an accurate description of the reality of managers' jobs. Chief among the critics of the functional approach was Henry Mintzberg.

Mintzberg argued that the functional or process school of management was "folklore" and that functions of management such as planning, organizing, leading, and controlling did not accurately depict the chaotic nature of managerial work. He felt that the functional approach to the managerial job falsely conveyed a sense that managers carefully and deliberately evaluated information before making management decisions.

Based upon an observational study of five executives, Mintzberg concluded that the work managers actually performed could best be represented by three sets of roles,

or activities: interpersonal roles, informational roles, and decision-making roles. He described the interpersonal roles as consisting of figurehead, leader, and liaison. He identified three informational roles: monitor, disseminator, and spokesperson. Finally, he described four decision-making roles that included entrepreneur, disturbance handler, resource allocator, and negotiator.

Mintzberg's challenge to the usefulness of the functions of management and the process school attracted a tremendous amount of attention and generated several empirical studies designed to determine whether his or Fayol's description of the managerial job was most accurate. While this research did indicate that managers performed at least some of the roles Mintzberg identified, there was little in the findings that suggested that the functions of management were not a useful way of describing managerial work.

Scholars continue to debate this question. Research by David Lamond suggests that both approaches had some validity, with Fayol's approach describing the ideal management job and Mintzberg describing the day-to-day activities of managers. Thus, the general conclusion seems to be that while Mintzberg offered a genuine insight into the daily activities of practicing managers, the functions of management still provides a very useful way of classifying the activities managers engage in as they attempt to achieve organizational goals.

PLANNING

Planning is the function of management that involves setting objectives and determining a course of action for achieving these objectives. Planning requires that managers be aware of environmental conditions facing their organization and forecast future conditions. It also requires that managers be good decision-makers.

Planning is a process consisting of several steps. The process begins with environmental scanning, which simply means that planners must be aware of the critical contingencies facing their organization in terms of economic conditions, their competitors, and their customers. Planners must then attempt to forecast future conditions. These forecasts form the basis for planning.

Planners must establish objectives, which are statements of what needs to be achieved and when. They must then identify alternative courses of action for achieving objectives. After evaluating the various alternatives, planners must make decisions about the best courses of action for achieving objectives. They must then formulate necessary steps and ensure effective implementation of plans. Finally, planners must constantly evaluate the success of their plans and take corrective action when necessary.

There are many different types of plans and planning.

Strategic Planning. Strategic planning involves analyzing competitive opportunities and threats, as well as the strengths and weaknesses of the organization, and then determining how to position the organization to compete effectively in their environment. Strategic planning has a long time frame, often three years or more. Strategic planning generally includes the entire organization and includes formulation of objectives. Strategic planning is often based on the organization's mission, which is its fundamental reason for existence. An organization's top management most often conducts strategic planning.

Tactical Planning. Tactical planning is intermediate-range planning that is designed to develop relatively concrete and specific means to implement the strategic plan. Middle-level managers often engage in tactical planning. Tactical planning often has a one- to three-year time horizon.

Operational Planning. Operational planning generally assumes the existence of objectives and specifies ways to achieve them. Operational planning is short-range planning that is designed to develop specific action steps that support the strategic and tactical plans. Operational planning usually has a very short time horizon, from one week to one year.

ORGANIZING

Organizing is the function of management that involves developing an organizational structure and allocating human resources to ensure the accomplishment of objectives. The structure of the organization is the framework within which effort is coordinated. The structure is usually represented by an organization chart, which provides a graphic representation of the chain of command within an organization. Decisions made about the structure of an organization are generally referred to as "organizational design" decisions.

Organizing also involves the design of individual jobs within the organization. Decisions must be made about the duties and responsibilities of individual jobs as well as the manner in which the duties should be carried out. Decisions made about the nature of jobs within the organization are generally called "job design" decisions.

Organizing at the level of the organization involves deciding how best to departmentalize or cluster jobs into departments to effectively coordinate effort. There are many different ways to departmentalize, including organizing by function, product, geography, or customer. Many larger organizations utilize multiple methods of departmentalization. Organizing at the level of job involves how best to design individual jobs to most effectively use human resources.

Traditionally, job design was based on principles of division of labor and specialization, which assumed that the more narrow the job content, the more proficient the individual performing the job could become. However, experience has shown that it is possible for jobs to become too narrow and specialized. When this happens, negative outcomes result, including decreased job satisfaction and organizational commitment and increased absenteeism and turnover.

Recently many organizations have attempted to strike a balance between the need for worker specialization and the need for workers to have jobs that entail variety and autonomy. Many jobs are now designed based on such principles as job enrichment and teamwork.

LEADING

Leading involves influencing others toward the attainment of organizational objectives. Effective leading requires the manager to motivate subordinates, communicate effectively, and effectively use power. If managers are effective leaders, their subordinates will be enthusiastic about exerting effort toward the attainment of organizational objectives.

To become effective at leading, managers must first understand their subordinates' personalities, values, attitudes, and emotions. Therefore, the behavioral sciences have made many contributions to the understanding of this function of management. Personality research and studies of job attitudes provide important information as to how managers can most effectively lead subordinates.

As a new generation of employees enter the workforce, managers must become familiar with the values and norms particular to the demographic. For example, much has been written about how to manage the 80 million workers under the age of 30 known as "millenials" or "Generation Y." Although the group has been stereotyped as self-absorbed and entitled, experts say that this generation is also passionate about teamwork and eager to take on challenges. Such generalizations may be a useful springboard for exploring the relationship between young employees and company culture, but they can easily be misused when relied on without supplemental information.

Studies of motivation and motivation theory provide important information about the ways in which workers can be energized to put forth productive effort. Studies of communication provide direction as to how managers can effectively and persuasively communicate. Studies of leadership and leadership style provide information regarding questions such as, "What makes a manager a good leader?" and "In what situations are certain leadership styles most appropriate and effective?"

CONTROLLING

Controlling involves ensuring that performance does not deviate from standards. Controlling consists of three steps, which include establishing performance standards, comparing actual performance against standards, and taking corrective action when necessary. Performance standards are often stated in monetary terms such as revenue, costs, or profits, but may also be stated in other terms, such as units produced, number of defective products, or levels of customer service. The measurement of performance can be done in several ways, depending on the performance standards, including financial statements, sales reports, production results, customer satisfaction, and formal performance appraisals. Managers at all levels engage in the managerial function of controlling to some degree.

The managerial function of controlling should not be confused with control in the behavioral or manipulative sense. This function does not imply that managers should attempt to control or manipulate the personalities, values, attitudes, or emotions of their subordinates. Instead, this function of management concerns the manager's role in taking necessary actions to ensure that the work-related activities of subordinates are consistent with and contributing toward the accomplishment of organizational and departmental objectives.

Effective controlling requires the existence of plans, since planning provides the necessary performance standards or objectives. Controlling also requires a clear understanding of where responsibility for deviations from standards lies. Two traditional control techniques are the budget and the performance audit. Although controlling is often thought of in terms of financial criteria, managers must also control production/operations processes, procedures for delivery of services, compliance with company policies, and many other activities within the organization.

The management functions of planning, organizing, leading, and controlling are widely considered to be the best means of describing the manager's job as well as the best way to classify accumulated knowledge about the study of management. Although there have been tremendous changes in the environment faced by managers and the tools used by managers to perform their roles, managers still perform these essential functions.

SEE ALSO *Management Control; Management Styles; Organizing; Planning*

BIBLIOGRAPHY

Anderson, P., and M. Pulich. "Managerial Competencies Necessary in Today's Dynamic Health Care Environment." *Health Care Manager* 21, no. 2 (2002): 1–11.

BNET Staff. "Mastering the Art of Effective Decision Making." *BNET*. Available from: http://www.bnet.com/2403-13056_23-183053.html.

Carroll, Stephen J., and Dennis J. Gillen. "Are the Classical Management Functions Useful in Describing Managerial Work?" *Academy of Management Review* 12, no. 1 (1980): 38—51.

Fayol, Henri. *General and Industrial Administration.* London: Sir Issac Pitman & Sons, Ltd., 1949.

Koontz, Harold, and Cyril O'Donnell. *Principles of Management: An Analysis of Managerial Functions.* New York: McGraw-Hill Book Co., 1955.

Lamond, David. "A Matter of Style: Reconciling Henri and Henry." *Management Decision* 42, no. 2 (2004): 330—356.

"Managing Millenials: A Survival Guide." *BNET.* Available from: http://www.bnet.com/2436-13059_23-202082.html.

Marquis, Bessie L., and Carol J. Huston. *Leadership Roles and Management Functions in Nursing: Theory and Application.* 6th ed. Philadelphia, PA: Lippincott Williams & Wilkins, 2008.

Mintzberg, Henry. *The Nature of Managerial Work.* New York: Harper & Row, 1973.

Robbins, Stephen P. and Mary Coulter. *Management.* Upper Saddle River, NJ: Prentice Hall, 1999.

MANAGEMENT INFORMATION SYSTEMS

All businesses share one common asset, regardless of the type of business. It does not matter if they manufacture goods or provide services. It is a vital part of any business entity, whether a sole proprietorship or a multinational corporation. That common asset is information.

Information enables one to determine the need to create new products and services. Information tells companies to move into new markets or to withdraw from other markets. Without information, the goods do not get made, the orders are not placed, the materials are not procured, the shipments are not delivered, the customers are not billed, and the business cannot survive.

But information has far lesser impact when presented as raw data. In order to maximize the value of information, it must be captured, analyzed, quantified, compiled, manipulated, made accessible, and shared. In order to accomplish those tasks, an information system (IS) must be designed, developed, administered, and maintained.

INFORMATION SYSTEMS

An information system is a computer system that provides management and other personnel within an organization with up-to-date information regarding the organization's performance; for example, current inventory and sales. It usually is linked to a computer network, which is created by joining different computers together in order to share data and resources. It is designed to capture, transmit, store, retrieve, manipulate, and or display information used in one or more business processes. These systems output information in a form that is useable at all levels of the organization: strategic, tactical, and operational.

Systems that are specifically geared toward serving general, predictable management functions are sometimes called management information systems (MIS). A good example of an MIS report is the information that goes into an annual report created for the stockholders of a corporation (a scheduled report). The administration of an information system is typically the province of the MIS or information technology (IT) department within an organization.

Some applications have infringed on the familiar MIS landscape. Enterprise resource planning (ERP) software and executive information systems (EIS) both provide packaged modules and programs that perform the same functions as traditional MIS, but with greater functionality, flexibility, and integration capabilities.

Mainframes. The original computerized information systems were based on mainframes. "Mainframe" is a term originally referring to the cabinet containing the central processor unit or "main frame" of a room-filling computer. Firms such as IBM were instrumental in the mid-twentieth century in helping businesses integrate and operate information systems and technology into their business operations. After the emergence of smaller minicomputer designs in the early 1970s, the traditional large machines were described as "mainframe computers," or simply mainframes. The term carries the connotation of a machine designed for batch rather than interactive use, though possibly with an interactive time-sharing operating system retrofitted onto it. It has been conventional wisdom in most of the business community since the late 1980s that the mainframe architectural tradition is essentially dead, having been swamped by huge advances in integrated circuit design technology and low-cost personal computing. Despite this, in the twenty-first century there are still uses for mainframe systems that store vast amounts of data.

The Internet. The Internet has opened up further developments in information systems and the exchange of information via Web-based e-mail, intranets, and extranets. These technologies allow for much faster data and information exchange and greater access for more users. Web-casting and videoconferencing allow for real-time information exchanges. Mobile computing technologies accessed by handheld devices, such as multi-functional mobile phones, personal digital assistants, and podcasting (via iPods), are offering further modes of communication.

Information systems are also crucial if a firm decides to practice telecommuting, or teleworking. Telecommuting is defined as when employees can conduct full operations without being inside the business's office, instead working from a location such as an employee's home.

Telecommuting is seen as an asset both in improving employees' quality of life, and with allowing an organization more flexibility. A 2005 article in *Technovation* noted a firm's ability to adapt to telecommuting as a policy is directly linked to its information technology resources. As some scholars note, these advances in technology can fundamentally change the nature of management.

However, some have also argued that security of a company's data has increased in importance with the increase in information technology. A 2007 *Software World* article stated that such practices as telecommuting make information systems vulnerable to attack. Due to the range of threats to information systems (including viruses and hackers), information security—such as passwords, firewalls, and so forth—are crucial to an organization.

INFORMATION SYSTEM DESIGN AND ADMINISTRATION

The design of an information system is based on various factors. Cost is a major consideration, but there certainly are others to be taken into account, such as the number of users; the modularity of the system, or the ease with which new components can be integrated into the system, and the ease with which outdated or failed components can be replaced; the amount of information to be processed; the type of information to be processed; the computing power required to meet the varied needs of the organization; the anticipated functional life of the system and/or components; the ease of use for the people who will be using the system; and the requirements and compatibility of the applications that are to be run on the system.

There are different ways to construct an information system, based upon organizational requirements, both in the function aspect and the financial sense. Of course, the company needs to take into consideration that hardware that is purchased and assembled into a network will become outdated rather quickly. It is almost axiomatic that the technologies used in information systems steadily increase in power and versatility on a rapid time scale. Perhaps the trickiest part of designing an information system from a hardware standpoint is straddling the fine line between too much and not enough, while keeping an eye on the requirements that the future may impose.

Applying foresight when designing a system can bring substantial rewards in the future, when system components are easy to repair, replace, remove, or update without having to bring the whole information system to its knees. When an information system is rendered inaccessible or inoperative, the system is considered to be "down."

A primary function of maintaining an information system is to minimize downtime, or hopefully, to eradicate downtime altogether. The costs created by a department, facility, organization, or workforce being idled by an inoperative system can become staggering in a short amount of time. The inconvenience to customers can cost the firm even more if sales are lost as a result, in addition to any added costs the customers might incur.

Another vital consideration regarding the design and creation of an information system is to determine which users have access to which information. The system should be configured to grant access to the different partitions of data and information by granting user-level permissions for access. A common method of administering system access rights is to create unique profiles for each user, with the appropriate user-level permissions that provide proper clearances.

Individual passwords can be used to delineate each user and their level of access rights, as well as identify the tasks performed by each user. Data regarding the performance of any user unit, whether individual, departmental, or organizational can also be collected, measured, and assessed through the user identification process.

The open systems interconnection (OSI) seven-layer model attempts to provide a way of partitioning any computer network into independent modules from the lowest (physical/hardware) layer to the highest (application/program) layer. Many different specifications can exist at each of these layers.

A crucial aspect of administering information systems is maintaining communication between the IS staff, who have a technical perspective on situations, and the system users, who usually communicate their concerns or needs in more prosaic terminology. Getting the two sides to negotiate the language barriers can be difficult, but the burden of translation should fall upon the IS staff. A little patience and understanding can go a long way toward avoiding frustration on the part of both parties.

There is more to maintaining an information system than applying technical knowledge to hardware or software. IS professionals have to bridge the gap between technical issues and practicality for the users. The information system should also have a centralized body that functions to provide information, assistance, and services to the users of the system. These services will typically include telephone and electronic mail "help desk" type services for users, as well as direct contact between the users and IS personnel.

INFORMATION SYSTEM FUNCTIONS

Document and record management. Documenting and recording management may well be the most crucial aspect of any information system. Some examples of types of information maintained in these systems would be accounting, financial, manufacturing, marketing, and human resources. An information system can serve as a library. When properly collected, organized, and indexed in accordance

with the requirements of the organization, its stored data becomes accessible to those who need the information.

The location and retrieval of archived information can be a direct and logical process, if careful planning is employed during the design of the system. Creating an outline of how the information should be organized and indexed can be a very valuable tool during the design phase of a system. A critical feature of any information system should be the ability to not only access and retrieve data, but also to keep the archived information as current as possible.

Collaborative tools. Collaborative tools can consist of software or hardware, and serve as a base for the sharing of data and information, both internally and externally. These tools allow the exchange of information between users, as well as the sharing of resources. As previously mentioned, real-time communication is also a possible function that can be enabled through the use of collaborative tools.

Data mining. Data mining, or the process of analyzing empirical data, allows for the extrapolation of information. The extrapolated results are then used in forecasting and defining trends.

Query tools. Query tools allow the users to find the information needed to perform any specific function. The inability to easily create and execute functional queries is a common weak link in many information systems. A significant cause of that inability, as noted earlier, can be the communication difficulties between a management information systems department and the system users.

Another critical issue toward ensuring successful navigation of the varied information levels and partitions is the compatibility factor between knowledge bases. For maximum effectiveness, the system administrator should ascertain that the varied collection, retrieval, and analysis levels of the system either operate on a common platform, or can export the data to a common platform. Although much the same as query tools in principle, intelligent agents allow the customization of the information flow through sorting and filtering to suit the individual needs of the users. The primary difference between query tools and intelligent agents is that query tools allow the sorting and filtering processes to be employed to the specifications of management and the system administrators, and intelligent agents allow the information flow to be defined in accord with the needs of the user.

KEY POINTS

Managers should keep in mind the following advice in order to get the most out of an information system:

- Use the available hardware and software technologies to support the business. If the information system does not support quality and productivity, then it is misused.

- Use the available technologies to create and facilitate the flow of communication within your organization and, if feasible, outside of it as well. Collaboration and flexibility are the key advantages offered for all involved parties. Make the most of those advantages.

- Determine if any strategic advantages are to be gained by use of your information system, such as in the areas of order placement, shipment tracking, order fulfillment, market forecasting, just-in-time supply, or regular inventory. If you can gain any sort of advantage by virtue of the use of your information system, use it.

- Use the quantification opportunities presented by your information system to measure, analyze, and benchmark the performances of an individual, department, division, plant, or entire organization.

INFORMATION SYSTEMS AND OUTSOURCING

With companies outsourcing significant portions of their business operations (such as supply chain management), information systems can play an important role. General Motors (GM) is one company that outsourced many of its information technology operations in 2003. Doing so required coordinating operations and information systems among GM's internal IT operations and numerous other companies. One major task in this process has been standardizing information technology and other software processes.

Others note that globalization and, indeed, multinational operations would simply not be possible without sophisticated information systems.

An information system is more than hardware or software. The most integral and important components of the system are the people who design it, maintain it, and use it. While the overall system must meet various needs in terms of power and performance, it must also be usable for the organization's personnel. If the operation of day-to-day tasks is too daunting for the workforce, then even the most humble of aspirations for the system will go unrealized.

A company should not view information systems as ancillary. As management school professor Petter Gottschalk notes, information technology operations should be central to a company's management. The emergence of the CIO, or chief information officer, as a top management position also speaks to the importance of information systems and information technology.

A company will likely have a staff entrusted with the overall operation and maintenance of the system and that staff will be able to make the system perform in the manner expected of it. Pairing the information systems department with a training department can create a synergistic solution to the quandary of how to get non-technical staff to perform technical tasks. Oft times, the individuals staffing an information systems department will be as technical in their orientation as the operative staff is non-technical in theirs. This creates a language barrier between the two factions, but the communication level between them may be the most important exchange of information within the organization. Nomenclature out of context becomes little more than insular buzzwords.

If a company does not have a formal training department, the presence of staff members with a natural inclination to demonstrate and teach could mitigate a potentially disastrous situation. Management should find those employees who are most likely to adapt to the system and its operation. They should be taught how the system works and what it is supposed to do. Then they can share their knowledge with their fellow workers. There may not be a better way to bridge the natural chasm between the IS department and non-technical personnel. When the process of communicating information flows smoothly and can be used for enhancing and refining business operations, the organization and its customers will all profit.

SEE ALSO *Knowledge Management*

BIBLIOGRAPHY
Caddy, Ian N., and Mammy M. Helou. "Supply Chains and Their Management: Applications of General Systems Theory." *Journal of Retailing and Consumer Services* 14, no. 5 (2007) 319.

Caldelli, A., and M.L. Parmigiani. "Management Information System: A Tool for Corporate Sustainability." *Journal of Business Ethics* 55, no.2 (2004): 159–171.

Denton, D.K. "Focus on Data Context, Not Content." *Communications News* 40, no. 12 (2003): 50.

Gellis, Harold C. "Protecting Against Threats to Enterprise Network Security." *Software World* 37, no. 2 (2006): 14.

Gottschalk, Petter. *Business Dynamics in Information Technology.* Hershey, PA: Idea Group Publishers, 2007.

Hoffman, Thomas. "GM's Global Positioning." *Computerworld* 26 November 2007.

King, William R., and Paulo Roberto Flor. "The Development of Global IT Infrastructure." *Omega* 36, no. 3 (June 2008): 486.

Kotabe, Masaaki, Michael J. Mol, and Janet Y. Murray. "Outsourcing, Performance, and the Role of e-Commerce: A Dynamic Perspective." *Industrial Marketing Management* 37, no. 1 (2008): 37.

Lail, P.W. "Improving IT's Support of Business Strategy." *Pulp & Paper* 79, no.1 (January 2005): 23.

Lawrence, F.B., D.F. Jennings, and B.E. Reynolds. *ERP in Distribution.* Mason, OH: Thomson/South-Western, 2005.

McKenna, Christopher D. *The World's Newest Profession.* Cambridge, MA: Cambridge University Press, 2006.

Mitchell, Robert L. "Driving Economies of Scale in IT." *Computerworld* 26 October 2006.

Pawlowski, S. D., and D. Robey. "Bridging User Organizations: Knowledge Brokering and the Work of Information Technology Professionals." *MIS Quarterly* 28, no. 4 (2004): 645–672.

Pérez, Manuela, et al. "The Differences of Firm Resources and the Adoption of Teleworking." *Technovation* 25, no. 12 (2005): 1476.

Yourdon, Edward. *Modern Structured Analysis.* Englewood Cliffs: Yourdon Press, 1989.

Zehir, C., and H. Keskin. "A Field Research on the Effects of MIS on Organizational Restructuring." *Journal of American Academy of Business* 3 (September 2003): 270–279.

MANAGEMENT LEVELS

Managers are organizational members who are responsible for the work performance of other organizational members. Managers have formal authority to use organizational resources and to make decisions. In organizations, there are typically three levels of management: top-level, middle-level, and first-level. These three main levels of managers form a hierarchy in which they are ranked in order of importance. In most organizations, the number of managers at each level is such that the hierarchy resembles a pyramid, with many more first-level managers, fewer middle managers, and the fewest managers at the top level. Each of these management levels is described below in terms of their possible job titles and their primary responsibilities and the paths taken to hold these positions. Additionally, there are differences across the management levels as to what types of management tasks each does and the roles that they take in their jobs. Finally, there are a number of changes that are occurring in many organizations that are changing the management hierarchies in them, such as the increasing use of teams, the prevalence of outsourcing, and the flattening of organizational structures.

The "Dean" of business history, Alfred Chandler, saw the managerial class as one of the great leaps forward in the business world. Chandler noted that managers and management levels arose from the need to further allocate responsibility and coordinate activities as large corporations emerged in the nineteenth century. For example, railroads were faced with the enormous task of coordinating activities (including scheduling) over wide geographic areas. Clear managerial roles helped this process. Chandler also reasoned that managers, because they had more specialized educational backgrounds, would tend to desire lifelong careers within a single corporation. As a result, managers favored long-range planning as opposed to short-term profits. Simply put, it is unlikely that the modern corporation

would have developed without the development of different and well-defined management levels.

TOP-LEVEL MANAGERS

Top-level managers, or top managers, are also called senior management or executives. These individuals are at the top one or two levels in an organization, and hold titles such as: chief executive officer (CEO), chief financial officer (CFO), chief operational officer (COO), chief information officer (CIO), chairperson of the board, president, vice president, corporate head.

Often, a set of these managers will constitute the top management team, which is composed of the CEO, the COO, and other department heads. Top-level managers make decisions affecting the entirety of the firm. Top managers do not direct the day-to-day activities of the firm; rather, they set goals for the organization and direct the company to achieve them. Top managers are ultimately responsible for the performance of the organization, and often, these managers have very visible jobs.

Top managers in most organizations have a great deal of managerial experience and have moved up through the ranks of management within the company or in another firm. An exception to this is a top manager who is also an entrepreneur; such an individual may start a small company and manage it until it grows enough to support several levels of management. Many top managers possess an advanced degree, such as a master's in business administration, but such a degree is not required.

Some CEOs are hired in from other top management positions in other companies. Conversely, they may be promoted from within and groomed for top management with management development activities, coaching, and mentoring. They may be tagged for promotion through succession planning, which identifies high potential managers.

MIDDLE-LEVEL MANAGERS

Middle-level managers, or middle managers, are those in the levels below top managers. Middle managers' job titles include: General manager, Plant manager, Regional manager, and Divisional manager.

Middle-level managers are responsible for carrying out the goals set by top management. They do so by setting goals for their departments and other business units. Middle managers can motivate and assist first-line managers to achieve business objectives. Middle managers may also communicate upward, by offering suggestions and feedback to top managers. Because middle managers are more involved in the day-to-day workings of a company, they may provide valuable information to top managers to help improve the organization's bottom line.

Jobs in middle management vary widely in terms of responsibility and salary. Depending on the size of the company and the number of middle-level managers in the firm, middle managers may supervise only a small group of employees, or they may manage very large groups, such as an entire business location. Middle managers may be employees who were promoted from first-level manager positions within the organization, or they may have been hired from outside the firm. Some middle managers may have aspirations to hold positions in top management in the future.

FIRST-LEVEL MANAGERS

First-level managers are also called first-line managers or supervisors. These managers have job titles such as: Office manager, Shift supervisor, Department manager, Foreperson, Crew leader, Store manager.

First-line managers are responsible for the daily management of line workers—the employees who actually produce the product or offer the service. There are first-line managers in every work unit in the organization. Although first-level managers typically do not set goals for the organization, they have a very strong influence on the company. These are the managers that most employees interact with on a daily basis, and if the managers perform poorly, employees may also perform poorly, may lack motivation, or may leave the company.

In the past, most first-line managers were employees who were promoted from line positions (such as production or clerical jobs). Rarely did these employees have formal education beyond the high-school level. However, many first-line managers are now graduates of a trade school, or have a two-year associates or a four-year bachelor's degree from college.

MANAGEMENT LEVELS AND THE FOUR MANAGERIAL FUNCTIONS

Managers at different levels of the organization engage in different amounts of time on the four managerial functions of planning, organizing, leading, and controlling.

Planning is choosing appropriate organizational goals and the correct directions to achieve those goals. Organizing involves determining the tasks and the relationships that allow employees to work together to achieve the planned goals. With leading, managers motivate and coordinate employees to work together to achieve organizational goals. When controlling, managers monitor and measure the degree to which the organization has reached its goals.

The degree to which top, middle, and supervisory managers perform each of these functions is presented in Exhibit 1. Note that top managers do considerably more planning, organizing, and controlling than do managers at any other level. However, they do much less leading. Most

Exhibit 1

Time Spent on Management Functions at Different Management Levels
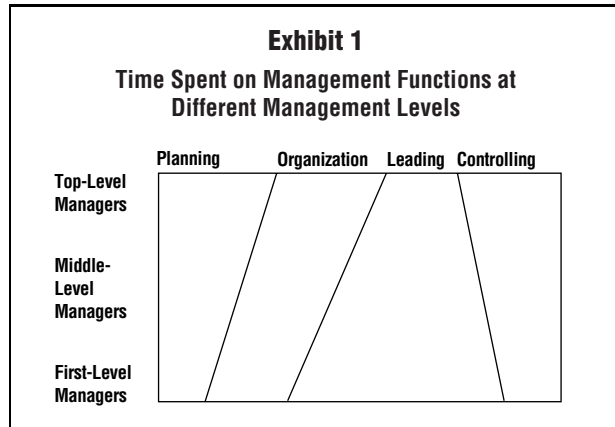
of the leading is done by first-line managers. The amount of planning, organizing, and controlling decreases down the hierarchy of management; leading increases as you move down the hierarchy of management.

MANAGEMENT ROLES

In addition to the broad categories of management functions, managers in different levels of the hierarchy fill different managerial roles. These roles were categorized by researcher Henry Mintzberg, and they can be grouped into three major types: decisional, interpersonal, and informational.

Decisional Roles. Decisional roles require managers to plan strategy and utilize resources. There are four specific roles that are decisional. The *entrepreneur* role requires the manager to assign resources to develop innovative goods and services, or to expand a business. Most of these roles will be held by top-level managers, although middle managers may be given some ability to make such decisions. The *disturbance handler* corrects unanticipated problems facing the organization from the internal or external environment. Managers at all levels may take this role. For example, first-line managers may correct a problem halting the assembly line or a middle level manager may attempt to address the aftermath of a store robbery. Top managers are more likely to deal with major crises, such as requiring a recall of defective products. The third decisional role, that of *resource allocator*, involves determining which work units will get which resources. Top managers are likely to make large, overall budget decisions, while middle managers may make more specific allocations. In some organizations, supervisory managers are responsible for determining allocation of salary raises to employees. Finally, the *negotiator* works with others, such as suppliers, distributors, or labor unions, to reach agreements regarding products and services. First-level managers may negotiate with employees on issues of salary increases

or overtime hours, or they may work with other supervisory managers when needed resources must be shared. Middle managers also negotiate with other managers and are likely to work to secure preferred prices from suppliers and distributors. Top managers negotiate on larger issues, such as labor contracts, or even on mergers and acquisitions of other companies.

Interpersonal Roles. Interpersonal roles require managers to direct and supervise employees and the organization. The *figurehead* is typically a top or middle manager. This manager may communicate future organizational goals or ethical guidelines to employees at company meetings. A *leader* acts as an example for other employees to follow, gives commands and directions to subordinates, makes decisions, and mobilizes employee support. Managers must be leaders at all levels of the organization; often lower-level managers look to top management for this leadership example. In the role of *liaison*, a manager must coordinate the work of others in different work units, establish alliances between others, and work to share resources. This role is particularly critical for middle managers, who must often compete with other managers for important resources, yet must maintain successful working relationships with them for long time periods.

Informational Roles. Informational roles are those in which managers obtain and transmit information. These roles have changed dramatically as technology has improved. The *monitor* evaluates the performance of others and takes corrective action to improve that performance. Monitors also watch for changes in the environment and within the company that may affect individual and organizational performance. Monitoring occurs at all levels of management, although managers at higher levels of the organization are more likely to monitor external threats to the environment than are middle or first-line managers. The role of *disseminator* requires that managers inform employees of changes that affect them and the organization. They also communicate the company's vision and purpose.

Managers at each level disseminate information to those below them, and much information of this nature trickles from the top down. Finally, a *spokesperson* communicates with the external environment, from advertising the company's goods and services, to informing the community about the direction of the organization. The spokesperson for major announcements, such as a change in strategic direction, is likely to be a top manager. But, other, more routine information may be provided by a manager at any level of a company. For example, a middle manager may give a press release to a local newspaper, or a supervisor manager may give a presentation at a community meeting.

MANAGEMENT SKILLS

Regardless of organizational level, all managers must have five critical skills: technical skill, interpersonal skill, conceptual skill, diagnostic skill, and political skill.

Technical Skill. Technical skill involves understanding and demonstrating proficiency in a particular workplace activity. Technical skills are things such as using a computer word-processing program, creating a budget, operating a piece of machinery, or preparing a presentation. The technical skills used will differ in each level of management. First-level managers may engage in the actual operations of the organization; they need to have an understanding of how production and service occur in the organization in order to direct and evaluate line employees. Additionally, first-line managers need skill in scheduling workers and preparing budgets. Middle managers use more technical skills related to planning and organizing, and top managers need to have skill to understand the complex financial workings of the organization.

Interpersonal Skill. Interpersonal skill involves human relations, or the manager's ability to interact effectively with organizational members. Communication is a critical part of interpersonal skill, and an inability to communicate effectively can prevent career progression for managers. Managers who have excellent technical skill, but poor interpersonal skill are unlikely to succeed in their jobs. This skill is critical at all levels of management.

Conceptual Skill. Conceptual skill is a manager's ability to see the organization as a whole, as a complete entity. It involves understanding how organizational units work together and how the organization fits into its competitive environment. Conceptual skill is crucial for top managers, whose ability to see "the big picture" can have major repercussions on the success of the business. However, conceptual skill is still necessary for middle and supervisory managers, who must use this skill to envision, for example, how work units and teams are best organized.

Diagnostic Skill. Diagnostic skill is used to investigate problems, decide on a remedy, and implement a solution. Diagnostic skill involves other skills—technical, interpersonal, conceptual, and politic. For instance, to determine the root of a problem, a manager may need to speak with many organizational members or understand a variety of informational documents. The difference in the use of diagnostic skill across the three levels of management is primarily due to the types of problems that must be addressed at each level. For example, first-level managers may deal primarily with issues of motivation and discipline, such as determining why a particular employee's performance is flagging and how to improve it. Middle

managers are likely to deal with issues related to larger work units, such as a plant or sales office. For instance, a middle-level manager may have to diagnose why sales in a retail location have dipped. Top managers diagnose organization-wide problems, and may address issues such as strategic position, the possibility of outsourcing tasks, or opportunities for overseas expansion of a business.

Political Skill. Political skill involves obtaining power and preventing other employees from taking away one's power. Managers use power to achieve organizational objectives, and this skill can often reach goals with less effort than others who lack political skill. Much like the other skills described, political skill cannot stand alone as a manager's skill; in particular, though, using political skill without appropriate levels of other skills can lead to promoting a manager's own career rather than reaching organizational goals. Managers at all levels require political skill; managers must avoid others taking control that they should have in their work positions. Top managers may find that they need higher levels of political skill in order to successfully operate in their environments. Interacting with competitors, suppliers, customers, shareholders, government, and the public may require political skill.

CHANGES IN MANAGEMENT HIERARCHIES

There are a number of changes to organizational structures that influence how many managers are at each level of the organizational hierarchy and what tasks they perform each day.

Flatter Organizational Structures. Organizational structures can be described by the number of levels of hierarchy; those with many levels are called "tall" organizations. They have numerous levels of middle management, and each manager supervises a small number of employees or other managers. That is, they have a small span of control. Conversely, "flat" organizations have fewer levels of middle management, and each manager has a much wider span of control. Examples of organization charts that show tall and flat organizational structures are presented in Exhibit 2.

Many organizational structures are now more flat than they were in previous decades. This is due to a number of factors. Many organizations want to be more flexible and increasingly responsive to complex environments. By becoming flatter, many organizations also become less centralized. Centralized organizational structures have most of the decisions and responsibility at the top of the organization, while decentralized organizations allow decision-making and authority at lower levels of the organization. Flat organizations that make use of decentralization are often

Exhibit 2: Flat vs. Tall Organizational Hierarchy

Tall Organizational Structure

Flat Organizational Structure
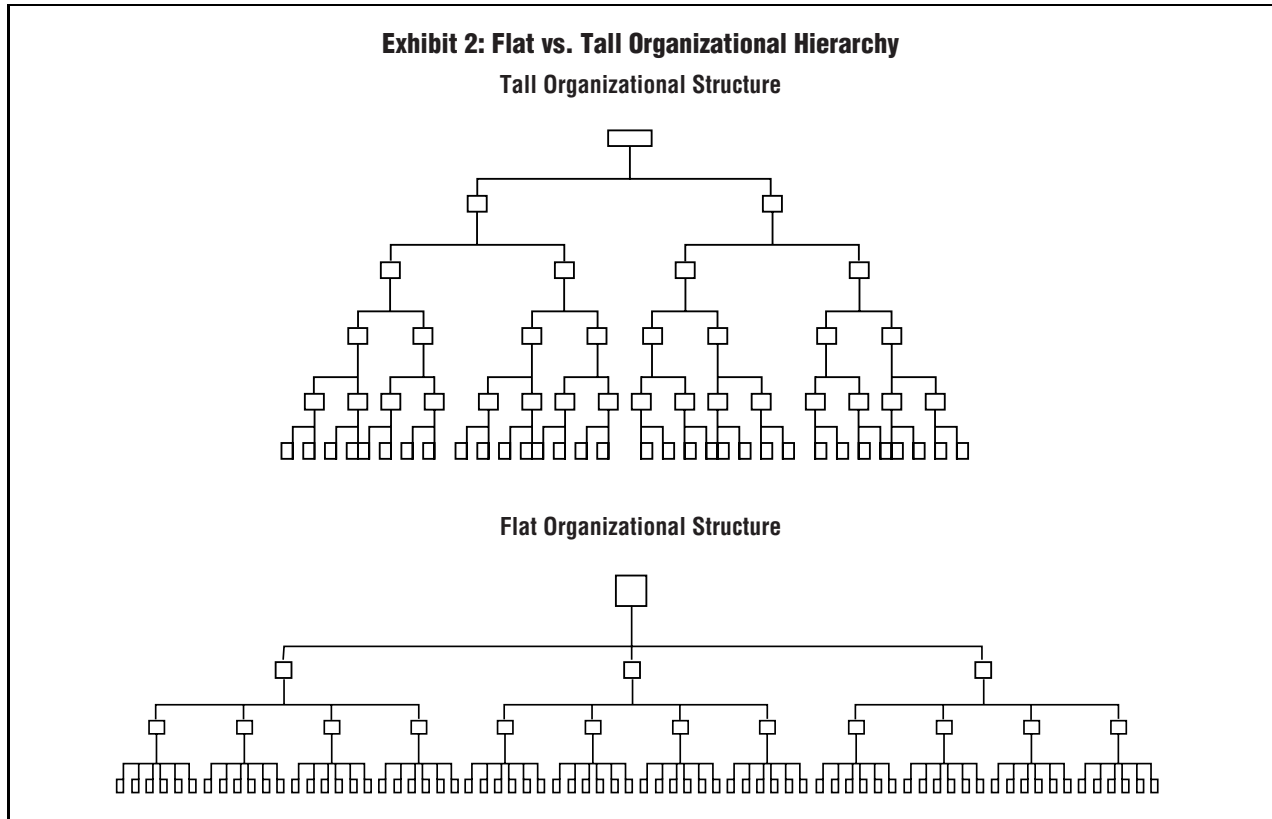
more able to efficiently respond to customer needs and the changing competitive environment.

As organizations move to flatter structures, the ranks of middle-level managers are diminishing. This means that there a fewer opportunities for promotion for first-level managers, but this also means that employees at all levels are likely to have more autonomy in their jobs, as flatter organizations promote decentralization. When organizations move from taller to flatter hierarchies, this may mean that middle managers lose their jobs, and are either laid off from the organization, or are demoted to lower-level management positions. This creates a surplus of labor of middle level managers, who may find themselves with fewer job opportunities at the same level.

Rosabeth Moss Kanter notes that hierarchical arrangements have eroded to make way for organizational structures that are more flexible. Specifically, she states that managers will be increasingly working in what she terms "peer networks." Ultimately, Kanter argues that these networks, and the network that a manager is a part of, may matter more than a manager's formal level in a hierarchy. However, she also notes that because of these changes, managers may feel a loss of power.

Increased Use of Teams. A team is a group of individuals with complementary skills who work together to achieve a common goal. That is, each team member has different capabilities, yet they collaborate to perform tasks. Many organizations are now using teams more frequently to accomplish work because they may be capable of performing at a level higher than that of individual employees. Additionally, teams tend to be more successful when tasks require speed, innovation, integration of functions, and a complex and rapidly changing environment.

Another type of managerial position in an organization that uses teams is the team leader, who is sometimes called a project manager, a program manager, or task-force leader. This person manages the team by acting as a facilitator and catalyst. He or she may also engage in work to help accomplish the team's goals. Some teams do not have leaders, but instead are self-managed. Members of self-managed teams hold each other accountable for the team's goals and manage one another without the presence of a specific leader.

Outsourcing. Outsourcing occurs when an organization contracts with another company to perform work that it previously performed itself. Outsourcing is intended to reduce costs and promote efficiency. Costs can be reduced through outsourcing, often because the work can be done in other countries, where labor and resources are less expensive than in the United States. Additionally, by

having an outsourcing company aid in production or service, the contracting company can devote more attention and resources to the company's core competencies. Through outsourcing, many jobs that were previously performed by American workers are now performed overseas. Thus, this has reduced the need for many first-level and middle-level managers, who may not be able to find other similar jobs in another company.

Telecommuting. Telecommuting is similar to outsourcing in that both involve work being performed for a company offsite. However, the major difference between the two is that telecommuters are still employees of a company. Because of this, they often have to report to a manager. However, this also means that the relationship between the manager and the employee will change, as will managerial responsibilities. *Technovation* observed that managers' roles will alter in that they will not be able to observe employees at work, and must focus on outcome with regards to telecommuting employees.

Insourcing. Insourcing is another business trend that came into its own in the early twenty-first century. Insourcing is when outside firms take over major parts of a company's internal process. The journalist and author Thomas Friedman uses UPS and Toshiba computers as an example. Toshiba has insourced its computer repair operations to UPS. Toshiba itself does not work on damaged computers, but UPS does the work instead. This practice has implications for management levels that are similar to outsourcing in that this practice can result in the elimination of some management positions inside an organization.

SEE ALSO *Management and Executive Development; Management Functions; Organizational Chart; Organizational Structure; Outsourcing and Offshoring; Teams and Teamwork*

BIBLIOGRAPHY
Chandler, Alfred. *The Visible Hand.* Cambridge, Massachusetts: Bellknap Press, 1977.

DuBrin, Andrew J. *Essentials of Management.* 6th ed. Peterborough, Ontario: Thomson South-Western, 2003.

Friedman, Thomas. *The World is Flat.* New York: Farrar, Straus and Giroux, 2005.

Jones, Gareth R., and Jennifer M. George. *Contemporary Management.* 4th ed. New York: McGraw-Hill Irwin, 2006.

Kanter, Rosabeth Moss. "The New Managerial Work." *Management Skills.* San Francisco, California: John Wiley and Sons, 2005. 91–112.

Mintzberg, Henry. "The Manager's Job: Folklore and Fact." *Harvard Business Review* July-August 1975, 56–62.

———. *The Nature of Managerial Work.* New York: Harper & Row, 1973.

Pérez, Manuela, et al. "The differences of Firm Resources and the Adoption of Teleworking." *Technovation* 25, no 12 (December 2005): 1476.

Rue, Leslie W., and Lloyd L. Byars. *Management: Skills and Applications.* 10th ed. New York, NY: McGraw-Hill Irwin, 2003.

Williams, Chuck. *Management.* Cincinnati, OH: South-Western College Publishing, 2000.

MANAGEMENT SCIENCE

Management science generally refers to mathematical or quantitative methods for business decision making. The term "operations research" may be used interchangeably with management science.

HISTORY

Frederick Winslow Taylor is credited with the initial development of scientific management techniques in the early twentieth century. In addition, several management science techniques were further developed during World War II. Some even consider the World War II period as the beginning of management science, as this global conflict posed many military, strategic, logistic, and tactical problems. Operations research teams of engineers, mathematicians, and statisticians were developed to use the scientific method to find solutions for many of these problems.

Nonmilitary management science applications developed rapidly after World War II. Based on quantitative methods developed during World War II, several new applications emerged. The development of the simplex method by George Dantzig in the 1940s made application of linear programming practical. C. West Churchman, Russell Ackoff, and Leonard Arnoff made management science even more accessible by publishing the first operations research textbook in the 1950s.

Computer technology continues to play an integral role in management science. Practitioners and researchers are able to use ever-increasing computing power in conjunction with management science methods to solve larger and more complex problems. In addition, management scientists are constantly developing new algorithms and improving existing algorithms; these efforts also enable management scientists to solve larger and more complex problems.

BREADTH OF MANAGEMENT SCIENCE TECHNIQUES

The scope of management science techniques is broad. These techniques include:

- Mathematical programming
- Linear programming
- Simplex method

- Dynamic programming
- Goal programming
- Integer programming
- Nonlinear programming
- Stochastic programming
- Markov processes
- Queuing theory/waiting-line theory
- Transportation method
- Simulation

Management science techniques are used on a wide variety of problems from a vast array of applications. For example, integer programming has been used by baseball fans to allocate season tickets in a fair manner. When seven baseball fans purchased a pair of season tickets for the Seattle Mariners, the Mariners turned to management science and a computer program to assign games to each group member based on member priorities.

In marketing, optimal television scheduling has been determined using integer programming. Variables such as time slot, day of the week, show attributes, and competitive effects can be used to optimize the scheduling of programs. Optimal product designs based on consumer preferences have also been determined using integer programming.

Similarly, linear programming can be used in marketing research to help determine the timing of interviews. Such a model can determine the interviewing schedule that maximizes the overall response rate while providing appropriate representation across various demographics and household characteristics.

In the area of finance, management science can be employed to help determine optimal portfolio allocations, borrowing strategies, capital budgeting, asset allocations, and make-or-buy decisions. In portfolio allocations, for instance, linear programming can be used to help a financial manager select specific industries and investment vehicles (e.g., bonds versus stocks) in which to invest.

With regard to production scheduling, management science techniques can be applied to scheduling, inventory, and capacity problems. Production managers can deal with multi-period scheduling problems to develop low-cost production schedules. Production costs, inventory holding costs, and changes in production levels are among the types of variables that can be considered in such analyses.

Workforce assignment problems can also be solved with management science techniques. For example, when some personnel have been cross-trained and can work in more than one department, linear programming may be used to determine optimal staffing assignments.

Airports are frequently designed using queuing theory (to model the arrivals and departures of aircraft) and simulation (to simultaneously model the traffic on multiple runways). Such an analysis can yield information to be used in deciding how many runways to build and how many departing and arriving flights to allow by assessing the potential queues that can develop under various airport designs.

MATHEMATICAL PROGRAMMING

Mathematical programming deals with models comprised of an objective function and a set of constraints. Linear, integer, nonlinear, dynamic, goal, and stochastic programming are all types of mathematical programming.

An objective function is a mathematical expression of the quantity to be maximized or minimized. Manufacturers may wish to maximize production or minimize costs, advertisers may wish to maximize a product's exposure, and financial analysts may wish to maximize rate of return.

Constraints are mathematical expressions of restrictions that are placed on potential values of the objective function. Production may be constrained by the total amount of labor at hand and machine production capacity, an advertiser may be constrained by an advertising budget, and an investment portfolio may be restricted by the allowable risk.

LINEAR PROGRAMMING

Linear programming problems are a special class of mathematical programming problems for which the objective function and all constraints are linear. A classic example of the application of linear programming is the maximization of profits given various production or cost constraints.

Linear programming can be applied to a variety of business problems, such as marketing mix determination, financial decision making, production scheduling, workforce assignment, and resource blending. Such problems are generally solved using the "simplex method."

Media Selection Problem. The local Chamber of Commerce periodically sponsors public service seminars and programs. Promotional plans are under way for this year's program. Advertising alternatives include television, radio, and newspaper. Audience estimates, costs, and maximum media usage limitations are shown in Exhibit 1.

If the promotional budget is limited to $18,200, how many commercial messages should be run on each medium to maximize total audience contact? Linear programming can find the answer.

Exhibit 1			
Constraint	**Television**	**Radio**	**Newspaper**
Audience per ad	100,000	18,000	40,000
Cost per ad	2,000	300	600
Maximum usage	10	20	10

SIMPLEX METHOD

The simplex method is a specific algebraic procedure for solving linear programming problems. The simplex method begins with simultaneous linear equations and solves the equations by finding the best solution for the system of equations. This method first finds an initial basic feasible solution and then tries to find a better solution. A series of iterations results in an optimal solution.

Simplex Problem. Assume that Georgia Television buys components that are used to manufacture two television models. One model is called High Quality and the other is called Medium Quality. A weekly production schedule needs to be developed given the following production considerations.

The High Quality model produces a gross profit of $125 per unit, and the Medium Quality model has a $75 gross profit. Only 180 hours of production time are available for the next time period. High Quality models require a total production time of six hours and Medium Quality models require eight hours. In addition, there are only forty-five Medium Quality components on hand.

To complicate matters, only 250 square feet of warehouse space can be used for new production. The High Quality model requires 9 square feet of space while the Medium Quality model requires 7 square feet.

Given the above situation, the simplex method can provide a solution for the production allocation of High Quality models and Medium Quality models.

DYNAMIC PROGRAMMING

Dynamic programming is a process of segmenting a large problem into a several smaller problems. The approach is to solve all the smaller, easier problems individually in order to reach a solution to the original problem.

This technique is useful for making decisions that consist of several steps, each of which also requires a decision. In addition, it is assumed that the smaller problems are not independent of one another given they contribute to the larger question.

Dynamic programming can be utilized in the areas of capital budgeting, inventory control, resource allocation, production scheduling, and equipment replacement. These applications generally begin with a longer time horizon, such as a year, and then break down the problem into smaller time units such as months or weeks. For example, it may be necessary to determine an optimal production schedule for a twelve-month period.

Dynamic programming would first find a solution for smaller time periods, for example, monthly production schedules. By answering such questions, dynamic programming can identify solutions to a problem that are most efficient or that best serve other business needs given various constraints.

GOAL PROGRAMMING

Goal programming is a technique for solving multi-criteria rather than single-criteria decision problems, usually within the framework of linear programming. For example, in a location decision a bank would use not just one criterion, but several. The bank would consider cost of construction, land cost, and customer attractiveness, among other factors.

Goal programming establishes primary and secondary goals. The primary goal is generally referred to as a priority level 1 goal. Secondary goals are often labeled priority level 2, level 3, and so on. It should be noted that trade-offs are not allowed between higher and lower level goals.

Assume a bank is searching for a site to locate a new branch. The primary goal is to be located in a five-mile proximity to a population of 40,000 consumers. A secondary goal might be to be located at least two miles from a competitor. Given the no trade-off rule, the bank would first search for a target solution of locating close to 40,000 consumers.

Blending Problem. The XYZ Company mixes three raw materials to produce two products: a fuel additive and a solvent. Each ton of fuel additive is a mixture of 2/5 ton of material A and 3/5 ton of material C. A ton of solvent base is a mixture of 1/2 ton of material A, 1/5 ton of material B, and 3/10 ton of material C. Production is constrained by a limited availability of the three raw materials. For the current production period XYZ has the following quantities of each raw material: 20 tons of material A, 5 tons of material B, and 21 tons of material C. Management would like to achieve the following priority level goals:

Goal 1. Produce at least 30 tons of fuel additive.

Goal 2. Produce at least 15 tons of solvent.

Goal programming would provide directions for production.

INTEGER PROGRAMMING

Integer programming is useful when values of one or more decision variables are limited to integer values. This

Table 1

Integer Programming Example

Project	Estimated Net Return	Year 1	Year 2	Year 3
New office	25,000	10,000	10,000	10,000
New warehouse	85,000	35,000	25,000	25,000
New branch	40,000	15,000	15,000	15,000
Available funds		50,000	45,000	45,000

is particularly useful when modeling production processes for which fractional amounts of products cannot be produced. Integer variables are often limited to two values—zero or one. Such variables are particularly useful in modeling either/or decisions.

Areas of business that use integer linear programming include capital budgeting and physical distribution. For example, faced with limited capital, a firm needs to select capital projects in which to invest. This type of problem is represented in Table 1.

As can be seen in the table, capital requirements exceed the available funds for each year. Consequently, decisions to accept or reject regarding each of the projects must be made and integer programming would require the following integer definitions for each of the projects.

$x1 = 1$ if the new office project is accepted; 0 if rejected

$x2 = 1$ if the new warehouse project is accepted; 0 if rejected

$x3 = 1$ if the new branch project is accepted; 0 if rejected

A set of equations is developed from the definitions to provide an optimal solution.

NONLINEAR PROGRAMMING

Nonlinear programming is useful when the objective function or at least one of the constraints is not linear with respect to values of at least one decision variable. For example, the per-unit cost of a product may increase at a decreasing rate as the number of units produced increases because of economies of scale.

STOCHASTIC PROGRAMMING

Stochastic programming is useful when the value of a coefficient in the objective function or one of the constraints is not known with certainty but has a known probability distribution. For instance, the exact demand for a product may not be known, but its probability distribution may be understood. For such a problem, random values from this distribution can be substituted into the problem formula-

tion. The optimal objective function values associated with these formulations provide the basis of the probability distribution of the objective function.

MARKOV PROCESS MODELS

Markov process models are used to predict the future of systems given repeated use. For example, Markov models are used to predict the probability that production machinery will function properly given its past performance in any one period. Markov process models are also used to predict future market share given any specific period's market share.

Computer Facility Problem. The computing center at a state university has been experiencing computer downtime. Assume that the trials of an associated Markov process are defined as one-hour periods and that the probability of the system being in a running state or a down state is based on the state of the system in the previous period. Historical data in Table 2 show the transition probabilities.

The Markov process would then solve for the following: if the system is running, what is the probability of the system being down in the next hour of operation?

QUEUING THEORY/WAITING-LINE THEORY

Queuing theory is often referred to as waiting-line theory. Both terms refer to decision making regarding the management of waiting lines (or queues). This area of management science deals with operating characteristics of waiting lines, such as:

- The probability that there are no units in the system
- The mean number of units in the queue
- The mean number of units in the system (the number of units in the waiting line plus the number of units being served)
- The mean time a unit spends in the waiting line
- The mean time a unit spends in the system (the waiting time plus the service time)
- The probability that an arriving unit has to wait for service
- The probability of n units in the system

Table 2

		To	
		Running	Down
From	**Running**	.9	.1
	Down	.3	.7

Table 3

Origin	Warehouse Location	3 month capacity
1	Houston	2,000
2	Dallas	2,500
3	San Antonio	2,800
	Total	**7,300**

Given the above information, programs are developed that balance costs and service delivery levels. Typical applications involve supermarket checkout lines and waiting times in banks, hospitals, and restaurants.

Bank Line Problem. XYZ State Bank operates a drive-in-teller window, which allows customers to complete bank transactions without getting out of their cars. On weekday mornings arrivals to the drive-in-teller window occur at random, with a mean arrival rate of twenty-four customers per hour or 0.4 customers per minute.

Delay problems are expected if more than three customers arrive during any five-minute period. Waiting line models can determine the probability that delay problems will occur.

TRANSPORTATION METHOD

The transportation method is a specific application of the simplex method that finds an initial solution and then uses iteration to develop an optimal solution. As the name implies, this method is utilized in transportation problems.

Transportation Problem. A company must plan its distribution of goods to several destinations from several warehouses. The quantity available at each warehouse is limited. The goal is to minimize the cost of shipping the goods. An example of production capacity can be found in Table 3. The forecast for demand is shown in Table 4.

Table 4

Destination	Location	3 month forecast
1	New Orleans	1,800
2	Little Rock	3,200
3	Las Vegas	2,300
	Total	**7,300**

The transportation method will determine the optimal amount to be shipped from each warehouse and determine the optimal destination.

SIMULATION

Simulation is used to analyze complex systems by modeling complex relationships between variables with known probability distributions. Random values from these probability distributions are substituted into the model and the behavior of the system is observed. Repeated executions of the simulation model provide insight into the behavior of the system that is being modeled.

The different arithmetic models of management science can be incorporated into the strategic operational functions of organizations—such as integrated product management—to achieve greater efficiency in resource allocation and utilization. Integrated product management defines the end-to-end production activities such as operational costs, ethical issues, social factors, and environmental constraints. The incorporation of the tools, models, techniques, and concepts of management science into the overall product life-cycle processes optimizes the utility functions of all the elements in the chain of production to the advantage of the firm.

Management science keeps evolving because of the continued inventions of automated technologies and information management systems. In the book titled *Programming Languages for Business Problem Solving*, Wang and Wang reckon that computer literacy has become a prerequisite requirement for managers wishing to adopt the use of information technology in advancing business strategies in their organizations. The complex concepts and logical processes of management science can easily be conquered by the use of automated information technology systems tailored to suit organization-specific needs.

SEE ALSO *Operations Management; Operations Scheduling; Operations Strategy; Production Planning and Scheduling*

BIBLIOGRAPHY

Anderson, David R., Dennis J. Sweeney, Thomas A. Williams, and R. Kipp Martin. *An Introduction to Management Science: A Qualitative Approach to Decision Making.* Cincinatti, OH: South-Western College Pub, 2007.

Anderson, David R., Dennis J. Sweeney, and Thomas A. Williams. *Quantitative Methods for Business.* Cincinnati, OH: South-Western Publishing, 2004.

Blumenfrucht, Israel, and Joel G. Segal. "Updating the Accountant on Financial Advisory Services: Financial Models, Latest Quantitative Techniques, and Other Recent Developments." *National Public Accountant,* September 1998, 20–23.

Camm, D. Jeffrey, and James R. Evans. *Management Science & Decision Technology.* Cincinnati, OH: South-Western Publishing, 2000.

Celik, Sabri, and Costas Maglaras. "Dynamic Pricing and Lead-Time Quotation for a Multiclass Make-to-Order Queue." *Management Science.* Vol. 54, No. 6, June 2008. Available from: http://mansci.journal.informs.org/cgi/reprint/54/6/iv.

The Institute For Operations Research and the Management Sciences. *INFORMS Online.* Available from: http://www.informs.org/.

McCulloch, C.E., B. Paal, and S.P. Ashdown. "An Optimisation Approach to Apparel Sizing." *Journal of the Operational Research Society,* May 1998, 492—499.

Wang, S., and Wang, H. *Programming Languages for Business Problem Solving.* Auerbach Publications, 2007.

MANAGEMENT SOCIETIES AND ASSOCIATIONS: DOMESTIC

SEE *Domestic Management Societies and Associations*

MANAGEMENT SOCIETIES AND ASSOCIATIONS: INTERNATIONAL

SEE *International Management Societies and Associations*

MANAGEMENT STYLES

A manager's style is determined by the situation, the needs and personalities of his or her employees, and by the culture of the organization. Organizational restructuring and the accompanying cultural change has caused management styles to come in and go out of fashion. There has been a move away from an authoritarian style of management (in which control is a key concept) to one that favors teamwork and empowerment. Managerial styles that focus on managers as technical experts who direct, coordinate, and control the work of others have been replaced by those that focus on managers as coaches, counselors, facilitators, and team leaders.

Successful management styles involve building teams, networks of relationships, and developing and motivating others. There is a greater emphasis on participative management styles and people management skills. In an article titled "Types of Managers and Management Styles" published in the *Fascicle of Management and Technological Engineering,* Mircea and Delia point out that accommodative management styles that encourage teamwork and employee participation in decision-making processes motivate employees and promote long-term growth prospects of organizations

compared to authoritative management styles. Management theorists have repeatedly found evidence to support the advantages of management styles such as participative management; Theory Y versus Theory X; Theory Z; Total Quality Management (TQM); Management by Walking Around; Management by Objectives; and employee empowerment.

PARTICIPATIVE MANAGEMENT

Participative management involves sharing information with employees and involving them in decision-making. Employees are encouraged to run their own departments and make decisions regarding policies and processes. Participative management has often been promoted as the quick cure for poor morale and low productivity. It is not, however, appropriate in every organization and at every level. This is because employees must have the skills and abilities to participate, and they must have the technical background, communication skills, and intelligence to make decisions and communicate those decisions effectively. The organization's culture must support employee involvement and the issues in which employees get involved must be relevant to them.

Representative participation allows workers to be represented by a small group who actually participate. The goal of representative participation is to redistribute power within the organization. Employees' interests become as important as those interests of management and stockholders.

According to Stephen P. Robbins, author of *Essentials of Organizational Behavior,* the two most popular forms of representative participation are works councils and board representatives. Works councils are groups of employees who have been elected by their peers and who must be consulted by management when making personnel decisions. Board representatives are employees that sit on the board of directors and represent labor interests.

As with participative management, representative participation is a poor choice for improving performance or morale. Evidence suggests that the overall influence of representative participation is small. The employees involved in representing personnel receive more benefit than those they represent.

THEORY X AND THEORY Y

Douglas McGregor's Theory X assumes that people are lazy and do not want to work; it is the job of the manager to force or coerce them to work. McGregor's Theory X makes three basic assumptions: (1) The average human being dislikes work and will do anything to get out of it; (2) most people must be coerced, controlled, directed, and threatened or punished to get them to work toward organizational objectives; and (3) the average human being

prefers to be directed, wishes to avoid responsibility, has relatively little ambition, and places job security above ambition. According to this theory, responsibility for demonstrating initiative and motivation lies with the employee, and failure to perform is his or her fault. Employees are motivated by extrinsic rewards such as money, promotions, and tenure.

Theory Y suggests employees would behave differently if treated differently by managers. Theory Y assumes that higher-order needs dominate individuals. The set of assumptions for Theory Y is: (1) the average human does not dislike work, and it is as natural as play; (2) people will exercise self-direction and self-control in order to achieve objectives; (3) rewards of satisfaction and self-actualization are obtained from effort put forth to achieve organizational objectives; (4) the average human being not only accepts but also seeks responsibility; (5) human beings are creative and imaginative in solving organizational problems; and (6) the intellectual potential of the average human is only partially realized. If productivity is low and employees are not motivated, then it is considered failure on the manager's part.

THEORY Z

William Ouchi studied management practices in the United States and Japan and developed Theory Z. Theory Z combines elements of both U.S. and Japanese management styles and is sometimes called Japanese Management. It assumes that the best management style involves employees at all levels of the organization. Specific characteristics included in Theory Z are long-term employment, less specialized career paths, informal control, group decision making, and concern for the individual (beyond work-related issues). This theory satisfies both lower order and higher order needs. Looking out for employees' well-being satisfies the lower-level needs. Incorporating group processes in decision making satisfies middle-level needs and encouraging employees to take responsibility for their work and decisions satisfies higher-level needs.

TOTAL QUALITY MANAGEMENT

Total Quality Management (TQM) is a management style that integrates all functions of a business to achieve a high quality of product. The major hallmarks are customer satisfaction, quality as the responsibility of all employees, and teamwork. As an integrated method, it involves every aspect of the company. The entire workforce, from the CEO to the line worker, must be involved in a shared commitment to improving quality.

TQM encourages employees to grow and learn and to participate in improvements, so it exemplifies a participative management style. TQM also encourages an ever-changing or continuous process, and emphasizes the ideas of working constantly toward improved quality.

Americans W. Edward Deming and Joseph M. Juran were the pioneers of the quality movement. Both did their major work in post-World War II Japan, and are credited with the major turnaround in the quality of Japanese products by the 1970s. In the 1980s both men were highly influential in the quality management movement in the United States.

MANAGEMENT BY WALKING AROUND

Management by Walking Around (MBWA) is a classic technique used by good managers who are proactive listeners. Managers using this style gather as much information as possible so that a challenging situation does not turn into a bigger problem. Listening carefully to employees' suggestions and concerns will help evade potential crises. MBWA benefits managers by providing unfiltered, real-time information about processes and policies that is often left out of formal communication channels. By walking around, management gets an idea of the level of morale in the organization and can offer help if there is trouble.

A potential concern of MBWA is that the manager will second-guess employees' decisions. The manager must maintain his or her role as coach and counselor, not director. By leaving decision-making responsibilities with the employees, managers can be assured of the fastest possible response time.

According to Max Messmer, another mistake managers make is to inadvertently create more work for employees. By offering suggestions that may be interpreted as assignments, managers can increase the workload and slow down progress.

Messmer illustrates an example of a team working on a project that needs a supplier of plastic molding. When the manager shows up, the team has reviewed three companies and selected the best one. The manager also knows of a good company, and suggests that team members give this company a call. They may not feel comfortable in saying that the decision has already been made, and will take the extra time to call the company in order to please the manager.

MANAGEMENT BY OBJECTIVES

Management by Objectives (MBO) is a company-wide process in which employees actively participate in setting goals that are tangible, verifiable, and measurable. Management theorist Peter Drucker pioneered this style in his 1954 book titled *The Practice of Management.*

MBO provides a systematic method of assuring that all employees and work groups set goals that are in alignment with achieving the organization's goals. Xerox, Intel,

and Du Pont are just a few examples of companies that use MBO at all levels of the organization. Overall organizational objectives are converted into specific objectives for employees. Objectives at each level of the organization are linked together through a "bottom up" approach as well as a "top down" approach. In this manner, if each individual achieves his or her goals, then the department will achieve its goals and the organization objectives will in turn be met.

There are four steps involved in the MBO process: setting goals, participative decision-making, implementing plans, and performance feedback. Top managers work with middle managers and middle managers work with lower level managers to set goals for their departments. Each manager then works with employees in the department to set individual performance goals. The participative decision-making step allows managers and employees to jointly set goals, define responsibility for achieving those goals, and set the evaluation process.

Managers are allowed to implement their plans and control their own performance. This step of MBO utilizes every manager's expertise to benefit the organization and permits managers to continuously improve their skills.

The final step is to continuously provide feedback on performance and achievement of objectives. By periodically reviewing employees' performance, goals can be modified or new goals can be set. This step complements the formal appraisal system because the continuous feedback throughout the year keeps individuals informed of their progress.

As with any other management style, the organization's culture must be conducive for MBO to work. Top management must be committed and involved in the MBO program for it to be beneficial. This management style is not without its problems. Managers often set their departmental goals and objectives too narrowly at the expense of the organization's strategic goals or objectives.

Another problem arises when managers are not flexible in setting up the goal-setting and evaluation processes, and employees lose the ability to respond to issues quickly. Unrealistic expectations about results are often a problem with MBO programs as is the unwillingness of management to allocate rewards based on the accomplishment of individual goals.

EMPLOYEE EMPOWERMENT

Employee empowerment is a style of management that puts managers in the role of coach, adviser, sponsor, or facilitator. Empowerment involves delegating the decision-making authority regarding the action to be taken on a task that is considered to be important to both the manager and employee. The main reasons for implementing an empowerment program are to provide fast solutions to business problems, to provide growth opportunities for employees, and to lower organizational costs while allowing the manager to work on multiple projects.

Employee empowerment is the most effective when management has set clear obtainable goals and defined specific accountability standards. The success of employee empowerment relies on the ability of management to provide resources such as time and money, support by way of legitimacy, and relevant and factual information so employees can make educated decisions. Training employees to take responsibility and make sound decisions that are supported by upper management as well as lower level managers are other areas that are important to the success of empowerment programs.

Employees benefit from empowerment because they have more responsibility in their jobs. Employee empowerment increases the level of employee involvement and therefore creates a deeper sense of satisfaction and higher levels of motivation.

However, there are potential problems with empowerment programs that often result in unfavorable outcomes. Many times managers delegate trivial, unimportant and boring tasks to employees and they retain the complicated and important tasks for themselves. Empowerment will not work unless the authority and decision-making tasks are perceived as meaningful by the employee.

Another problem arises when managers not only assign meaningless tasks to their employees but also then expect the employee to continuously consult them for approval. Managers must evaluate their employees' skills and abilities and determine if the organization's culture can support an empowerment program before beginning.

SELF-MANAGED WORK TEAMS

Employee empowerment led to the development of self-managed work teams. This management style delegates the authority to make decisions such as how to spend money, whom to hire, and what projects to undertake. Self-managed work teams are generally composed of ten to fifteen people and require minimal supervision. Xerox, General Motors, PepsiCo, Hewlett-Packard, and M&M/Mars are just a few organizations that have implemented self-managed work teams. According to Stephen P. Robbins, one in every five companies uses self-managed work teams.

Managers must select a management style that is best suited for them, their department, their subordinates, and finally the organization they work for. The situations managers encounter may require varying management styles depending on a specific assignment, the employees being managed, or the manager's personality. Management style can ultimately determine the performance outcome of employees and a company's growth depends on the

management styles of its executives. Therefore, in order to determine the most appropriate management style, it is necessary to first review previous results produced as a result of a particular management approach.

For example, Toyota has registered unprecedented growth and success as a result of a radical shift in management policy from an authoritative management style to a uniquely tailored management style called Toyota Production System. This particular system allows employees to exercise their skills independently and utilize tools within their reach to perform their duties and solve problems as they arise. Toyota production system management style has enabled the company to benefit from continued innovation from all categories of its employees from managers to junior staff.

Management positions require a certain degree of authority and therefore managers may often find themselves in leadership positions. However, not all leaders are managers and not all managers are leaders. Managers who possess good leadership skills influence and motivate employees to achieve organizational goals. It is therefore noteworthy to mention that certain leadership styles lend themselves to effective management styles as well.

SEE ALSO *Leadership Styles and Bases of Power; Leadership Theories and Studies; Quality and Total Quality Management; Theory X and Theory Y; Theory Z*

BIBLIOGRAPHY

Cherrington, D.J. *Organizational Behavior: The Management of Individual and Organizational Performance.* 2nd ed. Needham Heights, MA: Allyn and Bacon, 1994.

Deming, W.E. *Out of the Crisis.* Cambridge, MA: MIT Press, 1986.

Juran, Joseph M. *Juran on Leadership for Quality.* New York: Free Press, 1989.

———. *Juran on Planning for Quality.* New York: Free Press, 1988.

Loney, N. "Toyota: Leading from the Front." *World Business Web Exclusive.* April 26 2007. Available from: http://www.worldbusinesslive.com/Career/Article/653253/toyota-leading-front/.

Matejka, Joseph K., Richard J. Dunsing, and Christy McCabe. "The Empowerment Matrix." *Manage* 50, no. 2 (1999): 14–16.

Mathieu, John E., Lucy L. Gilson, and Thomas M. Ruddy. "Empowerment and Team Effectiveness: An Empirical Test of an Integrated Model." *Journal of Applied Psychology.* 9, no. 1 (2006): 97–108.

McGregor, Douglas. *The Human Side of Enterprise.* New York: McGraw-Hill Book Co., 1960.

Mescon, Michael H., Courtland L. Bovee, and John V. Thill. *Business Today.* 10th ed. Upper Saddle River, NJ: Prentice Hall, 2002.

Miller, Danny, Jon Hartwick, and Isabelle Le Breton-Miller. "How to Detect a Management Fad–And Distinguish It from a Classic." *Business Horizons* 47 no. 4 (2004): 7–16.

Ouchi, William G. *Theory Z: How American Business Can Meet the Japanese Challenge.* Reading, MA: Addison-Wesley, 1981.

Pop, Mircea and Delia. "Types of Managers and Management Styles." *Fascicle of Management and Technological Engineering* Vol. 7, 2008. Available from: http://imtuoradea.ro/auo.fmte/MIE_files/POP%20MIRCEA%201.pdf.

Robbins, Stephen P. *Essentials of Organizational Behavior.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2002.

Waddock, Sandra and Charles Bodwell. *Total Responsibility Management: The Manual.* London: Greenleaf Publications, 2007.

MANAGEMENT THOUGHT

The schools of management thought are theoretical frameworks for the study of management. Each of the schools of management thought are based on somewhat different assumptions about human beings and the organizations for which they work. Since the formal study of management began in the late nineteenth century, the study of management has progressed through several stages as scholars and practitioners working in different eras focused on what they believed to be important aspects of good management practice. Over time, management thinkers have sought ways to organize and classify the voluminous information about management that has been collected and disseminated. These attempts at classification have resulted in the identification of management schools.

Disagreement exists as to the exact number of management schools. Different writers have identified as few as three and as many as twelve. Those discussed below include (1) the classical school, (2) the behavioral school, (3) the quantitative or management science school, (4) the systems school, (5) and the contingency school. The formal study of management is largely a phenomenon that began in the twentieth-century, and to some degree the relatively large number of management schools of thought reflect a lack of consensus among management scholars about basic questions of theory and practice.

Table 1 provides a brief summary of five major schools of management thought, their approximate dates of origin, and their relative areas of emphasis. The following sections discuss each of the management schools in more detail. In addition, three contemporary management perspectives are discussed.

THE CLASSICAL SCHOOL

The classical school is the oldest formal school of management thought. Its roots pre-date the twentieth century. The classical school of thought generally concerns ways to manage work and organizations more efficiently. Three

Table 1

Five Major Schools of Management Thought

MANAGEMENT SCHOOLS	Beginning Dates	Emphasis
CLASSICAL SCHOOL		Managing workers and organizations more efficiently.
Scientific Management	1880s	
Administrative Management	1940s	
Bureaucratic Management	1920s	
BEHAVIORAL SCHOOL		Understanding human behavior in the organization.
Human Relations	1930s	
Behavioral Science	1950s	
QUANTITATIVE SCHOOL		Increasing quality of managerial decision-making through the application of mathematical and statistical methods.
Management Science	1940s	
Operations Management	1940s	
Management Information Systems	1950s—1970s	
SYSTEMS SCHOOL	1950s	Understanding the organization as a system that transforms inputs into outputs while in constant interaction with its environment.
CONTINGENCY SCHOOL	1960s	Applying management principles and processes as dictated by the unique characteristics of each situation.

areas of study that can be grouped under the classical school are scientific management, administrative management, and bureaucratic management.

Scientific Management. In the late nineteenth century, management decisions were often arbitrary, and workers often worked at an intentionally slow pace. There was little in the way of systematic management; workers and management were often in conflict. Scientific management was introduced in an attempt to create a mental revolution in the workplace. It can be defined as the systematic study of work methods to improve efficiency. Frederick W. Taylor was its main proponent; other major contributors were Frank Gilbreth, Lillian Gilbreth, and Henry Gantt.

Scientific management has several major principles. First, it calls for the application of the scientific method to work in order to determine the best method for accomplishing each task. Second, scientific management suggests that workers should be scientifically selected based on their qualifications and trained to perform their jobs in the optimal manner. Third, scientific management advocates genuine cooperation between workers and management based on mutual self-interest. Finally, scientific management suggests that management should take complete responsibility for planning the work and that workers' primary responsibility should be implementing management's plans. Other important characteristics of scientific management include the scientific development of difficult but fair performance standards and the implementation of a pay-for-performance incentive plan based on work standards.

Scientific management had a tremendous influence on management practice in the early twentieth century. Although it does not represent a complete theory of management, it has contributed to the study of management and organizations in many areas, including human resource management and industrial engineering. Many of the tenets of scientific management are still valid today.

Administrative Management. Administrative management focuses on the management process and principles of management. In contrast to scientific management, which deals largely with jobs and work at the individual level of analysis, administrative management provides a more general theory of management. Henri Fayol is the major contributor to this school of management thought.

Fayol was a management practitioner who brought his experience to bear on the subject of management functions and principles. He argued that management was a universal process consisting of functions, which he termed planning, organizing, commanding, coordinating, and controlling. Fayol believed that all managers performed these functions and that the functions distinguished management as a separate discipline of study apart from accounting, finance, and production. Fayol also presented fourteen principles of management, which included maxims related to the division of work, authority

and responsibility, unity of command and direction, centralization, subordinate initiative, and team spirit.

Although administrative management has been criticized as being rigid and inflexible and the validity of the functional approach to management has been questioned, this school of thought still influences management theory and practice. The functional approach to management is still the dominant way of organizing management knowledge, and many of Fayol's principles of management, when applied with the flexibility that he advocated, are still considered relevant.

Bureaucratic Management. Bureaucratic management focuses on the ideal form of organization. Max Weber was the major contributor to bureaucratic management. Based on observation, Weber concluded that many early organizations were inefficiently managed, with decisions based on personal relationships and loyalty. He proposed that a form of organization, called a bureaucracy—characterized by division of labor, hierarchy, formalized rules, impersonality, and the selection and promotion of employees based on ability—would lead to more efficient management. Weber also contended that managers' authority in an organization should be based not on tradition or charisma but on the position held by managers in the organizational hierarchy.

Bureaucracy has come to stand for inflexibility and waste, but Weber did not advocate or favor the excesses found in many bureaucratic organizations today. Weber's ideas formed the basis for modern organization theory and are still descriptive of some organizations.

THE BEHAVIORAL SCHOOL

The behavioral school of management thought developed, in part, because of perceived weaknesses in the assumptions of the classical school. The classical school emphasized efficiency, process, and principles. Some felt that this emphasis disregarded important aspects of organizational life, particularly as it related to human behavior. Thus, the behavioral school focused on trying to understand the factors that affect human behavior at work.

Human Relations. The Hawthorne Experiments began in the 1920s and continued through the early 1930s. A variety of researchers participated in the studies, including Clair Turner, Fritz J. Roethlisberger, and Elton Mayo, whose respective books on the studies are perhaps the best known. One of the major conclusions of the Hawthorne studies was that workers' attitudes are associated with productivity. Another was that the workplace is a social system and informal group influence could exert a powerful effect on individual behavior. A third was that the style of supervision is an important factor in increasing workers' job satisfaction. The studies also found that organizations should take steps to assist employees in adjusting to organizational life by fostering collaborative systems between labor and management. Such conclusions sparked increasing interest in the human element at work; today, the Hawthorne studies are generally credited as the impetus for the human relations school.

According to the human relations school, the manager should possess skills for diagnosing the causes of human behavior at work, interpersonal communication, and motivating and leading workers. The focus became satisfying worker needs. If worker needs were satisfied, wisdom held, the workers would in turn be more productive. Thus, the human relations school focuses on issues of communication, leadership, motivation, and group behavior. The individuals who contributed to the school are too numerous to mention, but some of the best-known contributors include Mary Parker Follett, Chester Barnard, Abraham Maslow, Kurt Lewin, Renais Likert, and Keith Davis. The human relations school of thought still influences management theory and practice, as contemporary management focuses much attention on human resource management, organizational behavior, and applied psychology in the workplace.

Behavioral Science. Behavioral science and the study of organizational behavior emerged in the 1950s and 1960s. The behavioral science school was a natural progression of the human relations movement. It focused on applying conceptual and analytical tools to the problem of understanding and predicting behavior in the workplace. However, the study of behavioral science and organizational behavior was also a result of criticism of the human relations approach as simplistic and manipulative in its assumptions about the relationship between worker attitudes and productivity. The study of behavioral science in business schools was given increased credence by the 1959 Gordon and Howell report on higher education, which emphasized the importance of management practitioners to understanding human behavior.

The behavioral science school has contributed to the study of management through its focus on personality, attitudes, values, motivation, group behavior, leadership, communication, and conflict, among other issues. Some of the major contributors to this school include Douglas McGregor, Chris Argyris, Frederick Herzberg, Renais Likert, and Ralph Stogdill, although there are many others.

THE QUANTITATIVE SCHOOL

The quantitative school focuses on improving decision making via the application of quantitative techniques. Its roots can be traced back to scientific management.

Management Science and MIS. Management science (also called operations research) uses mathematical and statistical approaches to solve management problems. It developed during World War II as strategists tried to apply scientific knowledge and methods to the complex problems of war. Industry began to apply management science after the war. George Dantzig developed linear programming, an algebraic method to determine the optimal allocation of scarce resources. Other tools used in industry include inventory control theory, goal programming, queuing models, and simulation.

The advent of the computer made many management science tools and concepts more practical for industry. Increasingly, management science and management information systems (MIS) are intertwined. MIS focuses on providing needed information to managers in a useful format and at the proper time. Decision support systems (DSS) attempt to integrate decision models, data, and the decision maker into a system that supports better management decisions.

Production and Operations Management. This school focuses on the operation and control of the production process that transforms resources into finished goods and services. It has its roots in scientific management but became an identifiable area of management study after World War II. It uses many of the tools of management science.

Operations management emphasizes productivity and quality of both manufacturing and service organizations. W. Edwards Deming exerted a tremendous influence in shaping modern ideas about improving productivity and quality. Major areas of study within operations management include capacity planning, facilities location, facilities layout, materials requirement planning, scheduling, purchasing and inventory control, quality control, computer integrated manufacturing, just-in-time inventory systems, and flexible manufacturing systems.

SYSTEMS SCHOOL

The systems school focuses on understanding the organization as an open system that transforms inputs into outputs. This school is based on the work of a biologist, Ludwig von Bertalanffy, who believed that a general systems model could be used to unite science. Early contributors to this school included Kenneth Boulding, Richard Johnson, Fremont Kast, and James Rosenzweig.

The systems school began to have a strong impact on management thought in the 1960s as a way of thinking about managing techniques that would allow managers to relate different specialties and parts of the company to one another, as well as to external environmental factors. The systems school focuses on the organization as a whole, its interaction with the environment, and its need to achieve equilibrium. General systems theory received a great deal of attention in the 1960s, but its influence on management thought has diminished somewhat. It has been criticized as too abstract and too complex. However, many of the ideas inherent in the systems school formed the basis for the contingency school of management.

CONTINGENCY SCHOOL

The contingency school focuses on applying management principles and processes as dictated by the unique characteristics of each situation. It emphasizes that there is no one best way to manage and that it depends on various situational factors, such as the external environment, technology, organizational characteristics, characteristics of the manager, and characteristics of the subordinates. Contingency theorists often implicitly or explicitly criticize the classical school for its emphasis on the universality of management principles; however, most classical writers recognized the need to consider aspects of the situation when applying management principles.

The contingency school originated in the 1960s. It has been applied primarily to management issues such as organizational design, job design, motivation, and leadership style. For example, optimal organizational structure has been theorized to depend upon organizational size, technology, and environmental uncertainty; optimal leadership style, meanwhile, has been theorized to depend upon a variety of factors, including task structure, position power, characteristics of the work group, characteristics of individual subordinates, quality requirements, and problem structure, to name a few. A few of the major contributors to this school of management thought include Joan Woodward, Paul Lawrence, Jay Lorsch, and Fred Fiedler, among many others.

CONTEMPORARY "SCHOOLS" OF MANAGEMENT THOUGHT

Management research and practice continues to evolve and new approaches to the study of management continue to be advanced. This section briefly reviews four contemporary approaches: total quality management (TQM), the learning organization, benchmarking, and core competencies. While none of these management approaches offer a complete theory of management, they do offer additional insights into the management field.

Total Quality Management. Total quality management (TQM) is a philosophy or approach to management that focuses on managing the entire organization to deliver quality goods and services to customers. This approach to management was implemented in Japan after World War II and was a major factor in Japan's economic renaissance. TQM has at least three major elements that

include employee involvement, customer focus, and a philosophy of continuous improvement. Employee involvement is essential in preventing quality problems before they occur. Customer focus means that the organization must attempt to determine customer needs and wants and deliver products and services that address them. Finally, a philosophy of continuous improvement means that the organization is committed to incremental changes and improvements over time in all areas of the organization. TQM has been implemented by many companies worldwide and appears to have fostered performance improvements in many organizations. Perhaps the best-known proponent of this school of management was W. Edwards Deming.

Benchmarking. Benchmarking means that the organization is always seeking out other organizations that perform a function or process more effectively and using them as a standard, or benchmark, to judge their own performance. The organization will also attempt to adapt or improve the processes used by other companies relative to the availability of technological resources and production skills.

Learning Organization. The contemporary organization faces unprecedented environmental and technological change. Thus, one of the biggest challenges for organizations is to continuously change in a way that meets the demands of this turbulent competitive environment. The learning organization can be defined as one in which all employees are involved in identifying and solving problems, which allows the organization to continually increase its ability to grow, learn, and achieve its purpose. The organizing principle of the learning organization is not efficiency, but problem solving. Three key aspects of the learning organization are a team-based structure, empowered employees, and open information. Peter Senge is one of the best-known experts on learning organizations.

Core Competencies. Core competencies is a strategy approach to management that focuses on optimizing definite organizational strengths. This approach to management allows organizations to pursue advantage by channeling technological and production resources towards enhancement of business objectives that have the potential to achieve sustained competitive advantage. The organizational culture and dedication among employees are the main components that facilitate the success of the core competencies in achieving corporate objectives. The concept of core competencies was floated by C.K Prahad and Gary Hemel in the early 1990s and it has since become a major reference point for management practices.

SEE ALSO *Knowledge Management; Management Functions; Management Information Systems;*

Management Science; Management Styles; Organizational Behavior; Organizational Development; Organizational Learning; Organizing; Quality and Total Quality Management

BIBLIOGRAPHY
Brannick, Michael T., Edward L. Levine, and Frederick P. Morgeson. *Job and Work Analysis: Methods, Research, and Applications for Human Resource Management.* 2nd ed. Thousand Oaks, CA: Sage Publications, 2007.

Daft, Richard L. *Management.* 7th ed. Australia: Thomson/South-Western, 2005.

Fayol, Henri. *General and Industrial Administration.* London: Sir Issac Pitman & Sons, Ltd., 1949.

Gomez-Mejia, Luis, R., David B. Balkin, and Robert L. Cardy. *Management: People, Performance, Change*, 3rd ed. McGraw-Hill: New York, USA, 2008.

Griffin, Ricky W. *Management.* 8th ed. Boston: Houghton Mifflin Company, 2004.

Hamel, Gary, and Bill Breen. *The Future of Management.* Boston: Harvard Business School Press, 2007.

Lewis, Pamela S., Stephen H. Goodman, and Patricia M. Fandt. *Management.* 2nd ed. Cincinnat, OH: South-Western College Publishing, 1998.

Locke, Edwin A. "The Ideas of Frederick W. Taylor: An Evaluation." *Academy of Management Review* 7, no. 1 (1982): 14–24.

O'Connor, Ellen S. "The Politics of Management Thought: A Case Study of the Harvard Business School and the Human Relations School." *Academy of Management Review* 24, no. 1 (1999): 117–131.

Robbins, Stephen P., and Mary Coulter. *Management.* 6th ed. Upper Saddle River, NJ: Prentice Hall, 1999.

Senge, Peter. *The Fifth Discipline: The Art and Practice of the Learning Organization.* Revised & updated ed. New York: Doubleday/Currency, 2006.

Strong, Bruce, Thomas H. Davenport, and Laurence Prusak. "Organizational Governance of Knowledge and Learning. " *Knowledge and Process Management.* 15, no. 2 (2008). Available from: http://www3.interscience.wiley.com/cgi-bin/fulltext/118999954/PDFSTART.

Warner, Malcolm. "Organizational Behavior Revisited." *Human Relations* 47, no. 10 (1994): 1151–1164.

Wren, Daniel. *The Evolution of Management Thought.* 3rd ed. New York: John Wiley and Sons, 1987.

MANAGING CHANGE

Recently, one of the concepts discussed, written about, and analyzed most frequently has been organizational change and the related concepts of resistance to change and management of change. Change has been variously defined as making a material difference in something compared to an earlier state, transforming or converting something, or simply becoming different. All of these definitions can be applied to change as it occurs within organizations and businesses. Organizational change may mean changing

technological infrastructures (e.g., changing network file systems), marketing strategies (targeting a new customer base), or management and decision-making practices.

Organizational change is not new to the American business landscape. Since the nineteenth century and the Industrial Revolution, corporations have had to deal with change on an increasingly rapid scale. The greater the technological developments and the greater the amount of products and information generated, the more necessary it becomes for corporations to provide effective management and develop solid organizational practices. The most revered business professionals of the United States have been those who were best able to exploit changes in business and the economy. For example, in the late nineteenth century, Andrew Carnegie greatly expanded his empire by purchasing the very businesses he depended on for his steel business, making his company one of the first successful examples of vertical integration.

The economist Joseph Schumpeter saw change and dynamism at the root of capitalism. His term "creative destruction" described the effects of capitalism's change. While newer activities were acts of creation, they simultaneously destroyed older forms, businesses, and ways of doing things by rendering them obsolete or putting them at a severe competitive disadvantage. Schumpeter noted that large, successful concerns tended to "automate" their processes. However, while many companies conducted business as usual, both in services and in operations, there were other individuals and firms who were quietly innovating; he referred to this as the "entrepreneurial response." These entrepreneurial firms and people would then, and sometimes suddenly, introduce a change that would significantly shift the balance of power in a given market. Schumpeter's ultimate lesson for managers was that change is inevitable and can be ruinous to an organization if it is ignored.

Beginning in the 1990s, change came at an exponentially faster rate due to factors such as increased competition in a global economy, expanding markets, new ways of doing business (such as e-commerce), and the omnipresent task of keeping up with the latest technology. Management guru Peter F. Drucker devoted his book, *Management Challenges of the Twenty-First Century*, to that very topic. As a result, businesses had to revise (or devise) corporate missions and goals, management practices, and day-to-day business functions. Companies routinely began redesigning business strategies, often replacing traditional hierarchical organization charts with flatter structures centered around "empowered" teams.

The late 1990s also saw the rise of the Internet, which fueled a large amount of rethinking business processes and organizational structure. Kevin Kelley, in a widely read book, *New Rules for the New Economy*, echoes

Schumpeter's mantra of creative destruction, arguing, among other things, that change needed to be at the core of business strategy. This period also saw the rise of business consultants who referred to themselves as "change agents."

In their book, *Corporate Cultures*, Terrence Deal and Allan Kennedy assert that change is inevitable for an organization. However, they also note that there are specific circumstances requiring change that an organization must recognize. These include market changes, an underperforming company, and a rapidly growing organization.

INDICATORS OF CHANGE

There are four primary indicators of major workplace change. They are a change to the organizational structure, a new product or service, new management, and new technology. Organizational structure may change through major downsizing, outsourcing, acquisitions, or mergers. These actions are often accompanied by layoffs, particularly as certain positions become redundant. A new product or service has implications for changes in production, sales, and customer service. Additionally, by changing product or service the organization may face new competitors or new markets. New management, such as a change in chief executive officer or president, often brings a period of transition during which upper-level managers are likely to alter existing business processes and personnel policies. Finally, new technology can create vast changes to the organization. Technology can change the production process or the working conditions (i.e., telecommuting), and these changes may influence the skills that employees use on the job.

During a transition period, a company may bring in management consultants to help the business as it reinvents itself or some process. It can be argued that these management consultants are more or less in the business of change. Many of the modern consulting firms emerged in the mid-twentieth century specifically offering their services as agents of organizational and structural change. These firms' success and longevity are testaments to the importance of change in the business world.

ROUTINE VERSUS NON-ROUTINE CHANGE

There are changes in organizations that are routine (e.g., they are commonplace and often expected), and there are those that are not routine (e.g., unique and unexpected). Examples of routine changes are organizational turnover and staffing replacements, small changes to products or services, or changes in human resources policies. Routine changes are the easiest to manage, and employees are somewhat accustomed to routine changes. There is typically little concern over implementing such changes. However, if not handled properly by management, even

routine change can prove to be difficult. If changes are not implemented properly or are not well communicated, problems may arise. For example, a small change to the company vacation policy may seem insignificant to management, but if employees are not properly apprised of the change it could result in considerable difficulty if employees do not follow the new policy.

Non-routine change is much more difficult than routine change; it can be unpredictable, significant, or even radical, and employees are much less likely to adapt well to non-routine change. In general, a non-routine change is seen as threatening, and employees are likely to be resistant. For instance, if a company announces a merger with a former competitor, this non-routine change is very likely to create anxiety about compensation and job security.

TYPES OF CHANGE

In addition to some of the major indicators of organizational change and the broad distinction of routine versus non-routine change, change can be categorized even more specifically into four categories: structural change, cost change, process change, and cultural change.

Structural change occurs when there is an alteration to the company's organizational structure. This reorganization may occur due to a merger or acquisition, or it may be the result of a restructuring. For instance, an organization that is intent on increasing its innovation may reorganize its traditional functional structure into a more flexible matrix structure that uses small, self-managed teams. Or, an organization that is expanding into new markets may adopt a divisional structure in which different geographic locations operate nearly independently of one another.

Cost changes are those that occur when an organization attempts to reduce costs in order to improve efficiency or performance. Major adjustments may be made to departments to cut costs: reducing budgets, laying off employees in redundant positions, and eliminating non-essential activities may all be a result of cost change.

Process changes are implemented to improve efficiency or effectiveness of organizational procedures. This may occur in production settings; there may be changes to how a product is created, assembled, packaged, or shipped. Or, in a service organization, there may be changes to the procedures used to accomplish work; new computer systems may create the need to change how paperwork is completed, or a new manager may modify the process used to handle customer complaints.

Cultural changes are the least tangible of all the types of change, but they can be the most difficult. An organization's culture is its shared set of assumptions, values, and beliefs. A prototypical culture is the very bureaucratic,

top-down style in which stability and standard processes are valued. When such an organization tries to adopt a more participative, involved style, this requires a shift in many organizational activities. Primarily, manager-employee relations are altered with a change in culture. Chris McKenna notes that consulting firms such as McKinsey and Co. regarded cultural change as so important that they began to focus on it in the 1980s.

IMPLEMENTING CHANGE

To properly implement change, management must take a number of steps: involving key people, developing a plan, supporting the plan, and communicating often.

1. The first step in implementing change is involving the key people; this typically means upper-level management and other executives whose processes and employees will be affected by the change. For instance, if a new computer system is to be installed in all areas of a company, key people would be not only top managers, but also lower-level managers who supervise the employees' use of the new technology. A different set of key people would be involved in a cost-cutting change. If the company is reducing its operating budget in a specific division, the managers of that division and also human resources personnel should be involved. In any circumstance in which there is a change to personnel policies or in which demotions, transfers, or layoffs occur, the human resources department should be involved to manage this change.

2. After key personnel have been identified and properly involved, the second step in implementing change is to develop a plan for effective transformation. The plan should help to define the responsibilities of the key people involved while also laying out short-term and long-term objectives for the changes. Because change can be unpredictable, the plan should also be flexible enough to accommodate new occurrences.

3. The third step in implementing change is to support the plan; this means that management follows through on the plan it created. Key to this step is enabling employees to adapt to the change. Employees may need training, reward systems may need to be adapted, or hiring may be required. If the organization does not provide the support necessary for the plan to take effect, it is unlikely to succeed.

4. The final step in successful change implementation should occur throughout the change process. Communicating with employees about what is occurring, why the changes are being made, and how they will develop is critical. Because change can create a lot of fear, increased communication can be used to calm

employees and encourage their continued support. In addition to downward communication, managers should pay attention to any upward communication that occurs. They should be available to take suggestions or answer questions that employees might have. Creating opportunities for employee feedback, such as holding meetings or having an open-door management policy, may facilitate change more successfully.

Heart of Change authors John Kotter and Dan Cohen also note that achieving permanent organizational change is only possible when that organization's culture also changes. Deal and Kennedy also highlight the role that internal culture plays in implementing and managing successful change. For example, they argue that the role of rituals can help members of an organization cope with change.

RESISTANCE TO CHANGE

As a general rule, it is not the proposed changes that people resist, but the impact that the changes will have on them, personally. People become comfortable in their jobs, in their areas of expertise, and in their relationships with coworkers and managers. Even when personnel are not very satisfied with the current workplace and therefore welcome change, they may find change to be stressful. Helping employees anticipate difficulties and informing employees of how these challenges will be handled can be a source of comfort to them. When an organization proposes large-scale change, those affected begin to worry about how their jobs will change, what new skills they will need, if their responsibilities will change, how established lines of communication will be altered, and how working relationships will change. The most successful members of a company may feel threatened because they were able to perform so well under the old organizational structure. Some common employee reactions to change include confusion, denial, loss of identity, and anger. And this resistance is not limited to employees—managers and executives may be just as prone as employees to experiencing problems with radical organizational change.

In their article, "Challenging 'Resistance to Change,'" Eric B. Dent and Susan Galloway Goldberg discuss their research on the origins of this concept and the prevalent idea that managers must overcome this resistance or are doomed to failure. Kurt Lewin, the mid-twentieth-century social psychologist, introduced the term "resistance to change" as a systems concept affecting managers and employees equally. The term, and not its original context, was adopted and used as a psychological concept placing employees against managers. Dent and Goldberg feel that

letting go of the term and its associations could help more useful models of change dynamics move forward.

There are theories of handling resistance to change that are related to this idea. While not explicitly questioning the use of the term, changing how organizations view resistance allows change to become an opportunity and not just a potential threat. Change is a personally challenging issue for everyone affected, but it also carries with it new possibilities. How corporate management responds to employee resistance can determine the fate of the organization. For example, a sense of confusion—usually represented by constant questioning from management and/or employees—usually means that not enough information has been provided. This can become an opportunity to convey additional information to employees, such as reiterating the big picture and why the company is working so hard to redefine its corporate culture. This is also a good time to provide assurances that management is going to take the time to address concerns.

Another common reaction is doubt or denial that actual change will occur. This reaction occurs sometimes because employees do not want change, and at other times because they do not believe management is fully committed to the idea. In any case, these reactions can also represent an opportunity for management to identify issues that may be present across the organization and address them. They can also alert management and higher-ups that actual implementation is not consistent with the plan that was put forth. A possibly related reaction is anger, sometimes accompanied by attempts to sabotage the company's efforts to change. Again, there can be benefits to this type of behavior. Employees who so visually make their feelings known let organizational leaders in on which impediments to change are likely to occur, and management can then formulate ways to address them. It also opens up areas for negotiation.

Peter Senge and his co-authors identified ten "challenges of change" (preferring the term "challenges" to "resistance") in the 1999 work *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations*. As reported in *Fast Company*, he formalized these challenges as common excuses that are offered as reasons for resistance. These excuses can then be countered by addressing the real concerns behind them. For example, "This stuff isn't relevant" indicates the need for continuous and open communication from people who can convince others of the driving need for change in an organization. "This stuff isn't working" indicates a need for management to provide measurable criteria for success and clear expectations. "They . . . never let us do this stuff" indicates that, while management may be claiming

to offer groups and teams more autonomy, they are really having trouble letting go of their control.

Another concern is the fact that people who consider themselves specialists or experts in a given area are often asked to start over (e.g., working in a different functional area or using different technology), sometimes more than once when companies make cross-training one of their goals. Again, this threatens the comfort zone for many people at all levels of an organization. Having proven themselves once, they are being asked to do so over again. In order to allay these fears, management needs to encourage people to ask questions, take initiative, and take risks. Fear of failure is possibly one of the strongest reasons for resisting change. Companies that hope change will be embraced need to view risks and failures as tools through which the organization can learn and grow.

Along these same lines, resistance need not be a dirty word. Whereas organizations once felt it was most important to put a positive spin on everything, corporate management is realizing that showing their own concerns about organizational change helps other personnel to deal with theirs. It also affords them the opportunity to teach others how to identify best practices under less than ideal circumstances, and to let employees know they empathize with their concerns.

Resistance to change, as put forth by Kurt Lewin, affects managers and employees equally when systems undergo change. As such, resistance is a naturally occurring phenomenon that can be dealt with in a constructive manner. In a sense, resistance is a sign that radical change is indeed occurring and that an organization is not just redefining the status quo. Management can help by anticipating common reactions and using them to their best advantage. For instance, if an employee is able to make requested changes to his or her performance but not willing to do so, some negotiation might be all that is required to convince that person to follow along with the company's new direction. For those who buy into the need for change but lack some of the necessary skills, targeted training could be all that is needed to quell the fears of those people. Whatever the resistance an organization encounters, it is almost a guaranteed part of change, which has become a constant in the business landscape. With the globalization of markets and speeding technological innovation, an organization cannot afford to rest on its laurels.

RECENT EXAMPLES

There are numerous recent examples of companies that have successfully managed change. In 2007, *T+D* ran a story on the Indian computer company, Satyam, offering it as one such example. Satyam was faced with the challenge of rapid growth. The company's response was to reorganize its structure; Satyam now has what it calls "full lifecycle businesses," with each unit trying to emulate a small business. The article points out that this dramatic change was successful because the company carefully managed the process.

SEE ALSO *Organizational Culture; Trends in Organizational Change*

BIBLIOGRAPHY

Champy, James, and Nitin Nohria, eds. *Fast Forward: The Best Ideas on Managing Change.* New York: McGraw-Hill, 1996.

———. "The Creative Response in Economic History." *The Journal of Economic History.* 7, no. 2 (November 1947), 149–159.

Deal, Terrence E., and Allan A. Kennedy. *Corporate Cultures: The Rites and Rituals of Corporate Life.* Reading, Massachusetts: Addison-Wesley Publications, 1982.

Dent, Eric B., and Susan Galloway Goldberg. "Challenging 'Resistance to Change.'" *Journal of Applied Behavioral Science* (March 1999): 25.

Drucker, Peter F. *Management Challenges for the 21st Century.* New York: HarperBusiness, 1999.

DuBrin, Andrew J. *Essentials of Management.* 6th ed. Thomson South-Western, 2003.

Hampton, John J., ed. *AMA Management Handbook.* 3rd ed. New York: American Management Association, 1994.

Kelley, Kevin. *New Rules for the New Economy.* New York: Penguin, 1998.

Kotter, John P., and Dan S. Cohen. *Heart of Change: Real-Life Stories of How People Change Their Organizations.* Boston: Harvard Business School Press, 2002.

———.*Managing Change and Transition.* Boston: Harvard Business School Press, 2003.

———. "Managing Massive Change: THE SATYAM WAY." *T+D* 61, no. 10, (October 2007), 30–32.

McKenna, Christopher D. *The World's Newest Profession: Management Consulting in the Twentieth Century.* New York: Cambridge University Press, 2006.

Peters, Tom. *The Circle of Innovation: You Can't Shrink Your Way to Greatness.* New York: Alfred A. Knopf, 1997.

Ristino, Robert J. *The Agile Manager's Guide to Managing Change.* Bristol, VT: Velocity Business Publishing, 2000.

Schumpeter, Joseph A. *Capitalism, Socialism, and Democracy.* New York: Harper and Brothers, 1942.

Senge, Peter M., et al. *The Dance of Change: The Challenges to Sustaining Momentum in Learning Organizations.* New York: Doubleday, 1999.

Sims, Ronald R. *Changing the Way We Manage Change.* Westport, CT: Praeger, 2002.

Stewart, Bruce A., "Know Why You Are Reorganizing." *Computerworld* 40, no. 13 (March 2006), 24–25.

Williams, Chuck. *Management.* Cincinnati: South-Western College Publishing, 2000.

MANUFACTURING CONTROL VIA THE INTERNET

Manufacturing control via the Internet (e-manufacturing) refers to the process of integrating information and communication networks as well as Internet-supported robotics into the production systems, processes, and structures of the firm. As such, the firm uses the Internet to link production equipments and control functions of its manufacturing systems through series of real-time monitoring gadgets such as computers and mobile communication devices. E-manufacturing comes with many advantages that include: ubiquitous accessibility, remote-controlled monitoring possibilities, real-time communications capabilities, and increased production efficiency as a result of information-integrated production systems.

The unlimited linkage of manufacturing operations to the global communication infrastructure is a phenomenon that relies heavily on the Internet's networking technology. The Internet consists of physically-networked servers and advanced communication linkages that relay information across Web-based servers and client computers. The advent of the Internet and the subsequent advancement of digital technologies have introduced new economic frontiers characterized by the emergence of revolutionary and information-driven economic institutions. The increased access to the global information and communication infrastructures has closed the gaps among consumers, manufacturers, and suppliers by eliminating the political, economic, and geographic barriers.

BRIEF HISTORY OF THE INTERNET

The origins of the Internet can be traced to the 1960s military research activities of the United States Army. In the book titled *Internet Literacy*, Fred Hofstetter credits the United States Department of Defense for developing the first ever viable Internet called ARPANET through the Advanced Research Projects Agency (ARPA) in 1969. The main objective of ARPANET was to provide the U.S. military with a communication network capacity that could withstand turbulence and obstructions that rose from enemy attacks. It would accomplish this by relying on sets of networked computers to transmit labeled and addressed packets of information to designated destinations, even if one or more of the computers along the way stopped functioning. Thus, in the event of enemy attacks (such as a massive bombing campaign), the packets of information would automatically be routed through alternative paths to their intended destinations.

Commercial use of the Internet has been evident ever since the early 1990s following the liberalization of the National Science Foundation Network (NSFNET) in the United States. The move opened up the routing of high-speed Internet traffic to different interconnected Internet service providers (ISPs), thereby providing easy access to pioneer online auction and commercial entities such as Amazon, eBay, and PayPal. The Internet has since become a powerful tool for trade, commerce, and manufacturing because of its formidable infrastructure that runs across the globe.

THE INTERNET AND MANUFACTURING PROCESSES

The use of computer-based networking in production activities is based on the materials and requirement planning (MRP) framework that is demand dependent and specifically geared to assembly operations in firms. MRP was developed in the 1960s and still remains an important component of industrial manufacturing processes. Computerized MRP has evolved into MRP II, which involves linking and streamlining operations in different departments such as marketing, purchasing, production planning and control, human-resource management, and financial accounting.

MRP II integrates different functions in the firm into a central monitoring and decision system by collecting and relaying data and additional production inputs. The advancements in MRP II have given rise to enterprise resource planning (ERP), which integrates different types of industrial data, processes, and functions into a unified database through comprehensive linkages of software and hardware systems. Unlike MRP and MRP II, ERP has the capacity to link organizational functionalities through multiple systems. Instead of functions such as human resource management, production control, customer relations, financial accounting, and supply chain management existing in independent software applications and individual databases, ERP brings all these functions under one roof to share a single database and software applications.

The ability for ERP to streamline workflows, track processes, and improve productivity makes it easy for manufacturing companies to integrate e-manufacturing in controlling and managing industrial production processes. The implementation of e-manufacturing strategies through the existing ERP systems definitely revolutionizes the monitoring and functioning of the engineering capacity of machines, quality control, material control, and workflow processes.

Firms can use either in-house teams and software applications or software vendors and consultants to implement customized e-manufacturing systems. For example, Jain has contracted Rockwell Automation, a leading industrial automation software and service provider in the United States, to manage its entire processes of real-time automation and track the company's manufacturing data.

Companies can also outsource the management of e-manufacturing to industrial automation and software companies that have global presence such as Oracle and IBM.

The twenty-first century has experienced unprecedented increase in the use of telephone modems, Ethernet wireless connections, cable modems, digital subscriber lines (DSL), and satellite communications to access Web-based services such as e-mails, newsgroups, chat rooms, real-time messaging, and list servers through either computers or mobile devices. Manufacturing companies are embedding digital devices and sensors that range from micro-scale to macro-scale sizes in all aspects of production. For example, as Kwon Yongjin and Rauniar Shreepud point out in their 2007 journal article titled "E-Quality Manufacturing (EQM) Within the Framework of Internet-Based System" and contained in the *IEEE Transactions on Systems, Man and Cybernetics, Part C: Application and Reviews,* manufacturers use advanced tools such as the Ethernet SmartImage sensor and the Internet Controllable Yamaha Scara robot to initiate continuous correspondence in production processes with the objective of monitoring and achieving sustained quality control.

Manufacturing companies are continuously taking advantage of the advancements in Internet tracking and communications technologies to entrench quality control and monitor daily production activities in firms. In addition to using the Internet to remotely monitor and track production processes, companies also use the Internet to diagnose faulty functionalities of equipment and processes in the entire production system. Remote and automated access to manufacturing systems enables operations managers and production line experts to sustain quality control and initiate instant responses to sudden changes in a firm's manufacturing environment.

The most common real-time solutions that companies employ in production control include chat rooms and instant messaging (IM), which allows the use of voice calls, file sharing, webcams, information-on-demand (such as news, weather, auctions, and stock trading), and online status reporting. Leading IM providers include AOL Instant Messaging (AIM), Microsoft's MSN Messenger, Yahoo Messenger, and Skype.

The twenty-first century has also experienced the increased use of Ethernet video on the floor of the manufacturing plants to monitor operations, streamline coordination, train workers, and control repairs and maintenance. In an Internet article titled *Video via Ethernet Now,* Martin T. Hoske acknowledges that in addition to enhancing security applications during production processes, Ethernet video applications have also proved to be effective time-saving tools.

SECURITY AND THREATS TO E-MANUFACTURING

Real-time manufacturing control via the Internet is prone to enforceable inconveniences that are beyond the control of the organizations. Such inconveniences include network failure of ISPs or time lag as a result of network congestions. Moreover, the unauthorized access to network systems by hackers, crackers, state intelligence agencies, and other types of intruders remains the biggest threat to Internet security. Internet security threats come in the form of Internet break-ins, Internet fraud, and message sniffing.

Internet break-ins. Internet break-ins are particularly committed by crackers who gain unauthorized access into Web sites to collect private information about individuals, companies, and organizations. Crackers can disastrously land on a firm's private information such as credit card numbers, bank account details of individuals, or classified company information such as production formulas, secret codes, and classified data. In the United States, Internet break-in is treated both as theft and trespassing by the federal laws; offenders can be handed up to a five-year prison sentence for stealing money and ten years for fraudulent acquisition of a company's classified information.

Internet fraud. Internet fraud involves the use of Web site tools such as chat rooms, e-mails, or newsgroups by fraudsters to offer services and products that do not exist with the aim of convincing unsuspecting Internet users to transfer money or goods to the fraudsters. The increased prevalence of Internet fraud, particularly in online auctions, has prompted regulatory authorities in the United States to respond by setting up the Internet Fraud Complaint Center (IFCC). Consisting of a partnership between the Federal Bureau of Investigation (FBI) and the National White Collar Crime Center, the IFCC controls and coordinates campaigns against Internet fraud by providing Internet fraud reporting structures and mechanisms for forwarding fraud cases to law enforcement agencies.

Message sniffing. Message sniffing involves intercepting e-mail communication messages on the Internet with the aim of gaining access to the content of the e-mail messages. Sniffing targets the routes and gateways that link the networks to the Information Superhighway. Incidentally, each computer on the network is a gateway prone to hacking by crackers. For example, the FBI scans both local and international Internet communications in the United States using a customizable electronic sniffing gadget called Carnivore.

Carnivore can be installed in one or more ISPs to monitor the Internet traffic in regard to transmissions of e-mail, instant messaging, chat rooms, and newsgroups, and it automatically forwards any suspect communications

to the FBI data repositories. Although the use of Carnivore by the FBI to spy on private and public communications in the United States raises major privacy concerns, the action is fully backed by the USA Patriot Act of 2001 and the USA Patriot Improvement and Reauthorization Act of 2005, which have broadened the authority of U.S. intelligence and counterintelligence agencies to apply Internet-based surveillance systems in investigations.

DATA PROTECTION MEASURES FOR E-MANUFACTURING

So many security threats lurk in the communication network systems that no company can afford to run an unprotected Internet network. There are several measures that a company can employ to protect its Internet network from unauthorized access by intruders. Use of password protection, data encryption, firewall, data filters, and employee training are some of the probable measures that companies can adopt as protection against Internet security risks.

Use of passwords. Use of passwords enables companies to limit Web site access to users with authorized passwords. However, password codes should never be fully trusted because crackers can use sophisticated software to break the codes and access the private content in the Web site and e-mail messages.

Data encryption. Data encryption protects data from crackers and sniffing gadgets during the process of transmitting information between computers and network servers. Encrypted messages do not allow access to people who do not have the keys to the encryption codes. Pretty Good Privacy (PGP) is one good example of encryption programs. Fred Hofstetter contends that PGP provides a reliable mode for encrypting messages because it can run on any brand of computer. Companies can acquire messaging software such as Mozilla Thunderbird and Microsoft Outlook which are equipped with built-in encryption abilities.

Firewalls. Firewalls stand out as reliable Internet-security-enhancing tools because they prevent a company's data from flowing beyond the domain restrictions, in addition to preventing users of other domains from accessing the company's domain. Companies implement firewall restrictions by combining software tools, hardware equipment, and relevant IT security policies that block the movement of restricted data across the company's network and computers.

Firewalls are particularly used to protect the company's intranet from unlimited public access through programming of the firewall software to regulate minimum and maximum access levels between the company's intranet and the public Internet.

Data filters. Companies can use data filters to scan and sift the outgoing and incoming data for certain types of Internet content. Data filters can be applied in situations where the company is seeking to block employees from accessing certain Web sites such as adult content and Internet gambling sites. Data filters can be set either on the user or client servers.

Employee training. Employee training through Internet education programs can tremendously improve safety of Internet use in the company apart from improving the capacities of employees to detect and handle fraud. Employees should always be discouraged from responding to everything that they read on the Internet. Employees should be made aware of the dangers of revealing their personal bank account and credit card information and the company's classified data to information seekers with concealed identities.

SEE ALSO *Enterprise Resource Planning*

BIBLIOGRAPHY

Hofstetter, Fred, T. *Internet Literacy,* 4th ed. McGraw-Hill Companies Inc., 2006.

Hoske, Mark, T. "Video via Ethernet Now." *Control Engineering,* January 12, 2007. Available from: http://www.controleng. com/article/CA6510487.html/.

National Institute of Standards and Technology. "Software Tackles Production Line Machine 'Cyclic Jitters'." *Science Daily,* 5 April 2008. Available from: http://www.sciencedaily. com/releases/2008/04/080402101656.htm/.

Smith-Atakan, Serengul. *Human-Computer Interaction.* Middlesex University Press: Thomson Learning, 2006.

"Three Tiered Web-Based Manufacturing System—Part 1: System Development." *Robotics and Computer Integrated Manufacturing.* 23, no. 1, (2007): 138–151. Available from: http://portal.acm.org/toc.cfm?id=J1050&type=periodical& coll=GUIDE&dl=GUIDE&CFID=183639&CFTOKEN= 75352989.

University of Wisconsin–Milwaukee. "Merging Control Software with Smart Devices Could Optimize Manufacturing." *Science Daily,* 22 May 2008. Available from: http://www.sciencedaily. com/releases/2008/05/080521105255.htm/.

Winschhsen, Molly, Janet Snell, and Jenny Johnson. Diploma in Digital Applications, Book 4. Heinemann, 2006.

Wolf-Ruediger, Hansen, and Frank Gillert. *RFID for the Optimization of Business Processes.* Wiley, 2008.

Yongjin, Kwon, and Rauniar Shreepud. "E-Quality Manufacturing (EQM) Within the Framework of Internet-Based Systems." *IEEE Transactions on Systems, Man and Cybernetics, Part C: Application and Reviews,* 2007. Available from: http://cat.inist.fr/?aModele=afficheN&cpsidt= 19180416.

MANUFACTURING RESOURCES PLANNING

Manufacturing resource planning, also known as MRP II, is a method for the effective planning of a manufacturer's resources. MRP II is composed of several linked functions, such as business planning, sales and operations planning, capacity requirements planning, and all related support systems. The output from these MRP II functions can be integrated into financial reports, such as the business plan, purchase commitment report, shipping budget, and inventory projections. It has the capability of specifically addressing operational planning and financial planning, and has simulation capability that allows its users to conduct sensitivity analyses (answering "what if" questions).

The earliest form of manufacturing resource planning was known as material requirements planning (MRP). This system was vastly improved upon until it no longer resembled the original version. The newer version was so fundamentally different from MRP that a new term seemed appropriate. Oliver Wight coined the acronym MRP II for manufacturing resource planning.

A basic understanding of MRP is essential to understanding MRP II. The following paragraphs begin with a description of MRP before moving on to MRP II.

MATERIAL REQUIREMENTS PLANNING

Material requirements planning (MRP) is a computer-based, time-phased system for planning and controlling the production and inventory function of a firm from the purchase of materials to the shipment of finished goods. All MRP systems are computer based since the detail involved and the inherent burden of computation make manual use prohibitive. MRP is time phased because it not only determines what and how much needs to be made or purchased, but also when.

MRP first appeared in the early 1970s and was popularized by a book of the same name by Joseph Orlicky. Its use was quickly heralded as the new manufacturing panacea, but enthusiasm slowed somewhat when firms began to realize the difficulty inherent in its implementation.

The MRP system is composed of three primary modules, all of which function as a form of input. These are the master production schedule, the bill-of-materials, and the inventory status file. Each module serves a unique purpose that is inter-related with the purpose of the other modules, and produces several forms of usable output.

Master Production Schedule. The master production schedule (MPS) is basically the production schedule for finished goods. This schedule is usually derived from current orders, plus any forecast requirements. The MPS is divided into units of time called "buckets." While any time frame may be utilized, usually days or weeks is appropriate. The MPS is also said to be the aggregate plan "disaggregated." In other words, the plan for goods to be produced in aggregate is broken down into its individual units or finished goods.

Bill-of-Materials. The bill-of-materials is a file made up of bills-of-material (BOM). Each BOM is a hierarchical listing of the type and number of parts needed to produce one unit of finished goods. Other information, such as the routings (the route through the system that individual parts take on the way to becoming a finished good), alternate routings, or substitute materials may be also be contained with the BOM.

A tool known as a product structure tree is used to clarify the relationship among the parts making up each unit of finished goods. Figure 1 details how a product structure tree for a rolling cart might appear on a bill-of-material. This cart consists of a top that is pressed from a sheet of steel; a frame formed from four steel bars; and a leg assembly consisting of four legs, each with a caster attached. Each caster is made up of a wheel, a ball bearing, an axle, and a caster frame.

The BOM can be used to determine the gross number of component parts needed to manufacturer a given number of finished goods. Since a gross number is determined, safety stock can be reduced because component parts may be shared by any number of finished goods (this is known as commonality).

The process of determining gross requirements of components is termed the "explosion" process, or "exploding" the bill-of-material. Assuming 100 rolling carts are needed, the example product structure tree can be used to compute the gross requirements for each rolling cart component. In order to produce 100 rolling carts, 100 tops are needed, which would require 100 sheets of steel; 100 leg assemblies, which would require 400 legs and 400 casters (requiring 400 wheels, 400 ball bearings,

Figure 1

Cart

Top — Leg Assembly — Frame

sheet steel

bars (4)

legs (4) — casters (4)

wheel — ball bearing — axle — caster frame
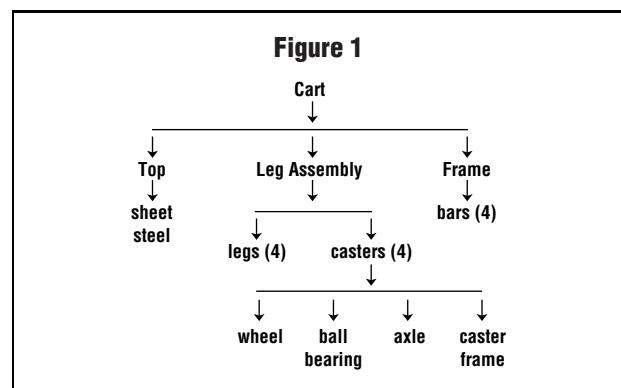
Figure 2

	1	2	3	4	5	6
Gross Requirements			100			250
Scheduled Receipts (open orders)			50		50	
On Hand (inventory balance)	25	25	25	0	0	50
Net Requirements			25			200
Planned Order Receipt			25			200
Planned Order Release	25			200		

400 axles, and 400 caster frames); and 100 frames, which would require 400 bars.

Inventory Status File. The inventory status file, or inventory records file, contains a count of the on-hand balance of every part held in inventory. In addition, the inventory status file contains all pertinent information regarding open orders and the lead time (the time that elapses between placing an order and actually receiving it) for each item.

Open orders are purchase orders (orders for items purchased outside the firm) or shop orders (formal instructions to the plant floor to process a given number of parts by a given date) that have not been completely satisfied. In other words, they are items that have been ordered, but are yet to be received.

The MRP Process. The MRP logic starts at the MPS, where it learns the schedule for finished goods (how many and when). It takes this information to the BOM where it "explodes" the gross requirements for all component parts. The MRP package then takes its knowledge of the gross requirements for all components parts to the inventory status file, where the on-hand balances are listed. It then subtracts the on-hand balances and open orders from the gross requirements for components yielding the net requirements for each component.

The process not only shows how many components are needed but when they are needed in order to complete the schedule for finished goods on time. By subtracting the lead time from the due date for each part, it is possible to see when an order must be placed for each part so that it can be received in time to avoid a delay in the MPS. A manual version of MRP for a part with requirements of 100 in period 3 and 250 in period 6 and with a two-period lead time is shown in Figure 2.

In order for the firm to meet demand on time (the MPS), it must place an order for 25 in period 1 and an order for 200 in period 4. Note that this is an overly simplified version of MRP, which does not include such relevant factors as lot sizing and safety stock.

EXPANDING INTO MRP II

With MRP generating the material and schedule requirements necessary for meeting the appropriate sales and inventory demands, more than the obvious manufacturing resources for supporting the MRP plan was found to be needed. Financial resources would have to be generated in varying amounts and timing. Also, the process would require varying degrees of marketing resource support. Production, marketing, and finance would be operating without complete knowledge or even regard for what the other functional areas of the firm were doing.

In the early 1980s MRP was expanded into a much broader approach. This new approach, manufacturing resource planning (MRP II), was an effort to expand the scope of production resource planning and to involve other functional areas of the firm in the planning process, most notably marketing and finance, but also engineering, personnel, and purchasing. Incorporation of other functional areas allows all areas of the firm to focus on a common set of goals. It also provides a means for generating a variety of reports to help managers in varying functions monitor the process and make necessary adjustments as the work progresses.

When finance knows which items will be purchased and when products will be delivered, it can accurately project the firm's cash flows. In addition, personnel can project hiring or layoff requirements, while marketing can keep track of up-to-the-minute changes in delivery times, lead times, and so on. Cost accounting information is gathered, engineering input is recorded, and distribution requirements planning is performed.

An MRP II system also has a simulation capability that enables its users to conduct sensitivity analyses or evaluate a variety of possible scenarios. The MRP II system can simulate a certain decision's impact throughout the organization, and predict its results in terms of customer orders, due dates, or other "what if" outcomes. Being able to answer these "what if" questions provides a firmer grasp of available options and their potential consequences.

As with MRP, MRP II requires a computer system for implementation because of its complexity and relatively large scale. Pursuit of MRP or MRP II in a clerical fashion would prove far too cumbersome to ever be useful. When MRP and MRP II were originally developed, hardware, software, and database technology were not sufficiently well advanced to provide the speed and computational power needed to run these systems in real time. Additionally, the cost of these systems was prohibitive. With the rapid advances in computer and information technology since the 1980s, these systems have become more affordable and widely available.

CLASSES OF FIRMS USING MRP AND MRP II

MRP and MRP II users are classified by the degree to which they utilize the various aspects of these systems. Class D companies have MRP working in their data processing area, but utilize little more than the inventory status file and the master production schedule, both of which may be poorly used and mismanaged. Typically, these firms are not getting much return for the expense incurred by the system.

Class C firms use their MRP system as an inventory ordering technique but make little use of its scheduling capabilities.

Class B companies utilize the basic MRP system (MPS, BOM, and Inventory file) with the addition of capacity requirements planning and a shop floor control system. Class B users have not incorporated purchasing into the system and do not have a management team that uses the system to run the business, but rather see it as a production and inventory control system.

Class A firms are said use the system in a closed loop mode. Their system consists of the basic MRP system, plus capacity planning and control, shop floor control, and vendor scheduling systems. In addition, their management uses the system to run the business. The system provides the game plan for sales, finance, manufacturing, purchasing, and engineering. Management then can use the system's report capability to monitor accuracy in the BOM, the inventory status file, and routing, as well as monitor the attainment of the MPS and capacity plans.

Class A firms have also tied in the financial system and have developed the system's simulation capabilities to answer "what if" questions. Because everyone is using the same numbers (e.g., finance and production), management has to work with only one set of numbers to run the business.

DEVELOPMENTS

A further extension of MRP and MRP II has been developed to improve resource planning by broadening the scope of planning to include more of the supply chain. The Gartner Group of Stamford, Connecticut, coined the term "enterprise resource planning" (ERP) for this system. Like MRP II systems, ERP systems rely on a common database throughout the company with the additional use of a modular software design that allows new programs to be added to improve the efficiency of specific aspects of the business.

With the improvement of lean manufacturing and just-in-time (JIT) systems that has occurred because of the same technological advances that made MRP and MRP II more accessible, some firms have come to feel that MRP, MRP II, and even ERP systems are obsolete. However, research has found that in certain environments with advance demand information, MRP-type push strategies yield better performance in term of inventories and service levels than did JIT's kanban-based pull strategies, and they continue to be used by big businesses and many medium and smaller businesses even today. In 2007, author Phil Robinson noted that "when properly implemented, an ERP package can be the most cost effective project a company has ever seen."

By the early twenty-first century, MRP and ERP systems were so entrenched in businesses that they no longer provided a source of competitive advantage. In 2005, the authors of *Manufacturing Planning and Control for Supply Chain Management* pointed out that sustaining competitive advantage would require that manufacturing planning and control (MPC) systems cross organizational boundaries to coordinate company units that have traditionally worked independently. They recommend that organizations need to begin working in pairs or dyads to develop jointly new MPC systems that allow integrated operations. Organizations will learn as much as possible from each dyad and then leverage what they have learned into other dyads. They termed this approach the "next frontier" for manufacturing planning and control systems.

SEE ALSO *Competitive Advantage; Enterprise Resource Planning; Inventory Types; Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management*

BIBLIOGRAPHY

Krishnamurthy, Ananth, Rajan Suri, and Mary Vernon. "Re-Examining the Performance of MRP and Kanban Material Control Strategies for Multi-Product Flexible Manufacturing Systems." *International Journal of Flexible Manufacturing Systems* 16, no. 2 (2004): 123.

Orlicky, Joseph. *Material Requirements Planning.* New York, NY: McGraw-Hill, 1975.

Robinson, Phil. "ERP (Enterprise Resource Planning) Survival Guide." *The Business Improvement Consultancy*, 2007. Available from: http://www.bpic.co.uk/erp.htm.

Stevenson, William J. *Production Operations Management.* Boston, MA: Irwin/McGraw-Hill, 2004.

Vollmann, Thomas E., William L. Berry, D. Clay Whybark, and F. Robert Jacobs. *Manufacturing Planning and Control for Supply Chain Management.* Boston, MA: McGraw-Hill, 2005.

Wight, Oliver. *Manufacturing Resource Planning: MRP II.* Essex Junction, VT: Oliver Wight Ltd., 1984.

Zhou, Li, and Robert W. Grubbstrom. "Analysis of the Effect of Commonality in Multi-Level Inventory Systems Applying MRP Theory." *International Journal of Production Economics* 90, no. 2 (2004): 251.

MARKET SHARE

Firms are always concerned with the size of the potential market for their products or services and the proportion of that market they actually reach—often referred to as a company's market share. Market share is the percentage of the total market (or industry) sales made by one firm. As a formula, Market Share = Firm's Sales ÷ Total Market Sales. Share can be reflected as either percentage of sales dollars, percentage of units sold, or percentage of customers. Percentage of sales dollars is the most common reference.

Market share is one of the most commonly quoted measures of success in any industry. To correctly determine market share, one must clearly define the market. Having a small share of a large market can be as profitable as a large share of a small market. A producer of leather horse saddles must determine if his market is made up of saddle sales, equestrian sales, or all leather goods sales. Obviously, his market share in the saddle industry is much larger than his share in the leather goods market.

There are two sources for measuring market share: competitors and consumers. Surveying competitors gives a more accurate and reliable picture of market share. It is possible to interview 100 percent of competitors, but not all consumers. To get a reliable figure from consumers, a large number of people would have to be interviewed. For many industries, sales and market share figures may already be compiled by government agencies, trade associations, or private research firms.

MARKET PLAYERS

Market share defines the roles played by various firms in an industry. The firm with the largest market share is the market leader. The market leader usually has the highest marketing expenditures, distribution, price changes, and new product innovations. Market challengers are the firms working to increase their market share. Firms in an industry that are content with their share of the market or doing little to increase sales are considered the market followers. The market niche brand is the player that targets its business toward serving smaller, overlooked segments that are often ignored by the larger players. The niche marketer can be very profitable, opting for high margins over higher volume.

MARKET STRATEGIES

The leader must constantly monitor the market because the challenger is constantly trying to take away market share. The market leader has three options to keep its market position: expand the total market, protect market share, or expand market share. Markets can be expanded by creating more usage, new uses, or new users. Leaders can protect market share by monitoring their position and rushing to remedy any weaknesses.

Continuous innovation is the best way to protect market share. Another way to protect market share is to remove competitors through acquisition or merger. This strategy has become more and more popular among large firms, resulting in an increasing level of corporate consolidation since the mid-1990s.

Maintaining market share often requires constant innovation and change. When leaders become complacent with their products or services, it becomes easier for the challenger to make progress. A 2007 report indicated that both Coke and Pepsi were seeing their dominant market shares slip as health-conscious consumers switched to vitamin-infused energy drinks and bottled water. In response, both companies announced new products to chase that new trend. In large markets such as this, small increases or decreases in market share can translate into very large changes in sales; one point of market share can be worth hundreds of millions of dollars.

The market challenger must attempt to gain market share from the leader. The challenger must have some sustainable competitive advantage to attack the leader's market share. The challenger can attack other competitors through a direct attack by altering price, promotion, or distribution, or indirectly by diversifying or catering to underserved segments. Followers must keep quality high and prices low to maintain their positions. As Armstrong and Kolter point out in *Principles of Marketing*, the market follower must "find the right balance between following closely enough to win customers from the market leader but . . . at enough of a distance to avoid retaliation."

Niche marketers have many options available to them. The company must find a niche that is safe and profitable. It must be large enough to sustain growth but small enough that it does not look attractive to the market's larger players. Targeting multiple niches is an option that offers the niche marketer a higher chance of survival because the firm is not dependent on one segment.

Across segments, attempts to affect market share take place across the four "P's" of the marketing mix: product, price, place, and promotion. However, there are instances in which increasing market share is not necessarily desirable. The costs to increase production or improve the product may not be covered by the incremental profits.

Market share is easily understood by most managers, employees, and shareholders; therefore, it is often used as a primary measure of success. It is critical to understand market share, how it is used to identify market participants, and how the different participants use it to determine their market strategy.

SEE ALSO *Generic Competitive Strategies*

BIBLIOGRAPHY
Armstrong, Gary and Philip Kotler. *Principles of Marketing.* 12th ed. Upper Saddle River, NJ: Prentice Hall, 2007.
Davenport, Todd. "Focusing on Share? Wise Up, Analysts Say." *American Banker*, 1 November 2004: 9.
Kavilanz, Parija B. "Coke, Pepsi lose ground for 2nd year." *CNNMoney.com*, 8 March 2007. Available from: http://money.cnn.com/2007/03/08/news/companies/softdrinks_sales/index.htm.
"Marketing: Market Share." QuickMBA.com. Available from: http://www.quickmba.com/marketing/market-share/.

MARKETING COMMUNICATION

As the term suggests, marketing communication functions within a marketing framework. Traditionally known as the promotional element of the four Ps of marketing (product, place, price, and promotion), the primary goal of marketing communication is to reach a defined audience to affect its behavior by informing, persuading, and reminding. Marketing communication acquires new customers for brands by building awareness and encouraging trial. Marketing communication also maintains a brand's current customer base by reinforcing their purchase behavior by providing additional information about the brand's benefits. A secondary goal of marketing communication is building and reinforcing relationships with customers, prospects, retailers, and other important stakeholders.

Successful marketing communication relies on a combination of options called the promotional mix. These options include advertising, sales promotion, public relations, direct marketing, and personal selling. The role each element takes in a marketing communication program relies in part on whether a company employs a push strategy or a pull strategy. A pull strategy relies more on consumer demand than personal selling for the product to travel from the manufacturer to the end user. The demand generated by advertising, public relations, and sales promotion "pulls" the good or service through the channels of distribution. A push strategy, on the other hand, emphasizes personal selling to push the product through these channels.

For marketing communication to be successful, however, sound management decisions must be made in the other three areas of the marketing mix: the product, service, or idea itself; the price at which the brand will be offered; and the places at or through which customers may purchase the brand. The best promotion cannot overcome poor product quality, inordinately high prices, or insufficient retail distribution.
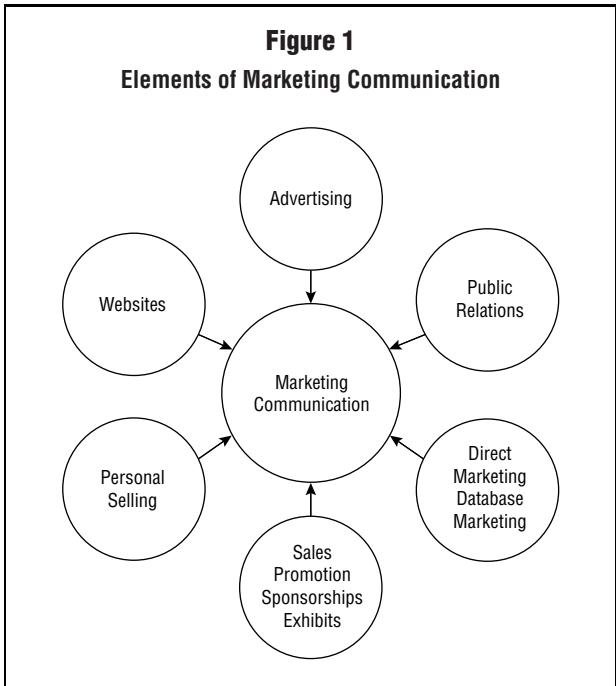
Likewise, successful marketing communication relies on sound management decisions regarding the coordination of the various elements of the promotional mix. To this end, a concept known as integrated marketing communication (IMC) has emerged; it seeks to orchestrate the use of all forms of the promotional mix to reach customers at different levels in new and better ways.

INTEGRATED MARKETING COMMUNICATION

The evolution of this perspective has two origins. Marketers began to realize that advertising, public relations, and sales were often at odds regarding responsibilities, budgets, management input, and a myriad of other decisions affecting the successful marketing of a brand. Executives in each area competed with the others for resources and a voice in decision making. The outcome was inconsistent promotional efforts, wasted money, counterproductive management decisions, and, perhaps worst of all, confusion among consumers.

Secondly, the marketing perspective itself began to shift from being market oriented to market driven. Marketing communication was traditionally viewed as an inside-out way of presenting the company's messages.

Figure 1
Elements of Marketing Communication

Advertising was the dominant element in the promotional mix because the mass media could effectively deliver a sales message to a mass audience. But then, the mass market began to fragment; consumers became better educated and more skeptical about advertising. A variety of sources, both controlled by the marketer and uncontrolled, became important to consumers. News reports, word-of-mouth, experts' opinions, and financial reports were just some of the "brand contacts" consumers began to use to learn about and form attitudes and opinions about a brand or company, or make purchase decisions. Advertising began to lose some of its luster in terms of its ability to deliver huge homogeneous audiences. In response, companies began to seek new ways to coordinate the multiplicity of product and company messages being issued and used by consumers and others.

Thus, two ideas permeate integrated marketing communication: relationship building and synergy. Rather than the traditional inside-out view, IMC is seen as an outside-in perspective. Customers are viewed not as targets but as partners in an ongoing relationship. Customers, prospects, and others encounter the brand and company through a host of sources and create from these various contacts ideas about the brand and company. By knowing the media habits and lifestyles of important consumer segments, marketers can tailor messages through media that are most likely to reach these segments at times when these segments are most likely to be receptive to these messages, thus optimizing the marketing communication effort.

Ideally, IMC is implemented by developing comprehensive databases on customers and prospects, segmenting these current and potential customers into groups with certain common awareness levels, predispositions, and behaviors, and developing messages and media strategies that guide the communication tactics to meet marketing objectives. In doing this, IMC builds and reinforces mutually profitable relationships with customers and other important stakeholders and generates synergy by coordinating all elements in the promotional mix into a program that possesses clarity, consistency, and maximum impact.

Practitioners and academics alike, however, have noted the difficulty of effectively implementing IMC. Defining exactly what IMC is has been difficult. For example, merely coordinating messages so that they speak "with one clear voice" in all promotional efforts does not fully capture the meaning of IMC. Also, changing the organization to accommodate the integrated approach has challenged the command and control structure of many organizations.

ADVERTISING

Advertising has four characteristics: it is persuasive in nature; it is non-personal; it is paid for by an identified sponsor; and it is disseminated through mass channels of communication. Advertising messages may promote the adoption of goods, services, persons, or ideas. Because the sales message is disseminated through the mass media—as opposed to personal selling—it is viewed as a much cheaper way of reaching consumers. However, its non-personal nature means it lacks the ability to tailor the sales message to the message recipient and, more importantly, actually get the sale. Therefore, advertising effects are best measured in terms of increasing awareness and changing attitudes and opinions, not creating sales. Advertising's contribution to sales is difficult to isolate because many factors influence sales. The contribution advertising makes to sales are best viewed over the long run.

The exception to this thinking is within the Internet arena. While banner ads, pop-ups, and interstitials should still be viewed as brand promoting and not necessarily sales drivers, technology provides the ability to track how many of a Web site's visitors click the banner, investigate a product, request more information, and ultimately make a purchase.

Through the use of symbols and images, advertising can help differentiate products and services that are otherwise similar. Advertising also helps create and maintain brand equity. Brand equity is an intangible asset that results from a favorable image, impressions of differentiation, or consumer attachment to the company, brand, or trademark. This equity translates into greater sales volume, and/or higher margins, thus greater competitive advantage. Brand equity is established and maintained through advertising that focuses on image, product attributes, service, or other features of the company and its products or services.

Cost is the greatest disadvantage of advertising. The average cost for a 30-second spot on network television increased fivefold between 1980 and 2005. Plus, the average cost of producing a thirty-second ad for network television is quite expensive. It is not uncommon for a national advertiser to spend in the millions of dollars for one thirty-second commercial to be produced. Add more millions on top of that if celebrity talent is utilized.

Credibility and clutter are other disadvantages. Consumers have become increasingly skeptical about advertising messages and tend to resent advertisers' attempt to persuade. Advertising is everywhere, from network television, to daily newspapers, to roadside billboards, to golf course signs, to stickers on fruit in grocery stores. Clutter encourages consumers to ignore many advertising messages. Further, technologies such as DVRs (digital video recorders) allow consumers to record programs and then skip commercials, and satellite radio provides a majority of its channels advertising free.

PUBLIC RELATIONS

Public relations is defined as a management function which identifies, establishes, and maintains mutually beneficial

relationships between an organization and the public upon which its success or failure depends. Whereas advertising is a one-way communication from sender (the marketer) to the receiver (the consumer or the retail trade), public relations considers multiple audiences (consumers, employees, suppliers, vendors, etc.) and uses two-way communication to monitor feedback and adjust both its message and the organization's actions for maximum benefit. A primary tool used by public relations practitioners is publicity. Publicity capitalizes on the news value of a product, service, idea, person, or event so that the information can be disseminated through the news media. This third party "endorsement" by the news media provides a vital boost to the marketing communication message: credibility. Articles in the media are perceived as being more objective than advertisements, and their messages are more likely to be absorbed and believed. For example, after the CBS newsmagazine *60 Minutes* reported in the early 1990s that drinking moderate amounts of red wine could prevent heart attacks by lowering cholesterol, red wine sales in the United States increased 50 percent. Another benefit publicity offers is that it is free, not considering the great amount of effort it can require to get out-bound publicity noticed and picked up by media sources.

Public relations' role in the promotional mix is becoming more important because of what Philip Kotler describes as an "over communicated society." Consumers develop "communication-avoidance routines" where they are likely to tune out commercial messages. As advertising loses some of its cost-effectiveness, marketers are turning to news coverage, events, and community programs to help disseminate their product and company messages. Some consumers may also base their purchase decisions on the image of the company, for example, how environmentally responsible the company is. In this regard, public relations plays an important role in presenting, through news reports, sponsorships, "advertorials" (a form of advertising that instead of selling a product or service promotes the company's views regarding current issues), and other forms of communication, what the company stands for.

DIRECT MARKETING AND DATABASE MARKETING

Direct marketing, the oldest form of marketing, is the process of communicating directly with target customers to encourage response by telephone, mail, electronic means, or personal visit. Users of direct marketing include retailers, wholesalers, manufacturers, and service providers, and they use a variety of methods including direct mail, telemarketing, direct-response advertising, online computer shopping services, cable shopping networks, and infomercials. Traditionally not viewed as an element in the promotional mix, direct marketing represents one of the most profound changes in marketing and promotion in the last twenty-five years. Aspects of direct marketing, which includes direct response advertising and direct mail advertising as well as the various research and support activities necessary for their implementation, have been adopted by virtually all companies engaged in marketing products, services, ideas, or persons.

Direct marketing has become an important part of many marketing communication programs for three reasons. First, the number of two-income households has increased dramatically. About six in every ten women in the United States work outside the home. This has reduced the amount of time families have for shopping trips. Secondly, more shoppers than ever before rely on credit cards for payment of goods and services. These cashless transactions make products easier and faster to purchase. Finally, technological advances in telecommunications and computers allow consumers to make purchases from their homes via telephone, television, or computer with ease and safety. These three factors have dramatically altered the purchasing habits of American consumers and made direct marketing a growing field worldwide.

Direct marketing allows a company to target more precisely a segment of customers and prospects with a sales message tailored to their specific needs and characteristics. Unlike advertising and public relations, whose connections to actual sales are tenuous or nebulous at best, direct marketing offers accountability by providing tangible results. The economics of direct marketing have also improved over the years as more information is gathered about customers and prospects. By identifying those consumers they can serve more effectively and profitably, companies may be more efficient in their marketing efforts. Whereas network television in the past offered opportunities to reach huge groups of consumers at a low cost per thousand, direct marketing can reach individual consumers and develop a relationship with each of them.

Research indicates that brands with strong brand equity are more successful in direct marketing efforts than little-known brands. Direct marketing, then, works best when other marketing communication such as traditional media advertising supports the direct marketing effort.

Direct marketing has its drawbacks also. Just as consumers built resistance to the persuasive nature of advertising, so have they with direct marketing efforts. Direct marketers have responded by being less sales oriented and more relationship oriented. Also, just as consumers grew weary of advertising clutter, so have they with the direct marketing efforts. Consumers are bombarded with mail, infomercials, and telemarketing pitches daily. Some direct marketers have responded by regarding privacy as a customer service benefit. Direct marketers must also overcome consumer mistrust of direct marketing efforts due to

incidents of illegal behavior by companies and individuals using direct marketing. The U.S. Postal Service, the Federal Trade Commission, and other federal and state agencies may prosecute criminal acts. The industry then risks legislation regulating the behavior of direct marketers if it is not successful in self-regulation. The Direct Marketing Association, the leading trade organization for direct marketing, works with companies and government agencies to initiate self-regulation. In March of 2003 the National Do Not Call Registry went into affect whereby consumers added their names to a list that telemarketers had to eliminate from their out-bound call database.

Database Marketing. Database marketing is a form of direct marketing that attempts to gain and reinforce sales transactions while at the same time being customer driven. Successful database marketing continually updates lists of prospects and customers by identifying who they are, what they are like, and what they are purchasing now or may be purchasing in the future. By using database marketing, marketers can develop products and/or product packages to meet their customers' needs or develop creative and media strategies that match their tastes, values, and lifestyles. Like IMC, database marketing is viewed by many marketers as supplanting traditional marketing strategies and is a major component of most IMC programs.

At the core of database marketing is the idea that market segments are constantly shifting and changing. People who may be considered current customers, potential customers, and former customers and people who are likely never to be customers are constantly changing. By identifying these various segments and developing a working knowledge of their wants, needs, and characteristics, marketers can reduce the cost of reaching non-prospects and build customer loyalty. Perhaps the most important role of database marketing is its ability to retain customers. The cumulative profit for a five-year loyal customer is between seven and eight times the first-year profit.

Since database marketing is expensive to develop and complex to implement effectively, companies considering database marketing should consider three important questions. First, do relatively frequent purchasers or high dollar volume purchasers for the brand exist? Secondly, is the market diverse enough so that segmenting into subgroups would be beneficial? Finally, are there customers that represent opportunities for higher volume purchases?

SALES PROMOTION/ SPONSORSHIPS/EXHIBITIONS

Sales promotions are direct inducements that offer extra incentives to enhance or accelerate the product's movement from producer to consumer. Sales promotions may be directed at the consumer or the trade. Consumer promo-

tions such as coupons, sampling, premiums, sweepstakes, price packs (packs that offer greater quantity or lower cost than normal), low-cost financing deals, and rebates are purchase incentives in that they induce product trial and encourage repurchase. Consumer promotions may also include incentives to visit a retail establishment or request additional information. Trade promotions include slotting allowances ("buying" shelf space in retail stores), allowances for featuring the brand in retail advertising, display and merchandising allowances, buying allowances (volume discounts and other volume-oriented incentives), bill back allowances (pay-for-performance incentives), incentives to salespeople, and other tactics to encourage retailers to carry the item and to push the brand.

Two perspectives may be found among marketers regarding sales promotion. First, sales promotion is supplemental to advertising in that it binds the role of advertising with personal selling. This view regards sales promotion as a minor player in the marketing communication program. A second view regards sales promotion and advertising as distinct functions with objectives and strategies very different from each other. Sales promotion in this sense is equal to or even more important than advertising. Some companies allocate as much as 75 percent of their advertising/promotion dollars to sales promotion and just 25 percent to advertising. Finding the right balance is often a difficult task. The main purpose of sales promotion is to spur action. Advertising sets up the deal by developing a brand reputation and building market value. Sales promotion helps close the deal by providing incentives that build market volume.

Sales promotions can motivate customers to select a particular brand, especially when brands appear to be equal, and they can produce more immediate and measurable results than advertising. However, too heavy a reliance on sales promotions results in "deal-prone" consumers with little brand loyalty and too much price sensitivity. Sales promotions can also force competitors to offer similar inducements, with sales and profits suffering for everyone.

Sponsorships. Sponsorships, or event marketing, combine advertising and sales promotions with public relations. Sponsorships increase awareness of a company or product, build loyalty with a specific target audience, help differentiate a product from its competitors, provide merchandising opportunities, demonstrate commitment to a community or ethnic group, or impact the bottom line. Like advertising, sponsorships are initiated to build long-term associations. Organizations sometimes compare sponsorships with advertising by using gross impressions or cost-per-thousand measurements. However, the value of sponsorships can be very difficult to measure. Companies considering sponsorships should consider the short-term public relations

value of sponsorships and the long-term goals of the organization. Sports sponsorships make up about two-thirds of all sponsorships.

Exhibits. Exhibits, or trade shows, are hybrid forms of promotion between business-to-business advertising and personal selling. Trade shows provide opportunities for face-to-face contact with prospects, enable new companies to create a viable customer base in a short period of time, and allow small and midsize companies that may not be visited on a regular basis by salespeople to become familiar with suppliers and vendors. Because many trade shows generate media attention, they have also become popular venues for introducing new products and providing a stage for executives to gain visibility.

PERSONAL SELLING

Personal selling includes all person-to-person contact with customers with the purpose of introducing the product to the customer, convincing him or her of the product's value, and closing the sale. The role of personal selling varies from organization to organization, depending on the nature and size of the company, the industry, and the products or services it is marketing. Many marketing executives realize that both sales and non-sales employees act as salespeople for their organization in one way or another. One study that perhaps supports this contention found that marketing executives predicted greater emphasis being placed on sales management and personal selling in their organization than on any other promotional mix element. These organizations have launched training sessions that show employees how they act as salespeople for the organization and how they can improve their interpersonal skills with clients, customers, and prospects. Employee reward programs now reward employees for their efforts in this regard.

Personal selling is the most effective way to make a sale because of the interpersonal communication between the salesperson and the prospect. Messages can be tailored to particular situations, immediate feedback can be processed, and message strategies can be changed to accommodate the feedback. However, personal selling is typically also the most expensive way to make a sale.

Sales and marketing management classifies salespersons into one of three groups: creative selling, order taking, and missionary sales reps. Creative selling jobs require the most skills and preparation. They are the "point person" for the sales function. They prospect for customers, analyze situations, determine how their company can satisfy wants and needs of prospects, and, most importantly, get an order. Order takers take over after the initial order is received. They handle repeat purchases (straight rebuys) and modified rebuys. Missionary sales

reps service accounts by introducing new products, promotions, and other programs. Orders are taken by order takers or by distributors.

INTERNET MARKETING

Just as direct marketing has become a prominent player in the promotional mix, so too has the Internet. Virtually unheard of in the 1980s, the 1990s saw this new medium explode onto the scene, being adopted by families, businesses and other organizations. Web sites provide a new way of transmitting information, entertainment, and advertising, and have generated a new dimension in marketing: electronic commerce. E-commerce is the term used to describe the act of selling goods and services over the Internet. In other words, the Internet has become more than a communication channel; it is a marketing channel itself with companies such as Amazon.com, eBay, and others selling goods via the Internet to individuals around the globe.

Public relations practitioners soon realized the value that Web sites offer in establishing and maintaining relationships with important publics. For example, company and product information can be posted on the company's site for news reporters researching stories and for current and potential customers seeking information. Political candidates have Web sites that provide information about their background and their political experience.

The interactivity of the Internet is perhaps its greatest asset. By communicating with customers, prospects, and others one-on-one, firms can build databases that help them meet specific needs of individuals, thus building a loyal customer base. Because the cost of entry is negligible, the Internet is cluttered with Web sites. However, this clutter does not present the same kind of problem that advertising clutter does. Advertising and most other forms of promotion assume a passive audience that will be exposed to marketing communication messages via the mass media or mail regardless of their receptivity. Web sites require audiences who are active in the information-seeking process to purposely visit the site. Therefore, the quality and freshness of content is vital for the success of the Web site.

VIRAL MARKETING

The Internet has also given rise to completely new forms of marketing. Often, these techniques are not generated by a marketing department, but rather, are adaptations of communications that have emerged independently. Ultimately, the Internet allows for direct communication with potential customers as well as providing those customers with a greater degree of interactivity. For example, David Meerman Scott notes that the marketers of FutureNow have released numerous press releases directly to the Web, instead of targeting the press and other media outlets. The strategy

here was to "reach bloggers and consumers via search engines and RSS feeds through news release content."

In particular, *blogs* (short for "Web logs") have become a way of communicating with potential customers as well as a means to track public perception of a company. For instance, Meerman Scott points out the ability to comment on blogs provides a way for marketers to target and tailor communication while also making this communication seem more like a dialogue.

Because of the interactive nature of the Internet, it lends itself to what is known as "viral marketing." Here, the public send and link content containing some marketing communication to people they know. This also lends a degree of authenticity to the message. With viral marketing, the goal is to generate "buzz."

However, companies must be careful when using these forms of marketing communication. For example, in 2006 it became known that a public relations firm was operating two blogs on behalf of Wal-Mart. However, the blogs themselves were presented in such a way as to appear that they were authored by independent individuals. Ultimately, the public relations firm apologized for the tactic. Perceived disingenuousness can change a company's fortunes, and the technologies that make viral marketing a powerful tool can also be used to quickly spread bad publicity.

COMPLICATIONS FROM GLOBALIZATION

The task of marketing communication has also become more difficult in a globalized age. A 2006 story in *Business Strategy* noted that a nation's standing in the world can affect consumers' purchasing decisions. The article points out that U.S. brands may have suffered in foreign countries because of citizens' disagreement with U.S. foreign policy. This is, of course, a matter that is mainly out of a company's hands. However, some argue that multinational corporations must become involved in "public diplomacy."

CONSUMER SAVVINESS

Though many feel that the information explosion of the late twentieth and early twenty-first centuries has provided companies with more marketing communications opportunities, the media environment has also resulted in a public that is increasingly savvy and sophisticated in terms of reading and interpreting marketing communications. In 2007, consultants Joseph Pine II and James Gilmore began to argue that consumers value "authenticity" in both products and marketing messages. They note that the patina of authenticity is crucial and that a lack of this (or a notable degree of insincerity) could mean the loss of a sale. Pine and Gilmore argue that "authenticity" can only be achieved through a combined marketing communications effort. Advertising, public relations, and other forms of communication must all be unified in message. This sense of authenticity can be derailed by aberrant messages.

An incomplete or superficial marketing communication effort can also result in cynicism. In 2008, with environmental concerns growing, the publication *Marketing* ran a story about "greenwashing," an attempt to appear environmentally friendly. However, the article points out that a brand can be damaged if this effort is seen as disingenuous. The lesson here is that a company's marketing communication cannot be out of step with a company's core business and practices.

THE FUTURE OF MARKETING COMMUNICATION

Marketing communication has become an integral part of the social and economic system in the United States. Consumers rely on the information from marketing communication to make wise purchase decisions. Businesses, ranging from multinational corporations to small retailers, depend on marketing communication to sell their goods and services. Marketing communication has also become an important player in the life of a business. Marketing communication helps move products, services, and ideas from manufacturers to end users and builds and maintains relationships with customers, prospects, and other important stakeholders in the company. Advertising and sales promotion will continue to play important roles in marketing communication mix. However, marketing strategies that stress relationship building in addition to producing sales will force marketers to consider all the elements in the marketing communication mix. In the future new information gathering techniques will help marketers target more precisely customers and prospects using direct marketing strategies. New media technologies will provide businesses and consumers new ways to establish and reinforce relationships that are important for the success of the firm and important for consumers as they make purchase decisions. The Internet will become a major force in how organizations communicate with a variety of constituents, customers, clients, and other interested parties.

SEE ALSO *Communication; Marketing Concept and Philosophy; Marketing Research*

BIBLIOGRAPHY
Arens, William F. *Contemporary Advertising.* 7th ed. Boston: Irwin/McGraw-Hill, 1998.
Belch, George E., and Michael A. Belch. *Advertising and Promotion: An Integrated Marketing Communication Perspective.* 4th ed. Boston: Irwin/McGraw-Hill, 1998.
Cutlip, Scott M., Allen H. Center, and Glen M. Broom. *Effective Public Relations.* 8th ed. Upper Saddle River, NJ: Prentice-Hall, 1999.

———. "The Eight Principles of Strategic Authenticity." *Strategy & Leadership,* 9 May 2008, 35–40.

Gilmore, James H. and B. Joseph Pine II. "Stop Dishing Out the Phoniness, Marketers; Standards of Authenticity." *Advertising Age* 10 December 2007, 18.

Gunther, Marc. "Corporate Blogging: Wal-Mart's Fumbles." *Fortune* 18 October 2008. Available from: http://money.cnn.com/2006/10/17/technology/pluggedin_gunther_blog.fortune/index.htm.

Harris, Thomas L. *Value-Added Public Relations: The Secret Weapon in Integrated Marketing.* Chicago: NTC Books, 1998.

Manning, Gerald L., and Barry L. Reese. *Selling Today: Building Quality Partnerships.* 7th ed. Upper Saddle River, NJ: Prentice-Hall, 1998.

Meerman Scott, David. *The New Rules of Marketing and PR.* Hoboken, NJ: John Wiley and Sons, 2007.

"PR Firm Admits It's Behind Wal-Mart Blogs." *cnnmoney.com* 20 October 2006. Available from: http://money.cnn.com/2006/10/20/news/companies/walmart_blogs/index.htm?cnn=yes.

Thomas, Joe. "Go Green, Be Ethical, Stay Genuine." *Marketing* 28 May 2008, 23.

Wang, Jay. "Public Diplomacy and Global Business." *Journal of Business Strategy* 1 May 2006, 41.

Weitz, Barton W., Stephen B. Castleberry, and John F. Tanner. *Selling: Building Partnerships.* 3rd ed. Boston: Irwin/McGraw-Hill, 1998.

MARKETING CONCEPT AND PHILOSOPHY

The marketing concept and philosophy is one of the simplest ideas in marketing, and at the same time, it is also one of the most important marketing philosophies. At its very core are the customer and his or her satisfaction. The marketing concept and philosophy states that the organization should strive to satisfy its customers' wants and needs while meeting the organization's goals. In simple terms, "the customer is king."

The implication of the marketing concept is very important for management. It is not something that the marketing department administers, nor is it the sole domain of the marketing department. Rather, it is adopted by the entire organization. From top management to the lowest levels and across all departments of the organization, it is a philosophy or way of doing business. The customers' needs, wants, and satisfaction should always be foremost in every manager and employees' mind. Wal-Mart's motto of "satisfaction guaranteed" is an example of the marketing concept. Whether the Wal-Mart employee is an accountant or a cashier, the customer is always first.

As simple as the philosophy sounds, the concept is not very old in the evolution of marketing thought. However, it is at the end of a succession of business philosophies that cover centuries.

EVOLUTION OF THE MARKETING CONCEPT AND PHILOSOPHY

The marketing concept and philosophy evolved as the last of three major philosophies of marketing. These three philosophies are the product, selling, and marketing philosophies. Even though each philosophy has a particular time when it was dominant, a philosophy did not die with the end of its era of dominance. In fact, all three philosophies are being used today.

Product Philosophy. The product philosophy was the dominant marketing philosophy prior to the Industrial Revolution and continued into the 1920s. The product philosophy holds that the organization knows its product better than anyone or any organization. The company knows what will work in designing and producing the product and what will not work. For example, the company may decide to emphasize the low cost or high quality of its products. This confidence in the company's ability is not a radical concept, but the confidence leads to the consumer being overlooked. Since the organization has the great knowledge and skill in making the product, the organization also assumes it knows what is best for the consumer.

This philosophy of only relying on the organization's skill and desires for the product did not lead to poor sales. In much of the product philosophy era, organizations were able to sell all of the products that they made. The success of the product philosophy era is due mostly to the time and level of technology in which it was dominant. The product era spanned both the pre-Industrial Revolution era and much of the time after the Industrial Revolution.

The period before the Industrial Revolution was the time when most goods were made by hand. The production was very slow and few goods could be produced. However, there was also a demand for those goods, and the slow production could not fill the demand in many cases. The importance for management of this shortage was that very little marketing was needed.

An example illustrates the effects of the shortages. Today, the gunsmith shop in Williamsburg, Virginia, still operates using the product philosophy. The gunsmiths produce single-shot rifles using the technology available during the eighteenth century. They are only able to produce about four or five rifles every year, and they charge from $15,000 to $20,000 for each rifle. However, the high price does not deter the demand for the guns; their uniqueness commands a waiting list of three to four years. Today's Williamsburg Gunsmith Shop situation was typical for organizations operating before the Industrial Revolution. Most goods were in such short supply that companies could sell all that they made. Consequently, organizations did not need to consult with consumers about designing and producing their products.

When mass production techniques created the Industrial Revolution, the volume of output was greatly increased. Yet the increased production of goods did not immediately eliminate the shortages from the pre-industrial era. The new mass production techniques provided economies of scale allowing for lower costs of production and corresponding lower prices for goods. Lower prices greatly expanded the market for the goods, and the new production techniques were struggling to keep up with the demand. This situation meant that the product philosophy would work just as well in the new industrial environment. Consumers still did not need to be consulted for the organization to sell its products.

One of the many stories about Henry Ford illustrates the classic example of the product philosophy in use after the Industrial Revolution. Henry Ford pioneered mass production techniques in the automobile industry. With the techniques, he offered cars at affordable prices to the general public. Before this time, cars were hand made, and only the very wealthy could afford them. The public enthusiastically purchased all the Model T Fords that the company could produce. The evidence that the product philosophy was alive and well in Ford Motor Company came in Henry Ford's famous reaction to consumer requests for more color options. He was said to have responded that "you can have any color car you want as long as it is black." Realizing that different colors would increase the cost of production and price of the Model T's, Henry Ford, using the product philosophy, decided that lower prices were best for the public.

Selling Philosophy. The selling philosophy era has the shortest period of dominance of the three philosophies. It began to be dominant around 1930 and stayed in widespread use until about 1950. The selling philosophy holds that an organization can sell any product it produces with the use of marketing techniques, such as advertising and personal selling. Organizations could create marketing departments that would be concerned with selling the goods, and the rest of the organization could be left to concentrate on producing the goods.

The reason for the emergence of the selling philosophy was the ever-rising number of goods available after the Industrial Revolution. Organizations became progressively more efficient in production, which increased the volume of goods. With the increased supply, competition also entered production. These two events eventually led to the end of product shortages and the creation of surpluses. It was because of the surpluses that organizations turned to the use of advertising and personal selling to reduce their inventories and sell their goods. The selling philosophy also enabled part of the organization to keep focusing on the product, via the product philosophy. In addition, the selling philosophy held that a sales or marketing department could sell whatever the company produced.

The Ford Motor Company is also a good example of the selling philosophy and why this philosophy does not work in many instances. Ford produced and sold the Model T for many years. During its production, the automobile market attracted more competition. Not only did the competition begin to offer cars in other colors, the styling of the competition was viewed as modern, and the Model T became considered as old-fashioned. Henry Ford's sons were aware of the changes in the automobile market and tried to convince their father to adapt. However, Henry Ford was sure that his standardized low-price automobile was what the public needed. Consequently, Ford turned to marketing techniques to sell the Model T. It continued to sell, but its market share began to drop. Eventually, even Henry Ford had to recognize consumer desires and introduce a new model.

The selling philosophy assumes that a well-trained and motivated sales force can sell any product. However, more companies began to realize that it is easier to sell a product that the customer wants, than to sell a product the customer does not want. When many companies began to realize this fact, the selling era gave way to the marketing era of the marketing concept and philosophy.

Marketing Philosophy. The marketing era started to dominate around 1950, and it continues to the present. The marketing concept recognizes that the company's knowledge and skill in designing products may not always be meeting the needs of customers. It also recognizes that even a good sales department cannot sell every product that does not meet consumers' needs. When customers have many choices, they will choose the one that best meets their needs.

MARKET CONCEPT AND PHILOSOPHY

The marketing concept and philosophy states that the organization should strive to satisfy its customers' wants and needs while meeting the organization's goals. The best way to meet the organization's goals is also by meeting customer needs and wants. The marketing concept's emphasis is to understand the customers before designing and producing a product for them. With the customer's wants and needs incorporated into the design and manufacture of the product, sales and profit goals are far more likely to be met.

With the customer's satisfaction the key to the organization, the need to understand the customer is critical. Marketing research techniques have been developed just for that purpose. Smaller organizations may keep close to their customers by simply talking with them. Larger corporations have established methods in place to keep in touch with their customers, such as consumer panels, focus groups, or third-party research studies. Whatever

the method, the desire is to know the customers so the organization can better serve them and not lose sight of their needs and wants.

The idea of keeping close to the organization's customers seems simple. In reality, it is very easy to forget the customer's needs and wants. Sometimes the management is so involved with the product that their own desires and wants begin to take dominance, even though they have adopted the marketing concept.

However, it is easy for managers to forget the marketing concept and philosophy. For example, many years ago—before there was a Subway restaurant on every corner—a college student opened a small submarine sandwich shop near his university's campus. The sub shop was an immediate success. By using the marketing concept, the young entrepreneur had recognized an unmet need in the student population and opened a business that met that need.

The sub shop was so successful that it began to outgrow its original location after about three years. The shop moved to a larger location with more parking spaces, also near the university. At the new sub shop, waiters in tuxedos met the students and seated them at tables with tablecloths. Besides the traditional subs, the shop now served full meals and had a bar. Within a few months the sub shop was out of business. The owner of the shop had become so involved with his business vision that he forgot the customers' needs and wants. They did not want an upscale restaurant—there were other restaurants in the area that met that need, they just wanted a quick sub sandwich. By losing sight of the customers' wants and needs, the owner of the sub shop lost his successful business.

MEETING CUSTOMER NEEDS WHILE MEETING ORGANIZATIONAL GOALS

Sometimes in the zeal to satisfy a customer's wants and needs, the marketing concept is construed to mean that the customer is always right. However, the marketing concept also states that it is important to meet organizational goals as well as satisfy customer wants and needs. Satisfying both customer wants and needs as well a meeting organizational goals may involve conflicts that sometimes cannot be resolved. The organization that adopts the marketing concept will do everything in its power to meet the needs of its customers, but it must also make a profit, which may involve disregarding some of the wants of customers.

Customers today often want both low price and environmental responsibility, two wants that cannot always be met simultaneously while also ensuring a profit for the organization. Consequently, the organization must hope for a compromise between what the consumer wants and what is practical for the business to provide. At the same time, unmet customer wants and needs can spur

further innovation so that the organization can hope to avoid these compromises and the consequent loss of sales.

In theory at least, no set of consumer wants and needs can go unmet with the application of innovation and technological advancement. In the twenty-first century, many organizations are finding ways to go "green" while continuing to offer low prices and high-quality goods and services. Wal-Mart, for example, announced in 2007 that it was pushing compact fluorescent light bulbs in an effort to improve its appeal to affluent consumers who typically favor environmental-friendly corporate practices.

Companies are also using cutting-edge information technologies to ascertain and track customers' wants and needs; these same technologies are also being used to organize production and distribution to enable efficient servicing of these wants and needs. As the authors of *Marketing Principle and Practices* note, "'Listening to the users,' involves the utilization of information technology in tracking customers' wants, thus, organizing network to create value for customers at a profit."

CRITICISM OF THE MARKETING CONCEPT

Interpreted literally, the marketing concept only advocates discovering consumers' wants and needs and satisfying them. Critics assert that consumers may not be aware of all of their wants and needs. For instance, in the 1950s, consumers were not aware of the ability to cook food by microwave. In the 1960s, consumers were not aware of the possibility of having personal computers in their homes. Critics argue that the marketing concept's concentration on consumers' wants and needs stifle innovation. Organizations will no longer concentrate on research and development in hopes that one product in ten might meet with consumer acceptance, and will less likely come up with innovative products such as microwaves and personal computers.

Supporters of the marketing concept have contended that it does not stifle innovation and that it does recognize that consumers cannot conceive of every product that they may want or need. However, need is defined in a very broad sense. In the microwave and personal computer examples, the need was not for the specific product, but there was a need to cook food faster and a need for writing and calculating. The microwave and personal computer satisfied those needs though the consumer never imagined these products. The marketing concept does not stifle creativity and innovation. It seeks to encourage creativity to satisfy customer needs.

The marketing concept is a relative newcomer as a philosophy of doing business. However, its evolution started before the Industrial Revolution. As time progressed,

customer and business needs also evolved. The product and selling philosophies eventually evolved into the marketing concept and philosophy. Today, the marketing concept and philosophy stands as a formula for doing business and many believe it is a prescription for success. It aims to satisfy customers by guiding the organization to meet the customers' needs and wants while meeting the organization's goals.

SEE ALSO *Market Share; Marketing Communication; Marketing Research*

BIBLIOGRAPHY

Barbaro, Michael. "Wal-Mart Puts Some Muscle Behind Power-Sipping Bulbs." *New York Times*, 2 January 2007.

Kotler, Philip, and Gary Armstrong. *Principles of Marketing.* 12th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Perreault, William D., Jr., and E. Jerome McCarthy. *Basic Marketing: A Global-Managerial Approach.* 15th ed. Boston: McGraw-Hill, 2005.

Stauble, Vernon R. *Marketing Principles and Practices*, 2nd ed. Ojai, CA: Novus Publishing, 2007.

MARKETING RESEARCH

Marketing research is the function that links the consumer, customer, and public to the marketer through information. This information is used to identify and define marketing opportunities and problems; to generate, refine, and evaluate marketing actions; to monitor marketing performance; and to improve understanding of the marketing process. Marketing research specifies the information, manages and implements the data-collection process, analyzes the results, and communicates the findings and their implications. Marketing research is concerned with the application of theories, problem-solving methods, and techniques to identify and solve problems in marketing. In order to offset unpredictable consumer behavior, companies invest in market research.

Increased customer focus, demands for resource productivity, and increased domestic and international competition have prompted an increased emphasis on marketing research. Managers cannot always wait for information to arrive in bits and pieces from marketing departments. They often require formal studies of specific situations. For example, Dell Computer might want to know a demographic breakdown of how many and what kinds of people or companies will purchase a new model in its personal computer line. In such situations, the marketing department may not be able to provide the detailed information needed from existing knowledge, and managers normally do not have the skill or time to obtain the information on their own. This formal study, whether performed internally or externally, is called marketing research.

The marketing research process consists of four steps: defining the problem and research objectives, developing the research plan, implementing the research plan, and interpreting and reporting the findings.

DEFINING THE OBJECTIVES

The marketing manager and the researcher must work closely together to define the problem carefully and agree on the research objectives. The manager best understands the decision for which information is needed; the researcher best understands marketing research and how to obtain the information.

Managers must know enough about marketing research to help in the planning and to interpret research results. Managers who know little about the importance of research may obtain irrelevant information or accept inaccurate conclusions. Experienced marketing researchers who understand the manager's problem should also be involved at this stage. The researcher must be able to help the manager define the problem and suggest ways that research can help the manager make better decisions.

Defining the problem and research objectives is often the hardest step in the research process. The manager may know that something is wrong without knowing the specific causes. For example, managers of a retail clothing store chain decided that falling sales were caused by poor floor set-up and incorrect product positioning. However, research concluded that neither problem was the cause. It turned out that the store had hired sales persons who were not properly trained in providing good customer service. Careful problem definition would have avoided the cost and delay of research and would have suggested research on the real problem.

When the problem has been defined, the manager and researcher must set the research objectives. A marketing research project might have one of three types of objectives. Sometimes the objective is exploratory—to gather preliminary information that will help define the problem and suggest hypotheses. Sometimes the objective is descriptive—to describe things such as the market potential for a product or the demographics and attitudes of consumers who buy the product. Sometimes the objective is causal—to test hypotheses about cause-and-effect relationships.

DEVELOPING THE RESEARCH PLAN

The second step of the marketing research process calls for determining the information needed, developing a plan for gathering it efficiently, and presenting the plan to marketing management. The plan outlines sources of secondary data and spells out the specific research approaches, contact methods, sampling plans, and instruments that researchers will use to gather primary data.

A marketing researcher can gather secondary data, primary data, or both. Primary data consists of information collected for the specific purpose at hand. Secondary data consists of information that already exists somewhere, having been collected for another purpose. Sources of secondary data include internal sources such as profit and loss statements, balance sheets, sales figures, and inventory records; and external sources such as government publications, periodicals, books, and commercial data. Primary data collection requires more extensive research, more time, and more money. Secondary sources can sometimes provide information that is not directly available or would be too expensive to collect.

Secondary data also present problems. The needed information may not exist. Researchers can rarely obtain all the data they need from secondary sources. The researcher must evaluate secondary information carefully to make certain of its relevance (fits research project needs), accuracy (reliably collected and reported), currency (up to date enough for current decisions), and impartiality (objectively collected and reported). Researchers must also understand how secondary sources define basic terms and concepts, as different sources often use the same terms but mean slightly different things, or they attempt to measure the same thing but go about it in different ways. Either way, the result can be that statistics found in secondary sources may not be as accurate or as relevant as they appear on the surface.

RESEARCH APPROACHES

Observational research is the gathering of primary data by observing relevant people, actions, and situations. Observational research can be used to obtain information that people are unwilling or unable to provide. In some cases, observation may be the only way to obtain the needed information.

Survey research is the approach best suited for gathering descriptive information. A company that wants to know about people's knowledge, attitudes, preferences, or buying behavior can often find out by asking them directly. Survey research is the most widely used method for primary data collection, and it is often the only method used in a research study. The major advantage of survey research is its flexibility. It can be used to obtain many different kinds of information in many different marketing situations. A classic example of survey research comes from the 1980s, when cola companies began to run taste tests against their competitors. Participants were allowed to taste different cola brands without knowing which was which. The participant then decided which brand was preferred, providing the tester with impartial information about consumer tastes. (It should be noted that these tests were also used for advertising purposes,

which differed from the research purposes.) Today, online surveys are a common feature on a wide variety of Web sites, providing marketing researchers with an important source of survey data.

Whereas observation is best suited for exploratory research and surveys for descriptive research, experimental research is best suited for gathering causal information. Experiments involve selecting matched groups of subjects, giving them different treatments, controlling unrelated factors, and checking for differences in group responses. Thus, experimental research tries to explain cause-and-effect relationships.

RESEARCH CONTACT METHODS

Research may be collected by mail, telephone, e-mail, fax, or personal contact. Mail questionnaires can be used to collect large amounts of information at a low cost per respondent rate. Respondents may give more honest answers to more personal questions on a mail questionnaire than to an unknown interviewer in person or over the phone. However, mail questionnaires lack flexibility in that they require simply worded questions. They can also take a long time to complete, and the response rate—the number of people returning completed questionnaires—is often very low.

Telephone interviewing is the best method for gathering information quickly, and it provides greater flexibility than mail questionnaires. Interviewers can explain questions that are not understood. Telephone interviewing also allows greater sample control. Response rates tend to be higher than with mail questionnaires. But telephone interviewing also has its drawbacks. The cost per respondent is higher than with mail questionnaires, people may regard a phone call as more of an inconvenience or an intrusion, and they may not want to discuss personal questions with an interviewer.

Recent laws have created further difficulty with telephone interviewing. In 2003, the National Do-Not-Call Registry was created in the United States, blocking commercial telemarketers from calling numbers on the no-call list. By early 2008, over 157 million phone numbers in the United States were on the list. A similar list was created in Great Britain in 1999 and in Canada in 2004. The creation of these lists and their widespread use by telephone customers has significantly limited the use of telephone interviewing for marketing research purposes.

Personal interviewing consists of inviting several people to talk with a trained interviewer about a company's products or services. The interviewer needs objectivity, knowledge of the subject and industry, and some understanding of group and consumer behavior. Personal interviewing is quite flexible and can be used to collect large amounts of information. Trained interviewers can hold a respondent's

attention for a long time and can explain difficult questions. They can guide interviews, explore issues, and probe as the situation requires. The main drawbacks of personal interviewing are costs and sampling problems. Personal interviews may cost three to four times as much as telephone interviews.

SAMPLING PLAN

Marketing researchers usually draw conclusions about large groups of consumers by studying a relatively small sample of the total consumer population. A sample is a segment of the population selected to represent the population as a whole. Ideally, the sample should be representative so that the researcher can make accurate estimates of the thoughts and behaviors of the larger population. If the sample is not representative, it may lead the company to draw the wrong conclusions and misuse its resources.

The marketing researcher must design a sampling plan, which calls for three decisions:

1. Sampling unit—determining who is to be surveyed. The marketing researcher must define the target population that will be sampled. If a company wants feedback on a new basketball shoe, it would be wise to target active players and even professional players.

2. Sample size—determining the number of people to be surveyed. Large samples give more reliable results than small samples. Samples of less than 1 percent of a population can often provide good reliability, given a credible sampling procedure. Most commercial samples consist of between several hundred and several thousand respondents.

3. Sampling procedure—determining how the respondents should be chosen. To obtain a representative sample, a probability (random) sampling of the population should be drawn. This is a means of determining who is reached by the survey to ensure they are indeed a valid cross-section of the sampling unit. Choosing passersby on a street corner, for example, would not produce a random sample, whereas allowing a computer to pick names randomly from a relevant calling list probably would (depending on how the list was compiled). Probability sampling allows the calculation of confidence limits for sampling error.

RESEARCH INSTRUMENTS

In collecting primary data, marketing researchers have a choice of two main research instruments—the questionnaire and mechanical devices. The questionnaire is by far the most common instrument. A questionnaire consists of a set of questions presented to a respondent for his or her answers. In preparing a questionnaire, the marketing researcher must decide what questions to ask, the form of the questions, the wording of the questions, and the ordering of the questions. Each question should be checked to see that it contributes to the research objectives.

Although questionnaires are the most common research instrument, mechanical instruments are also used. Two examples of mechanical instruments are people meters and barcode scanners. People meters are not widely used because they tend to be expensive, require unrealistic advertising exposure conditions, and are hard to interpret. The use of data automatically collected by barcode scanners has become more common with the advent of powerful computers and sophisticated database and data-mining software. Data collected by scanners provide marketing researchers with valuable information drawn from a large data pool.

COLLECTING THE INFORMATION

The researcher must now collect the data. This phase is generally the most expensive and the most prone to error. In the case of surveys, four major problems arise. Some respondents will not be at home and will have to be replaced. Other respondents will refuse to cooperate. Still others will give biased or dishonest answers. Finally, some interviewers will occasionally be biased or dishonest.

CHARACTERISTICS OF GOOD MARKETING RESEARCH

Following are the characteristics of good marketing research:

1. Scientific method. Effective marketing research uses the principles of the scientific method: careful observation, formulation of hypotheses, prediction, and testing.

2. Research creativity. At its best, marketing research develops innovative ways to solve a problem.

3. Multiple methods. Competent marketing researchers shy away from over-reliance on any one method, preferring to adapt the method to the problem rather than the other way around. They also recognize the desirability of gathering information from multiple sources to give greater confidence.

4. Interdependence of models and data. Competent marketing researchers recognize that the facts derive their meaning from models of the problem. These models guide the type of information sought and therefore should be made as explicit as possible.

5. Value and cost of information. Competent marketing researchers show concern for estimating the value of

information against its cost. Value/cost evaluation helps the marketing research department determine which research projects to conduct, which research designs to use, and whether to gather more information after the initial results are in. Research costs are typically easy to quantify, while the value is harder to anticipate. The value depends on the reliability and validity of the research findings and management's willingness to accept and act on its findings. In general, the most valuable information tends to cost the most because it requires more intensive methods, although it is easy to spend a great deal of money on poorly conceived research.

6. Healthy skepticism. Competent marketing researchers will show a healthy skepticism toward assumptions made by managers about how the market works.

7. Ethical marketing. Most marketing research benefits both the sponsoring company and its consumers. Through marketing research, companies learn more about consumers' needs, and are able to supply more satisfying products and services. However, the misuse of marketing research can also harm or annoy consumers. There are professional ethical standards guiding the proper conduct of research.

PRESENTING THE RESEARCH PLAN

The last step in market research is the presentation of a formal plan. At this stage, the marketing researcher should summarize the plan in a written proposal to management. A written proposal is especially important when the research project will be large and complex or when an outside firm carries it out. The proposal should cover the management problems addressed and the research objectives, the information to be obtained, the sources of secondary information or methods for collecting primary data, and the way the results will help management decision making. A written research plan or proposal makes sure that the marketing manager and researchers have considered all the important aspect of the research and that they agree on why and how the research will be done.

MANAGEMENT'S USE OF MARKETING RESEARCH

In spite of the rapid growth of marketing research, many companies still fail to use it sufficiently or correctly. Several factors can stand in the way of its greater utilization.

1. A narrow conception of marketing research. Many managers see marketing research as only a fact-finding operation. The marketing researcher is supposed to design a questionnaire, choose a sample, conduct interviews, and report results, often without being given a careful definition of the problem or of the decision alternatives facing management. As a result, some fact-finding fails to be useful. This reinforces management's idea of the limited usefulness of some marketing research.

2. Uneven caliber of marketing researchers. Some managers view marketing research as little better than a clerical activity and reward it as such. Poorly qualified marketing researchers are hired, and their weak training and deficient creativity lead to unimpressive results. The disappointing results reinforce management's prejudice against expecting too much from marketing research. Management continues to pay low salaries, perpetuating the basic difficulty.

3. Late and occasional erroneous findings by marketing research. Managers want quick results that are accurate and conclusive. However, good marketing research takes time and money. If they cannot perceive the difference between quality and shoddy research, managers become disappointed, and they lower their opinion of the value of marketing research. This is especially a problem in conducting marketing research in foreign countries.

4. Intellectual differences. Intellectual divergences between the mental styles of line managers and marketing researchers often get in the way of productive relationships. The marketing researcher's report may seem abstract, complicated, and tentative, while the line manager wants concreteness, simplicity, and certainty. Yet in the more progressive companies, marketing researchers are increasingly being included as members of the product management team, and their influence on marketing strategy in growing.

SEE ALSO *Marketing Concept and Philosophy; Research Methods and Processes*

BIBLIOGRAPHY

Higgins, Lexis F. "Applying Principles of Creativity Management to Marketing Research Efforts in High-Technology Markets." *Industrial Marketing Management,* May 1999, 305–317.

Malhorta, Naresh K. *Review of Marketing Research.* Armonk, NY: M.E. Sharpe, 2008.

———."Market Focus: Research-Instant Intelligence." *PR Week,* 7 February 2005, 17.

———."Online Market Research Poised for Even Bigger Growth." *B&T Weekly,* 21 January 2005.

———."Simply Wrong Assumptions." *Nilewide Marketing Review,* 13 February 2005.

Woodside, Arch G. *Essential Knowledge for Research in Marketing.* Thousand Oaks, CA: Sage Publications, 2008.

MECHANISTIC ORGANIZATIONS

In their 1961 book *The Management of Innovation*, Burns and Stalker noted that mechanistic organizations are often appropriate in stable environments and for routine tasks and technologies. In some ways similar to bureaucratic structures, mechanistic organizations have clear, well-defined, centralized, vertical hierarchies of command, authority, and control. Efficiency and predictability are emphasized through specialization, standardization, and formalization. This results in rigidly defined jobs, technologies, and processes. The term mechanistic suggests that organizational structures, processes, and roles are like a machine in which each part of the organization does what it is designed to do, but little else.

It is easy to confuse mechanistic organizations with bureaucracies due to the considerable overlap between the two concepts. Yet despite the overlaps, a primary difference between mechanistic organizations and bureaucracy is the rationale for utilizing each of these. A goal of bureaucratic structures is to protect lower-level administrative positions from arbitrary actions of owners and higher-level managers. For example, an individual holding the job title of vice-president of production would, in a bureaucracy, be protected from indiscriminate changes in work hours, wages, and responsibilities through formal rules, regulations, and grievance procedures. The goal of the bureaucracy is protection of positions within the organization.

Mechanistic organizations, on the other hand, are utilized to increase efficiency when tasks and technologies are relatively stable. The vice-president of production in a mechanistic organization would employ production processes and techniques that minimize waste and maximize outputs for a given quantity of inputs. The goal of mechanistic structures is efficiency. Thus, the rationale for bureaucracy is protection while the rationale for mechanistic organizations is efficiency. Clearly, the two are not mutually exclusive; an organization could be structured as a bureaucracy and also be mechanistic. On the other hand, many examples of inefficient bureaucracies can quickly come to mind, suggesting that while there is overlap between the concepts, there are distinctions as well.

Burns and Stalker focused on the difference between mechanistic structures and organic structures, which they defined as being more fluid and interactive. Recently, focus has shifted to place more emphasis on organic systems, which are lauded for being more adaptable and friendly. In his 2008 article "Cultivate an Organic Organization," Dr. Ben Carlsen notes that "Whether in the boardroom or the supermarket, organic is healthier… having the characteristics of a living organism, the organic organization seeks the best and most synergistic 'match'"

Mechanistic structures, on the other hand, are highly formalized, which means that nearly all processes and procedures have been administratively authorized. The organization considers processes and procedures outside these established protocols as variances that must be brought under control. Such formalization is driven by efficiency; reduction in variance increases predictability, and increases in predictability allow for improvements in efficiency. Examples pertinent to product or service distribution include the processes a store clerk uses when presented with a customer's credit card or how returns of products by customers are to be handled. Examples pertinent to product or service production and assembly include how a book publisher manages the workflow from completed manuscripts to final bookbinding, and how Dell Computer manages assembly of made-to-order personal computers. Decision making is largely concerned with application of the appropriate predetermined rule, policy, procedure, or criteria.

When a mechanistic organization accepts innovation and implementation of new practices, it does so through its formalized channels. As Chapman's 2007 *Handbook of Management Accounting Research* details, the mechanistic structure allows business to implement new policy quickly and effectively. Innovations are transferred throughout the business with ease, and plans are followed through to the letter. While this encourages implementation of processes, it also makes it difficult for the mechanistic organization to change direction partway through innovation, or to scrap one idea for the sake of another in the midst of transition.

Mechanistic organizations also possess the environmental and technological stability to allow work to be clearly defined and differentiated. The work of the organization is divided into specific, precise tasks. Created from one or more such specific tasks, specialized job positions rigidly define skills needed, task methodology and procedures to be used, and specific responsibilities and authority. In effect, lower-level managers and other employees simply follow procedures, and while this may have the side effect of stifling creativity, it also increases efficiency of established processes. In stable environments, however, stifling creativity may be worth the improvements in efficiency. Few customers, for instance, would want a McDonald's employee to use creativity in preparing their hamburger. Instead, the repetitiveness and stability of the procedures needed to cook a hamburger are more efficient when the employee follows established procedures and customers can trust that each hamburger they purchase will taste the same.

However, specialized tasks are repetitive and can sometimes be boring. For example, at a Sam's Club store, one person stands at the door to perform the single task of

marking customer receipts. Because employees often work separately with little interaction, it is often hard for them to see how one small, specialized task relates to overall organizational objectives.

In addition, the work of mechanistic organizations tends to be impersonal. Jobs are designed around the task rather than the individual. Personnel selection, assignment, and promotion are based on the possession of skills required for specific tasks. Other people, like interchangeable parts of a machine, can replace people in a position.

Specialization carries throughout the organization. Positions are grouped together into specialized work units and, ultimately, into specialized functional departments such as production, marketing, or finance. Each organizational unit has clear and specific responsibilities and objectives. Communication is primarily vertical, with more emphasis on downward directives than on upward communication. Thus, such matters as goals, strategies, policies, and procedures are determined by top-level management and communicated downward as instructions and decisions to be implemented.

Upward communication usually involves transmittal of reports and other information for management to consider, usually at the request of management. Coordination is maintained through the chain of command. For example, top-level management is responsible for coordination across functional departments such as integrating marketing sales forecasts with production schedules. Within a department, the department manager is responsible for coordination across department subunits; production managers, for example, coordinate raw inventory requirements with work-in-process inventory.

At least two criticisms are generally made about mechanistic organizations. First, while focusing on task concerns such as efficiency and standardization, mechanistic organizations tend to ignore human needs and dynamics. Second, creativity, and thus innovation, are restricted by the rigidity of standardized and formalization. Thus, the appropriate environment for mechanistic organizations is a stable environment, while rapidly changing environments require more flexibility. For such environments, Burns and Stalker recommend the organic model of organization. Highly mechanized organizations operating in rapidly changing environments run the risk of becoming obsolete as competitors sacrifice maximum efficiency in exchange for flexibility to tackle new environmental conditions.

However, it has been argued by such authors as Robert Waldersee and Andrew Griffiths that certain developments in the business world are creating an increasingly strong environment for mechanistic organization. Waldersee and Griffith theorize that the increase in globalization will benefit mechanistic organizations, which can identify problems and respond to them more effectively than the less streamlined organic models. In agreement, such authors as Brad Moore and Alan Brown have suggested that the newer business models designed with organic organizations in mind are being established in mechanistic companies equally well. In their 2006 piece on TQM (Total Quality Management), they propose that mechanistic organizations have no trouble implementing such practices as TQM, which are thought to require a more fluid approach. This suggests mechanistic organizations are beginning to incorporate adaptability into their formalized structure.

SEE ALSO *Effectiveness and Efficiency; Organic Organizations; Organization Theory; Organizational Behavior; Organizational Structure*

BIBLIOGRAPHY

Burns, T., and G.M. Stalker. *The Management of Innovation.* London: Tavistock, 1961.

Cardinal, L.B., S.B. Sitkin, and C.P. Long. "Balancing and Rebalancing in the Creation and Evolution of Organizational Control." *Organization Science* 15, no. 4 (2004): 411–432.

Carlsen, Dr. Ben A. "Cultivate an Organic Organization." *EzineArticles.com* Available from: http://ezinearticles.com/ ?Cultivate-An-Organic-Organization&id=1197654.

Chapman, Christopher S., ed. *Handbook of Accounting Management Research* Amsterdam: Elsevier Science, 2007.

Martin P., and T.C. Heeren. "Product-Line Management in Professional Organizations: An Empirical Test of Competing Theoretical Perspectives." *Academy of Management Journal* 47, no. 5 (2004): 723–735.

McAdam R., and B. Lafferty. "A Multilevel Case Study Critique of Six Sigma: Statistical Control or Strategic Change?" *International Journal of Operations and Production Management* 24, no. 5 (2004): 530–549.

Moore, Brad. Brown, Alan. "The Application of TQM: Organic or Mechanistic?" *International Journal of Quality and Reliability Management* Vol. 23. Issue 7. 2006. Pgs 721–742. London: Tavistock, 1961.

Waldersee, Robert. Griffiths, Andrew. "Predicting Organization Change Success: Matching Organization Type, Change Type, and Capabilities" *Journal of Applied Management and Entrepeneurship* Jan, 2003

MENTORING

Mentors are individuals with advanced experience and knowledge who take a personal interest in helping the careers and advancement of their protégés. Mentors may or may not be in their protégés' chain of command, be employed in the same organization as their protégés, or even be in the same field as their protégés. Mentoring relationships may range from focusing exclusively on the protégé's job functions to being a close friendship that

Table 1
Kram's Mentoring Roles

1. Career Development Roles
   • Coaching
   • Sponsoring advancement
   • Providing challenging assignments
   • Protecting protégé from adverse forces
   • Fostering positive visibility
2. Psychosocial Roles
   • Personal support
   • Friendship
   • Counseling
   • Acceptance
   • Role modeling

becomes one of the most important relationships in the protégé's life.

Most mentoring relationships are informal, and develop on the basis of mutual identification and the fulfillment of career needs. The mentor may see the protégé as a "diamond in the rough" or a younger version of himself or herself, while the protégé may view the mentor as a competent role model with valued knowledge, skills, and abilities. Members of mentoring relationships often report a mutual attraction or chemistry that sparks the development of the relationship.

According to Kathy Kram, mentors provide two primary types of behaviors or roles. First, they provide career development roles, which involve coaching, sponsoring advancement, providing challenging assignments, protecting protégés from adverse forces, and fostering positive visibility. Second, mentors provide psychosocial roles, which involve personal support, friendship, counseling, acceptance, and role modeling. A given mentor may engage in some or all of these roles and these roles may not only vary from relationship to relationship, but may also vary over time in a given relationship.

Kram observes that mentoring relationships pass through four phases: initiation, cultivation, separation, and redefinition. The relationship develops during the initiation and cultivation stages. In initiation, the mentor and protégé meet and first begin to know a little about each other. The real learning occurs in the cultivation stage, where the mentor helps the protégé to grow and develop. The separation stage is typically reached after two to five years, and the relationship may terminate because of physical separation or because the members no longer need one another. Research indicates that the majority of mentoring relationships end because of physical separation. After separation, the members of the relationship may redefine their relationship as a peer relationship, or may terminate their relationship entirely.

POSITIVE OUTCOMES OF MENTORING RELATIONSHIPS

Mentoring relationships are related to a variety of positive organizational and career outcomes. A number of different research studies indicate that mentored individuals have higher levels of mobility on the job, recognition, promotion, and compensation. Also, employees with mentors report higher levels of learning on the job than those without mentors. Additionally, research indicates that employees with positive mentoring experiences typically feel higher levels of pay satisfaction, career satisfaction, and organizational commitment. Finally, research indicates that the lower levels of turnover that occur with mentored individuals are due, in part, to their higher levels of organizational commitment that may be brought about by the mentoring relationship.

A meta-analysis (a statistical technique that combines results from numerous studies to give an "average" finding) conducted by Allen, Eby, Poteet, Lentz, and Lima in 2004 supports these findings. In their analysis of forty-three individual studies, they found that individuals who had been mentored had better career outcomes from both career-related and psychosocial mentoring; they were more satisfied with their careers, believed strongly that they would advance in their careers, and were committed to their careers. The meta-analysis indicated that mentored individuals also had better compensation and more promotions that those employees without mentors.

Mentoring relationships may also be beneficial for the mentor. Mentors have reported more benefits than costs to being a mentor. Research indicates that key benefits to mentors included a sense of satisfaction and fulfillment, recognition from others, career and job renewal, and support from their protégés. The business historian Pamela Laird has even suggested that mentors have gained status through their placing of protégés, since it could serve as a marker for the "ability to judge talent and character in a visible and competitive arena."

Finally, mentoring relationships may be beneficial for the organization. Mentoring relationships are a powerful tool for socializing new employees, for increasing organizational commitment, and for reducing unwanted turnover. Mentoring relationships can foster innovation and revitalize mentors who have reached career plateaus. Because members of the relationship may share different insights and perspectives regarding organizational and societal cultures, mentoring relationships may also be useful in mergers and in international organizations.

SOCIAL CAPITAL

Generally speaking, mentoring relationships are a type of "social capital." According to Wayne Baker, social capital refers to one's access to various networks, both in one's

personal and professional life. Pamela Laird has also shown that an individual moves through a series of networks in his or her career.

In her book, *Pull*, Laird notes that social capital is distributed unevenly and can have enormous impact in terms of "pull" discrimination, where certain members are granted access and others are not. Perception of potential is critical, but Laird points out that the criteria for "potential" often reflects the values and background of the "gatekeeper." Because of this, certain inequalities in the workplace can be perpetuated. The mentor/protégé is one example where "pull" can operate in this manner, often to the detriment of women and minorities throughout much of the twentieth century.

Baker notes that social capital is crucial to career success, specifically arguing against the American value of the "self-made man." He even suggests that businesses must learn to build social capital into their structures by such measures as rotating members through an organization.

GENDER, DIVERSITY, AND MENTORING

Although mentoring relationships are important for all organizational members, they are essential for women and employees of color. Mentors can help these individuals overcome barriers to advancement in organizations and break through the "glass ceiling," the invisible barrier to advancement based on gender biases. Research indicates that a full 91 percent of the female executives surveyed in a Catalyst study reported having a mentor, and the majority of respondents identified mentoring as a key strategy used to break through the glass ceiling.

A mentor can buffer women and people of color from both overt and covert forms of discrimination, and help them navigate the obstacle course to the executive suite. By conferring legitimacy on their female and minority protégés, mentors can alter stereotypic perceptions and send the message that the protégé has the mentor's powerful support and backing. Research indicates that mentors provide "reflected power" to their protégés, and use their influence to build their protégé's power in the organization. Mentors can train their female and minority protégés in the "ins and outs" of corporate politics and provide valuable information on job openings and changes in the organization—information that is typically provided in the "old boys' network."

Although most research indicates that women and people of color are as likely as their majority counterparts to have mentors, women reported greater barriers to getting a mentor than men. Research showed that women were more likely than men to report that mentors were unwilling to mentor them, that supervisors and coworkers would disapprove of the relationship, that they had less access to mentors, and that they were hesitant to initiate the rela-

tionship for fear that their efforts would be misconstrued as being sexual by either the mentor or others in the organization. In spite of these reported barriers, women were as likely as men actually to have a mentor, suggesting that women overcame these barriers in order to develop these important relationships. Laird notes that by the 1970s, mentoring had become a prominent concern for businesswomen. Similarly, other mentoring research indicates that African American protégés were more likely than Caucasian protégés to go outside their departments and formal lines of authority to develop mentoring relationships with higher ranking mentors of the same race. These studies indicate that women and minorities recognize the importance of mentors and are willing to overcome barriers to gaining this critical developmental relationship. Laird points out that African Americans and other ethnic minority groups have formed associations that serve in part of facilitate mentoring relationships for their members.

Another obstacle faced by female and minority protégés is that they are more likely than their majority counterparts to be in a "diversified mentoring relationship." Diversified mentoring relationships are composed of mentors and protégés who differ on one or more group memberships associated with power. Because of the scarcity of female and minority mentors at higher organizational ranks, female and minority protégés are more likely than their majority counterparts to be in cross-gender or cross-race relationships. These relationships provide limited role modeling functions, functions that are particularly important for women and employees of color. In addition, individuals in cross-gender relationships are less likely to engage in close friendship and social roles that involve after-work networking activities because of the threat or appearance of romantic involvement.

Female and minority protégés face a certain catch 22: even if they find a female or minority mentor who can provide role modeling functions, these mentors may be restricted in helping them advance since women and people of color have less power in organizations than their majority counterparts. In sum, majority protégés obtain mentors who can provide more functions than minority or female protégés, and these functions in turn lead to increased power and more promotions, thus perpetuating the cycle.

One area of diversity that has received research attention is the role of age in mentoring relationships. Age has become a more important workplace issue as the large group of American baby boomers ages. Experts suggest that mentors be eight to fifteen years (a half generation) older than their protégés, so that the age difference is not as large as that of parent and child, and not so small that the mentor and protégé act more as peers. However, not all mentoring relationships have this age span. Research indicates that the mentoring experience differs

for protégés based on their age, with younger protégés receiving more career-related mentoring than older protégés.

FORMAL MENTORING RELATIONSHIPS

In recognition of the benefits of mentoring relationships, many organizations attempt to replicate informal mentoring relationships by creating formal mentoring programs. One key difference between formal and informal mentoring relationships is that informal relationships develop spontaneously, whereas formal mentoring relationships develop with organizational assistance or intervention—usually in the form of voluntary assignment or matching of mentors and protégés. A second distinction is that formal relationships are usually of much shorter duration than informal relationships; formal relationships are usually contracted to last less than a year.

Although many organizations assume that formal relationships are as effective as informal relationships, existing research indicates that this is not the case. Georgia Chao and her associates found that protégés with formal mentoring relationships received less compensation than protégés with informal relationships. Other studies suggest that formal protégés not only received less compensation than informal protégés, but they also reported less psychosocial and career development functions and less satisfaction with their mentors than informal protégés. In fact, individuals with formal mentors did not receive more compensation or promotions than individuals who were not mentored. These researchers also found that women received fewer benefits from formal mentors than men did, indicating that female protégés may have the least to gain from entering a formal mentoring relationship. This research indicates that formal mentors are not a substitute for informal mentoring relationships.

In conclusion, organizations can create an environment that fosters mentoring relationships by structuring diverse work teams that span departmental and hierarchical lines and by increasing informal opportunities for networking and interaction. Organizations can increase the pool of diverse mentors by structurally integrating women and minorities into powerful positions across ranks and departments, and by rewarding these relationships in performance appraisals and salary decisions.

NEGATIVE MENTORING EXPERIENCES

Although there are numerous potential benefits for both the mentor and protégé from the mentoring relationship, it is not always a positive experience. Researchers have identified dysfunctional mentoring relationships in which the needs of either the mentor or protégé are not being met, or the relationship is causing some distress to either of the parties. Negative experiences that have been identified include the following:

- The mentor delegates too much work to the protégé.
- The mentor abuses his/her power over the protégé.
- Mentor inappropriately takes credit for the protégé's work.
- The mentor attempts to sabotage the protégé.
- The mentor intentionally deceives the protégé.
- The mentor intentionally is unavailable to or excludes the protégé.
- The mentor neglects the protégé's career, or does not provide support.
- The mentor is too preoccupied with his/her own career progress.
- The mentor lacks technical competence and cannot guide the protégé.
- The mentor lacks interpersonal competence and cannot interact with the protégé.
- There's a poor fit in personality between the mentor and protégé.
- There's a poor fit in work styles between the mentor and protégé.
- The mentor has a bad attitude about the organization or job.
- The mentor cannot mentor effectively due to problems in his/her personal life.
- The mentor sexually harasses protégé.

MENTORING SUCCESSES AND FAILURES

Though mentoring is now a widespread business practice, its results can vary. At its worst, mentoring can place incompetent or unscrupulous people in positions of power. Enron represents perhaps the most glaring example. Some have interpreted Jeff Skilling's relationship with Andy Fastow as a mentor/protégé relationship. Some press coverage of Enron indicated that Fastow would not have been named the company's chief financial officer without this relationship. Once in this position of power, Fastow was able to do enormous damage to the company and investors. Andy Fastow also cultivated his own protégé, Michael Kopper, who then became a partner in Fastow's more blatant fraudulent and criminal activity.

Enron's internal "Performance Review Committee," a process that was introduced by Jeff Skilling, was intended to make employee evaluation at the company more objective. However, managers often promoted their

own favorite employees. Some argue that this subverted the original goal of creating a meritocracy. This is one example where a mentoring relationship may have been harmful to an organization.

Despite these examples, many giants of the business world were once protégés. Warren Buffett, who is sometimes known as the "Sage" of Omaha, was mentored by the investor Benjamin Graham. Some have noted that Buffett's own successful investment strategies are derived from his time as Graham's protégé.

SEE ALSO *Diversity; Knowledge Management; Training Delivery Methods; Women and Minorities in Management*

BIBLIOGRAPHY

Allen, Tammy D., et al. "Career Benefits Associated with Mentoring for Protégés: A Meta-Analysis." *Journal of Applied Psychology* 89, no. 1 (2004): 127–136.

Baker, Wayne. *Achieving Success Through Social Capital: Tapping the Hidden Resources in Your Personal and Business Networks.* San Francisco: Jossey-Bass, 2000.

Barrionuevo, Alexei. "The Courtroom Showdown, Played as Greek Tragedy." *New York Times* 12 March 2006, Section 4, Pg. 1.

Chao, Georgia, Pat Walz, and Philip Gardner. "Formal and Informal Mentorships: A Comparison on Mentoring Functions and Contrast with No Mentored Counterparts." *Personnel Psychology* 45 (1992): 619–636.

Dreher, George, and Ronald Ash. "A Comparative Study of Mentoring Among Men and Women in Managerial, Professional, and Technical Positions." *Journal of Applied Psychology* 75 (1990): 539–546.

Eby, Lillian, et al. "Protégés' Negative Mentoring Experiences: Construct Development and Nomological Validation." *Personnel Psychology* 57 (2004): 411–447.

Eichenwald, Kurt. *Conspiracy of Fools.* New York: Broadway Books, 2005.

France, Mike, et al. "Who Will Fastow Implicate?" *Business Week* 26 January 2004, 41.

Hosenbal, Mark. "Enron: Expensing His Taxes." *Newsweek* 2 September 2002, 6.

Kram, Kathy. *Mentoring at Work.* Glenview, IL: Scott, Foresman & Co., 1985.

Laird, Pamela. *Pull.* Cambridge, MA: Harvard University Press, 2006.

McLean, Bethany, and Peter Elkind. *The Smartest Guys in the Room.* New York: Penguin, 2004.

———. "Mentor Functions and Outcomes: A Comparison of Men and Women in Formal and Informal Mentoring Relationships." *Journal of Applied Psychology* 1999.

Ragins, Belle Rose. "Diversified Mentoring Relationships in Organizations: A Power Perspective." *Academy of Management Review* 22 (1997): 482–521.

Reese, John. "Bruised Retailers Ben Graham Would Buy." *Forbes.com* 20 February 2008. Available from: http://www.forbes.com/2008/02/20/buffett-graham-pacsun-pf-guru-in_jr_0220guruscreen_inl.html.

Scandura, Terri. "Mentorship and Career Mobility: An Empirical Investigation." *Journal of Organizational Behavior* 13 (1992): 169–174.

Thomas, David. "The Impact of Race on Managers' Experiences of Developmental Relationships (Mentoring and Sponsorship): An Intra-Organizational Study." *Journal of Organizational Behavior* 11 (1990): 479–492.

MERGERS AND ACQUISITIONS

A merger takes place when two companies decide to combine into a single entity. When the merger is forced through buyouts or financial leverage, it is referred to as an acquisition (also called a *takeover*). While the motivations may differ, the essential feature of both mergers and acquisitions involves one firm emerging where once there existed two firms.

Essentially, the difference rests in the attitude of the incumbent management of firms that are targeted. A so-called friendly takeover is often a euphemism for a merger. A hostile takeover refers to unwanted advances by outsiders. Thus, the reaction of management to the overtures from another firm tends to be the main influence on whether the resulting activities are labeled friendly or hostile.

Many kinds of mergers increase the emerging company's Herfindahl-Hirschman Index (HHI), the concentration rating of their industry. If the merger raises the HHI by 100 points or more (especially in industries rated 1800 or higher), the Justice Department may take steps to prevent the merger. This is done primarily to discourage monopolistic practices, as the combining firms often lessen competition. Although the HHI Index is used primarily by the United States, it has applications internationally in providing checks and balances for merger activity. For instance, in 2007 Ireland adopted the HHI Index as a guide in restraining monopolistic mergers in its private health insurance industry.

MOTIVATIONS FOR MERGERS AND ACQUISITIONS

There are a number of possible motivations that may result in a merger or acquisition. One of the most oft-cited reasons is to achieve economies of scale. Economies of scale may be defined as a lowering of the average cost to produce one unit due to an increase in the total amount of production. The idea is that the larger firm resulting from the merger can produce more cheaply than the previously separate firms. Efficiency is the key to achieving economies of scale, through the sharing of resources and technology and the elimination of needless duplication and waste. Economies of scale sounds good as a

rationale for merger, but there are many examples to show that combining separate entities into a single, more efficient operation is not easy to accomplish in practice.

A similar motivation is economies of scope, often found when the merger involves *vertical integration*. This involves acquiring firms through which the parent firm currently conducts normal business operations, such as suppliers and distributors.

By combining different elements involved in the production and delivery of the product to the market, acquiring firms gain control over raw materials and distribution outlets. This may result in centralized decisions and better communications and coordination among the various business units. It may also result in competitive advantages over rival firms that must negotiate with and rely on outside firms for inputs and sales of the product.

Horizontal integration is a merger or acquisition to achieve greater market presence or market share. The combined, larger entity may have competitive advantages such as the ability to buy bulk quantities at discounts, store and inventory needed production inputs, and achieve mass distribution through sheer negotiating power. Greater market share also may result in advantageous pricing, since larger firms are able to compete effectively through volume sales with thinner profit margins. This type of merger or acquisition often results in the combining of complementary resources, such as a firm that is very good at distribution and marketing merging with a very efficient producer. The shared talents of the combined firm may mean competitive advantages versus other, smaller competition.

The ideas above refer to reasons for mergers or acquisitions among firms in similar industries. When two unrelated firms join without an industrial relationship, it is referred to as a conglomerate merger. Since conglomerate mergers do not involve noticeable vertical or horizontal integration, they are more rare than other types of mergers.

Conglomerate mergers were especially popular in the 1960s wave of merger activity, when companies believed that combining certain departments—such as accounting or human resources—would streamline even unrelated businesses. Yet conglomerate mergers developed a history of being unsuccessful, and their use has faded. There are very few restrictions against conglomerate mergers today, since the combination of unrelated companies does not radically interfere in many industries. However, in Europe, legislation passed in 2007 which restricted even conglomerate mergers if (upon examination) they threatened to create monopolies.

There are several additional motivations for firms that may not necessarily be in similar lines of business. One of the often-cited motivations for acquisitions involves excess cash balances. Suppose a firm is in a mature industry, and has little opportunities for future investment beyond the existing business lines. If profitable, the firm may acquire large cash balances as managers seek to find outlets for new investment opportunities. One obvious outlet is to acquire other firms. The ostensible reason for using excess cash to acquire firms in different product markets is diversification of business risk.

Management may claim that by acquiring firms in unrelated businesses the total risk associated with the firm's operations declines. However, it is not always clear for whom the primary benefits of such activities accrue. A shareholder in a publicly traded firm who wishes to diversify business risk can always do so by investing in other companies' shares. The investor does not have to rely on incumbent management to achieve the diversification goal. On the other hand, a less risky business strategy is likely to result in less uncertainty in future business performance, and stability makes management look good. The agency problem resulting from incongruent incentives on the part of management and shareholders is always an issue in public corporations. However, regardless of the motivation, excess cash is a primary motivation for corporate acquisition activity.

To reverse the perspective, an excess of cash is also one of the main reasons why firms become the targets of takeover attempts. Large cash balances make for attractive potential assets; indeed, it is often implied that a firm with a very large amount of cash is not being efficiently managed. While that conclusion is situation specific, it is clear that cash is attractive, and the greater the amount of cash the greater the potential to attract attention. Thus, the presence of excess cash balances in either acquiring or target firms is often a primary motivating influence in subsequent merger or takeover activity.

Another feature that makes firms attractive as potential merger partners is the presence of unused tax shields. The corporate tax code allows for loss carry-forwards; if a firm loses money in one year, the loss can be carried forward to offset earned income in subsequent years. A firm that continues to lose money, however, has no use for the loss carry-forwards. However, if the firm is acquired by another firm that is profitable, the tax shields from the acquired firm may be used to shelter income generated by the acquiring firm. Thus the presence of unused tax shields may enhance the attractiveness of a firm as a potential acquisition target.

A similar idea is the notion that the combined firm from a merger will have lower absolute financing costs. For example, two firms, X and Y, have each issued bonds as a normal part of the financing activities. If the two firms combine, the cash flows from the activities of X can be used to service the debt of Y, and vice versa. Therefore,

with less default risk the cost of new debt financing for the combined firm should be lower. It may be argued that there is no net gain to the combined firm; since shareholders have to guarantee debt service on the combined debt, the savings on the cost of debt financing may be offset by the increased return demanded by equity holders. Nevertheless, lower financing costs are often cited as rationale for merger activity.

During the U.S. merger wave in the 1960s, many firms attempted to acquire other companies to artificially boost their earnings per share. Consider two firms, A and B. Firm A has earnings of $1,000, 100 shares outstanding, and thus $10 earnings per share. With a price-earnings ratio of 20, its shares are worth $200. Firm B also has earnings of $1,000, 100 shares outstanding, but due to poorer growth opportunities its shares trade at 10 times earnings, or $100. If A acquires B, it will only take one-half share of A for each share of B purchased, so the combined firm will have 150 total shares outstanding. Combined earnings will be $2,000, so the new earnings per share of the combined firm are $13.33 per share. It appears that the merger has enhanced earnings per share, when in fact the result is due to inconsistency in the rate of increase of earnings and shares outstanding. Such manipulations were common in the 1960s, but investors have learned to be more wary of mergers instigated mainly to manipulate per share earnings. It is questionable whether such activity will continue to fool a majority of investors. The use of this ploy has faded since the 1980s.

Finally, there is the ever-present hubris hypothesis concerning corporate takeover activity. The main idea is that the target firm is being run inefficiently, and the management of the acquiring firm is likely to do a better job of utilizing the target's assets and strategic business opportunities. In addition, there is additional prestige in managing a larger firm, which may include additional perquisites such as club memberships or access to amenities such as corporate jets or travel to distant business locales. These factors cannot be ignored in detailing the set of factors motivating merger and acquisition activity.

TYPES OF TAKEOVER DEFENSES

As the previous section suggests, some merger activity is unsolicited and not desired on the part of the target firm. Often, the management of the target firm will be replaced or let go as the acquiring firm's management steps in to make their own mark and implement their plans for the new, combined entity. In reaction to hostile takeover attempts, a number of defense mechanisms have been devised and used to try and thwart unwanted advances.

To any offer for the firm's shares, several actions may be taken which make it difficult or unattractive to subsequently pursue a takeover attempt. One such action is the creation of a staggered board of directors. If an outside firm can gain a controlling interest on the board of directors of the target, it will be able to influence the decisions of the board. Control of the board often results in de facto control of the company. To avoid an outside firm attempting to put forward an entire slate of their own people for election to the target firm's board, some firms have staggered the terms of the directors. The result is that only a portion of the seats is open annually, preventing an immediate takeover attempt. If a rival does get one of its own elected, they will be in a minority and the target firm's management has the time to decide how to proceed and react to the takeover threat.

Another defense mechanism is to have the board pass an amendment requiring a certain number of shares needed to vote to approve any merger proposal. This is referred to as a supermajority, since the requirement is usually set much higher than a simple majority vote total. A supermajority amendment puts in place a high hurdle for potential acquirers to clear if they wish to pursue the acquisition. This is sometimes referred to as a fair price amendment.

Finally, another preemptive strike on the part of existing management is a poison pill provision. A poison pill gives existing shareholders rights that may be used to purchase outstanding shares of the firms stock in the event of a takeover attempt. The purchase price using the poison pill is a significant discount from fair market value, giving shareholders strong incentives to gobble up outstanding shares, and thus preventing an outside firm from purchasing enough stock on the open market to obtain a controlling interest in the target. Such strategies as staggering director terms, fair price amendments, and poison pills are sometimes referred to as "shark repellents."

Once a takeover attempt has been identified as underway, incumbent management can initiate measures designed to thwart the acquirer. One such measure is a dual-class recapitalization; whereby a new class of equity securities is issued which contains superior voting rights to previously outstanding shares. The superior voting rights allow the target firm's management to effectively have voting control, even without a majority of actual shares in hand. With voting control, they can effectively decline unsolicited attempts by outsiders to acquire the firm.

Another reaction to undesired advances is an asset restructuring. Here, the target firm initiates the sale or disposal of the assets that are of primary interest to the acquiring firm, usually called the "crown jewel." The divestiture of the crown jewel results in an end to the acquisition activity. On the other side of the balance sheet, the firm can solicit help from a third party, friendly firm. Such a firm is commonly referred to as a "white knight," the implication being that the knight comes to

the rescue of the targeted firm, or "maiden." A white knight may be issued a new set of equity securities such as preferred stock with voting rights, or may instead agree to purchase a set number of existing common shares at a premium price. This is called the lockup defense. The white knight is supportive of incumbent management; by purchasing a controlling interest in the firm unwanted takeovers are effectively avoided.

There are other drastic measures that targeted firms can take. Professor Michael Baye, in his 2008 book *Managerial Economics and Business Strategy*, names several other options. One is the golden parachute strategy, in which leading managers retaliate against the takeover by creating contracts for themselves with provisions for significant severance pay or compensation in case they lose their jobs through an acquisition. If the takeover is successful, the golden parachute will grant top managers enormous gains upon their release from the new firm.

The targeted firm may also use the strategy called greenmail, in which it buys back the shares the hostile firm owns. If this practice is successful, the raider will sell its stock in the firm, usually at a very inflated price, to gain a significant profit. This leaves the targeted firm safe with its own shares, if also in debt.

Lastly, a maiden firm may use the going private defense as a last resort. They find a buyer (less agreeable than a white knight) to buy the public stock in the firm and delist it as a public firm. Stock trading is then no longer possible, and the firm, though privately owned, is safe from the raider.

Baye also lists several practices used by a hostile firm upon attempting a takeover. These include stripping, which is the practice of selling off the assets of the targeted company to create extra cash when the takeover is complete, and the less aggressive standstill agreement, which is a last-minute contract in which the hostile company ceases the acquisition process and ends the takeover, keeping only its current holdings in the company.

One of the most prominent takeover activities associated with liability restructuring involves the issuance of junk bonds. "Junk" is used to describe debt with high default risk, and thus junk bonds carry very high coupon yields to compensate investors for the high risk involved. During the 1980s, the investment-banking firm Drexel Burnham Lambert (led by Michael Milken) pioneered the development of the junk-bond market as a vehicle for financing corporate takeover activity. Acquisition groups, which often included the incumbent management group, issued junk bonds backed by the firm's assets to raise the capital needed to acquire a controlling interest in the firm's equity shares. In effect, the firm's balance sheet was restructured with debt replacing equity financing. In several instances, once the acquisition was successfully completed the acquiring management subsequently sold off portions of the firm's assets or business divisions at large premiums, using the proceeds to retire some or all of the junk bonds. The takeover of RJR Nabisco by the firm Kohlberg Kravis Roberts & Co. in the late 1980s was one of the most celebrated takeovers involving the use of junk-bond financing.

VALUING A POTENTIAL MERGER

There are several alternative methods that may be used to value a firm targeted for merger or acquisition. One method involves discounted cash flow analysis. First, the present value of the equity of the target firm must be established. Next, the present value of the expected synergies from the merger, in the form of cost savings or increased after-tax earnings, should be evaluated. Finally, summing the present value of the existing equity with the present value of the future synergies results in a present valuation of the target firm.

Another method involves valuation as an expected earnings multiple. First, the expected earnings in the first year of operations for the combined or merged firm should be estimated. Next, an appropriate price-earnings multiple must be determined. This figure will likely come from industry standards or from competitors in similar business lines. Now, the PE ratio can be multiplied by the expected combined earnings per share to estimate an expected price per share of the merged firm's common stock. Multiplying the expected share price by the number of shares outstanding gives a valuation of the expected firm value. Actual acquisition price can then be negotiated based on this expected firm valuation.

Another technique that is sometimes employed is valuation in relation to book value, which is the difference between the net assets and the outstanding liabilities of the firm. A related idea is valuation as a function of liquidation, or breakup, value. Breakup value can be defined as the difference between the market value of the firm's assets and the cost to retire all outstanding liabilities. The difference between book value and liquidation value is that the book value of assets, taken from the firm's balance sheet, are carried at historical cost. Liquidation value involves the current, or market, value of the firm's assets.

Some valuations, particularly for individual business units or divisions, are based on replacement cost. This is the estimated cost of duplicating or purchasing the assets of the division at current market prices. Some premium is usually applied to account for the value of having existing and established business in place.

Finally, in the instances where firms that have publicly traded common stock are targeted, the market value of the stock is used as a starting point in acquisition

negotiations. Earlier, a number of takeover defense activities were outlined that incumbent management may employ to restrict or reject unsolicited takeover bids. These types of defenses are not always in the best interests of existing shareholders. If the firm's existing managers take seriously the corporate goal of maximizing shareholder wealth, then a bidding war for the firm's stock often results in huge premiums for existing shareholders. It is not always clear that the shareholders interests are primary, since many of the takeover defenses prevent the use of the market value of the firm's common stock as a starting point for takeover negotiations. It is difficult to imagine the shareholder who is not happy about being offered a premium of 20 percent or more over the current market value of the outstanding shares.

SEE ALSO *Financial Ratios*

BIBLIOGRAPHY

Baye, Michael R. *Managerial Economics and Business Strategy.* 6th ed. Boston, MA: McGraw-Hill/Irwin, 2008.

Brealey, R.A., and S.C. Myers. *Principles of Corporate Finance.* 7th ed. Boston, MA: McGraw-Hill/Irwin, 2003.

Bruner, R.F. *Applied Mergers and Acquisitions.* Hoboken, NJ: J. Wiley, 2004.

Coy, P., et al. "Shake, Rattle, and Merge." *Business Week,* 10 January 2005, 32.

Harrington, D.R. *Corporate Financial Analysis in a Global Environment.* 7th ed. Mason, Ohio: Thomson/South-Western, 2004.

METADATA OR META-ANALYSIS

In today's world of data management, it has become increasingly important to master methods of accumulating, controlling, and accessing information electronically. The key to this process is metadata, or data concerning data. Businesses use metadata every day when filing electronically, searching for documents on their intranets, and collecting customer data for analysis. E-retailers and businesses that interact online depend on metadata to run their companies. According to Nigel Ford's 2008 *Web-Based Learning Through Educational Informatics*, some common types of metadata found today are:

- General: Information pertaining to the data as a whole set, including its title, what language it is in, and its tag or description.

- Lifecycle: Who has accessed the data, added to or taken from it, and when.

- Technical: Refers to what format the data is in, how long it will last, and other IT information.

- Rights: Who owns the data, who has written it, and who owns the rights to publish or distribute it?

- Relation: Any information that connects one set of data to another, such as a chapter of a book, a summary of a report, or an addendum to a file.

- Annotation: Any added information concerning the usefulness of the data to particular operations.

- Classification: Where the data belongs within an organization's framework, pertaining to sources and applications—labeling data by names such as a human resources (HR) document, a financial report, or a customer service analysis.

GROUPINGS

Metadata is most often divided into three categories of use. The first is business metadata, or data that conforms to specific business regulations and is tailored for business use. This is a more common, linguistic type of metadata, based on intuitive relations and organized so that users can search for particular sets of data more easily.

The second type of metadata is database metadata, the labels referring to the database itself and how information is organized within it. IT practices, such as source-system mapping and defining objects for spreadsheets, use this type of metadata. Database metadata is also used for security purposes, such as keeping track of when the users last accessed the data and possibly even for what reason.

The third type of metadata is application metadata, an elaborate type of data that explains what other metadata means. For instance, an example of application metadata is a description/explanation of what the monthly customer service report is, and who has access to it.

ANALYSIS AND ACCOUNTING

Beyond helping users to understand data systems and search for specific information, metadata also plays an important role in analysis. Most analysis programs use metadata to collect the required information, organize it into sets, and conduct tests. Thanks to business metadata, data-mining parameters can be set (such as all data collected on the corporate Web sites from the past three months). This information can also be analyzed using metadata, which can include the number of online users who clicked on Web ads, or where the company made most of its revenue within a given time period. The most common barrier businesses find between themselves and this sort of in-depth information analysis is semantics—the need to apply simple language to the purely mathematical or technical metadata.

Other companies find metadata to be especially helpful in accountability practices. Since information concerning who created the data, who has accessed it, and what has been added or taken away from it, is all included in

metadata, mining such information can easily clear up electronic accountability issues. Most metadata made for business transactions includes every part of the process, a record of each step and when it was completed, which can help clear up misunderstandings. Metadata can also be helpful in analysis accountability; it defines data sets, separating them into proper fields and allowing creators to limit what the data can be used for so that none is mistakenly included in a data mining or analysis process.

To develop efficient metadata systems, companies should first accept a clear data scheme including accepted titles and parameters for what types of metadata should be included. Periodic updates using metadata can then be included in reports, giving managers and employees instant access to beneficial information concerning the company's data.

BIBLIOGRAPHY
"The Business Meta-Data Repository." *TDAN.com,* 2004. Available from: http://www.tdan.com/view-articles/5197.
Dyche, Jill. *e-Data* Addison-Wesley, 2000.
Ford, Nigel. *Web-Based Learning Through Educational Informatics.* London: Idea Group Inc., 2008.
Sherman, Rick. "Align Metadata and Business Initiatives." *DMReview.com* DM Review Magazine, January 2006.
Wayne, Linda. "Metadata in Action." *GeoMaxim* GIS Plant, June 2005.

MICROECONOMICS

SEE *Economics*

MILES AND SNOW TYPOLOGY

In their 1978 book *Organization Strategy, Structure, and Process,* Raymond E. Miles and Charles C. Snow argued that different company strategies arise from the way companies decide to address three fundamental problems: entrepreneurial, engineering (or operational), and administrative problems.

The entrepreneurial problem is how a company should manage its market share. The engineering problem involves how a company should implement its solution to the entrepreneurial problem. The administrative problem considers how a company should structure itself to manage the implementation of the solutions to the first two problems. Although businesses choose different solutions to these problems, Miles and Snow suggested that many companies develop similar solutions. As a result, they postulated that there are four general strategic types of organizations: prospector, defender, analyzer, and reactor organizations.

ORGANIZATION TYPES

Prospector Organizations. Prospector organizations face the entrepreneurial problem of locating and exploiting new product and market opportunities. These organizations thrive in changing business environments that have an element of unpredictability, and succeed by constantly examining the market in a quest for new opportunities. Moreover, prospector organizations have broad product or service lines and often promote creativity over efficiency.

Prospector organizations face the operational problem of not being dependent on any one technology. Consequently, prospector companies prioritize new product and service development and innovation to meet new and changing customer needs and demands and to create new demands. The administrative problem of these companies is how to coordinate diverse business activities and promote innovation. Prospector organizations solve this problem by being decentralized, employing generalists (not specialists), having few levels of management, and encouraging collaboration among different departments and units.

Defender Organizations. Defender organizations face the entrepreneurial problem of how to maintain a stable share of the market, and hence they function best in stable environments. A common solution to this problem is cost leadership, and so these organizations achieve success by specializing in particular areas and using established and standardized technical processes to maintain low costs. In addition, defender organizations tend to be vertically integrated in order to achieve cost efficiency.

Defender organizations face the administrative problem of having to ensure efficiency, and thus they require centralization, formal procedures, and discrete functions. In their 2006 guide *Designing and Executing Strategy in Aviation Management*, authors Flouris and Oswald remind readers that the danger in creating a defender organization lies in maintaining stability. Such companies require an industry where change occurs slowly and long-term planning can be conducted. In today's world of business, there are very few sectors of business that maintain such a stasis, and this poses a threat to those with a purely defender typology.

Analyzer Organizations. Analyzer organizations share characteristics with prospector and defender organizations; thus, they face the entrepreneurial problem of how to maintain their shares in existing markets and how to find and exploit new markets and product opportunities.

These organizations have the operational problem of maintaining the efficiency of established products or services, while remaining flexible enough to pursue new business activities. Consequently, they seek technical efficiency to maintain low costs, but they also emphasize new product

and service development to remain competitive when the market changes. The administrative problem is how to manage both of these aspects.

Like prospector organizations, analyzer organizations cultivate collaboration among different departments and units. Analyzer organizations are characterized by balance—a balance between defender and prospector organizations. Indeed, according to Flouris and Oswald, analyzer organizations are the natural progression of prospector organizations, since they take the innovation and inventions the prospectors create and market them with reliable business procedures.

Reactor Organizations. Reactor organizations, as the name suggests, do not have a systematic strategy, design, or structure. They are not prepared for changes they face in their business environments. If a reactor organization has a defined strategy and structure, it is no longer appropriate for the organization's environment. A reactor organization's new product or service development fluctuates in response to the way the managers perceive their environment. Reactor organizations do not make long-term plans, because they see the environment as changing too quickly for them to be of any use, and they possess unclear chains of command.

ADVANTAGES OF DIFFERENT STRATEGIES.

Miles and Snow argued that companies develop their adaptive strategies based on their perception of their environments. Hence, as seen above, the different organization types view their environments in different ways, causing them to adopt different strategies. These adaptive strategies allow some organizations to be more adaptive or more sensitive to their environments than others, and the different organization types represent a range of adaptive companies. Because of their adaptive strategies, prospector organizations are the most adaptive type of company. In contrast, reactor organizations are the least adaptive type. The other two types fall in between these extremes: analyzers are the second most adaptive organizations, followed by defenders.

Since business environments vary from organization to organization, having a less adaptive strategy may be beneficial in some environments, such as highly regulated industries. For example, a study of the airline industry in the 1960s and 1970s indicated that the defender airlines were more successful than the prospector airlines in that the business environment changed slowly during this period because of the heavy regulation. Hence, the emphasis on efficiency by the defender airlines worked to their advantage.

On the other hand, prospector organizations clearly have an advantage over the other types of organizations in

business environments with a fair amount of flux. Companies operating in mature markets in particular benefit from introducing new products or services and innovations to continue expanding. As Miles and Snow note, no single strategic orientation is the best. Each one—with the exception of the reactor organization—can position a company so that it can respond and adapt to its environment. What Miles and Snow argue determines the success of a company ultimately is not a particular strategic orientation, but simply establishing and maintaining a systematic strategy that takes into account a company's environment, technology, and structure.

FURTHER STUDIES

Scholars have attempted to verify the reliability and validity of the Miles and Snow typology. A study by Shortell and Zajac, conducted in 1990, indicated that this typology of strategic orientations and its predictions was generally accurate. They found that prospectors are likely to be the first organizations to adopt new products and services, analyzers are likely to be the first organizations to adopt new managerial procedures and systems, and defenders are usually the first organizations to adopt new production-related technology. Moore carried Miles and Snow's framework to the retail environment and concluded that the typology is generally applicable to retail contexts.

Some have suggested that Miles and Snow typology is important not as a study of static conditions, but as a dynamic cycle that businesses go through. *Methodological Issues in Accounting Research*, written by Zahirul Hoque in 2006, suggests that the Miles and Snow typology has remained viable because it shows how organizations respond to various business conditions. When confronted with a certain change, a department or section of an organization will usually react with one of the Miles and Snow typologies. In this view, the typologies are not so much classes of organizations as they are processes that businesses go through based on their environment.

Other researchers further broadened the scope and applicability of Miles and Snow's typology, relating the strategic approaches strategic decision processes, international strategies, and functional areas within organizations. In their 1993 article "An Empirical Examination of the Relationship Between Strategy and Scanning," Subramanian, Fernandes, and Harper found that strategic types differed in terms of how managers perform environmental scanning. Prospectors tended to be more proactive in their scanning, followed by analyzers; defenders tended to be less proactive or "ad hoc."

As an example of the effects of functional expertise in an international context, Professor David Naranjo-Gil explored the impact of sophisticated accounting information systems on strategic performance among hospitals in

Spain. Findings indicated that performance was enhanced primarily through sophisticated accounting information systems' role in implementing the prospector strategy.

Clearly, the Miles and Snow typology has contributed to the understanding of organizational behavior in a variety of settings. As demonstration for its further applicability, Peng, Tan, and Tong studied firms in the emerging Chinese economy. In their 2004 article "Ownership Types and Strategic Groups in an Emerging Economy," these authors concluded that the type of firm ownership can help predict strategic group membership. Specifically, state-owned enterprises tended to adopt defender strategies, and privately-owned enterprises tended to adopt prospector strategies. The analyzer orientation was also represented, most commonly under collective and foreign ownership. Future research efforts aimed at the extension of Miles and Snow's typology to international settings appears warranted.

SEE ALSO *First-Mover Advantage; Generic Competitive Strategies; Innovation; Technology Management*

BIBLIOGRAPHY
Flouris, Triant G. Oswald, Sharon L. *Designing and Executing Strategies in Aviation Management.* Ashgate Publishing, 2006.

Fox-Wolfgramm, Susan J., Kimberly B. Boal, and James G. Hunt. "Organizational Adaptation to Institutional Change: A Comparative Study of First-Order Change in Prospector and Defender Banks." *Administrative Science Quarterly,* March 1998, 87.

Ghobadian, Abby, et al. "Evaluating the Applicability of the Miles and Snow Typology in a Regulated Public Utility Environment." *British Journal of Management,* 15 September 1998, S71.

Hoque, Zahirul *Methodological Issues in Accounting Research: Theories and Methods* Spiramus Press Ltd., 2006.

Miles, Raymond E., and Charles C. Snow. *Organizational Strategy, Structure, and Process.* New York: McGraw-Hill, 1978.

Moore, M. "Towards a Confirmatory Model of Retail Strategy Types: An Empirical Test of Miles and Snow." *Journal of Business Research* 58 (2005): 696–704.

Naranjo-Gil, D. "The Role of Sophisticated Accounting Systems in Strategy Management." *International Journal of Digital Accounting Research* 4, no. 8 (2004): 125–144.

Peng, M. W., J. Tan, and T.W. Tong. "Ownership Types and Strategic Groups in Emerging Economies." *The Journal of Management Studies* 41 (2004): 1105–1129.

Ramaswamy, Kannan, Anisya S. Thomas, and Robert J. Litschert. "Organizational Performance in a Regulated Environment: the Role of Strategic Orientation." *Strategic Management Journal,* January 1994, 63.

Shortell, Stephen M., and Edward J. Zajac. "Perceptual and Archival Measures of Miles and Snow's Strategic Types: A Comprehensive Assessment of Reliability and Validity." *Academy of Management Journal* (1990): 817.

Subramanian, R., N. Fernandes, and E. Harper. "An Empirical Examination of the Relationship Between Strategy and Scanning." *Mid-Atlantic Journal of Business* 29 (1993): 315–330.

MIS
SEE *Management Information Systems*

MISSION AND VISION STATEMENTS

An organizational mission is an organization's reason for existence. It often reflects the values and beliefs of top managers in an organization. A mission statement is the broad definition of the organizational mission. It is sometimes referred to as a creed, purpose, or statement of corporate philosophy and values.

A good mission statement inspires employees and provides a focus and direction for setting lower level objectives. It should guide employees in making decisions and establish what the organization does. Mission statements are crucial for organizations to prosper and grow. While studies suggest that they have a positive impact on profitability and can increase shareholder equity, they also support that almost 40 percent of employees do not know or understand their company's mission.

Large as well as small corporations benefit from creating mission statements. Entrepreneurial businesses are driven by vision and high aspirations. Developing a mission statement helps the small business realize their vision. Its primary purpose is to guide the entrepreneur and assist in refining the planning process. By developing a strategic plan that incorporates the mission statement, entrepreneurs are more likely to be successful and stay focused on what is important. The mission statement encourages managers and small business owners alike to consider the nature and scope of the business. *Business Week* attributes 30 percent higher return on several key financial measures for companies with well-crafted mission statements.

COMMON ELEMENTS

While mission statements vary from organization to organization and represent the distinctness of each one, they all share similar components. Most statements include descriptions of the organization's target market; the geographic domain; their concern for survival, growth, and profitability; the company philosophy; and the organization's desired public image. The following is an example of a mission statement for a family dining restaurant chain:

> Our mission is to become the favorite family dining restaurant in every neighborhood in which we operate. This will be accomplished by serving a variety of delicious tasting and generously portioned foods at moderate prices. Our restaurants will be clean, fun, and casual. Our guests will be served by friendly, knowledgeable people who are dedicated to providing excellent customer service.

This mission statement describes the target market, which are families and the geographic domain of neighborhoods. It clearly states how it expects to be profitable by offering excellent customer service by friendly, knowledgeable people. When defining the mission statement it is important to take into account external influences such as the competition, labor conditions, economic conditions, and possible government regulation. It is important to remember, however, that mission statements should not attempt to be too broad.

Companies should have mission statements that clearly define expected shareholder returns and they should regularly measure performance in terms of those expected returns. If the major reason for a business's existence is to make a profit, then it stands to reason that expectations of profit should be included in the organization's mission. This means that management should reach a consensus about which aspects of the company's profit performance should be measured. These might include margin growth, product quality, market share changes, competitive cost position, and capital structure efficiency.

A mission statement sets the boundaries for how resources should be allocated and what strategic and operational goals should be set. It should acknowledge the company's strengths and then inform employees where to direct their efforts in order to take advantage of those strengths.

Before writing a mission statement organizations should take a look at how they are different from the competition, whether it is in technology, image and name brand, or employees. It can often be thought of as a recipe for success because it not only defines the organization's accomplishments but it also provides employees with directions to help them develop plans and look for opportunities for improvement.

The organization defines what is acceptable behavior through the mission statement. Values and beliefs are the core of a strong mission statement. For example:

> Quality and values will secure our success. We will live by our values, have fun, and take pride in what we do. Our values are to maintain a work environment where people enjoy coming to work, to serve our guests and exceed their expectations, and to be profitable and result oriented.

This mission statement is simple and straightforward. It does not, however, specify the products or target market. The mission statement also provides meaning to the organization by stating not only what goals the company wants to achieve but also why it wants to achieve these goals. It is not effective unless it is challenging and forces workers to establish goals and means

to measure the achievement of those goals. A mission statement should inspire employees and get them involved in the organization. It has been called the glue that holds the organization together through shared values and standards of behavior. A mission statement should be relevant to the history, culture, and values of the company.

Many statements refer to the social responsibility of the organization. For example, a company can show their concern for the community in the following:

> To be involved as good corporate citizens wherever we are around the world. We will treat customers and distributors with honesty, courtesy, and respect. We will respect and preserve the environment. Through all of this we will prove to be the worldwide leader in industry trade.

One important issue in organizations today is the concern with diversity. While it is not a traditional point included in mission statements, more and more companies are including it because of the globalization of the economy and the increased diversity of the workforce.

Before writing a mission statement, leaders in the organization must have an idea of what is in store for the future. This vision is the foundation for the mission statement. The vision provides a strategic direction, which is the springboard for the mission and its related goals. A vision statement differs from a mission statement. Vision statements are a view of what an organization is striving to become. For example:

> To bring back to neighborhoods all over America the importance of family unity. We will view ourselves as a family so these attributes will be carried over into our service.

Vision statements guide an organization into the future while mission statements are a reflection of the present. Because vision statements are a glimpse into the future, they are often not realized for several years. Organizations go through many changes and can face times of confusion and uncertainty. Changes are not always expected or easy, so a well thought out vision statement will help everyone stay focused and meet the organization's goals.

The following are two examples of well-known companies' mission statements:

- Wal-Mart: "To give ordinary folk the chance to buy the same thing as rich people."

- 3M: "To solve unsolved problems innovatively."

Historically, these may have seemed arrogant. But consider the outcome of the following mission statements from each company's early days:

- Ford Motor Company: "Ford will democratize the automobile."

- Sony: "Become the company most known for changing the world-wide poor-quality image of Japanese products."

- Wal-Mart: "Become a $125 billion company by the year 2000."

WRITING A MISSION STATEMENT

When creating a mission statement there are a few simple guidelines that can be followed. It is important to remember the basics so the mission statement stays simple and straight to the point. Some researchers, such as C.K. Bart, advise that it should be kept to between thirty and sixty words, while others believe it does not necessarily have to be that brief. Some organizations have mission statements that are only one sentence, while others are a paragraph.

An example of a mission statement that is limited to one sentence is "Our business is selling houses and our mission is total customer satisfaction." At a minimum, each mission statement should answer the following three questions: (1) What are the opportunities or needs the organization addresses? (2) What does the organization do to address those needs? and (3) What principles and values guide the organization? In other words, the statement should define the organization's purpose, business, and values.

Avoiding jargon and buzzwords will keep the mission statement clear and easy to understand. It should be universal and simple to comprehend for all employees in the organization, and should also be unique and identify the organization. A mission statement is often what sets one company apart from the competition. It should outline the organization's competitive advantages and differentiate it from everyone else. Specific products/services offered as well as markets or customers should be included. Also a general business definition, behavioral standards, and desired competitive position can be added to a strong mission statement.

Jim Collins revolutionized the idea of the mission concept in his 2001 book *Good to Great*, where he introduced the hedgehog concept. The hedgehog concept is, according to Collins, "a simple, crystalline concept that flows from deep understanding." The concept is formed from the combination of three definitions—what you can be best in the world at, what drives your economic engine, and what you are deeply passionate about. Collins proposes that businesses often fail because they do not ask the right questions, prompted by this three-in-one concept, and because they build their mission "more from bravado than from understanding." The hedgehog concept and its three components form an alternative method for creating a focused mission statement.

There are also several software programs designed to help start-up companies create their mission statements and build goals. Once such program is *Business Plan Pro*, although there are many to choose from.

Nonprofit businesses must take special care in composing their mission statements. Peri Pakroo, in *Starting and Building a Nonprofit*, advises that nonprofit organizations create very well-defined mission statements at the outset so that their activities and programs have clear goals. Since nonprofit organizations are usually centered around a clear goal, humanitarian project, or particular meaning, it is vital that they have a mission statement supporting their company.

EMPLOYEE INVOLVEMENT

It is often helpful to allow company-wide input when creating a mission statement. This "bottom up" approach results in greater commitment to the organization, and a better understanding of the organization. Employees from throughout the organization can help identify the core values of the company.

In order to encourage employee participation, many companies have created competitions inviting employees to submit suggestions. Cash prizes are sometimes provided as an incentive for creative and inspirational statements. Some companies find it useful to invite customers to assist in writing a mission statement because they can provide an honest perspective. Mission statements from other companies may also be reviewed to provide ideas.

It is important to keep in mind that there will be a draft process involved in creating the mission statement. Employees can often provide invaluable insight on how to improve on each draft. In the end, the mission statement should reflect the personality of the organization. Thus, each company should be creative and unique in developing its own statement.

Creating a mission committee that consists of members of management, frontline employees, and customers is another way to begin writing a mission statement. The major benefit of this strategy is the inclusion of all areas of the organization to ensure that everyone is represented. Another benefit is that employees will be more willing to work toward accomplishing the mission if they know they had a voice in its creation.

Jim Collins noted the effectiveness of creating what he termed "the Council." The Council is a circle of employees usually found in successful companies who focus on the three questions of the hedgehog concept— what can they be best at, what are they passionate about, and what can drive their economic engine—and use their understanding to form mission statements, goals, and vision statements for the future. The Council is often an informal body, five to twelve members, and can be

composed from nearly any position in the company. Collins notes the organic qualities of such bodies and recommends them for important decision making.

A "top down" approach can be effective in smaller organizations or even sole proprietorships. There is less time involved in creating a mission statement when it comes from the top. Also, many times frontline employees and lower level managers lack the insight necessary to see the big picture. They may not be able to conceptualize the entire organization and therefore miss important aspects of the business.

Participation may not always be a good option for small businesses. In small businesses that are started by entrepreneurs the mission statement is generally a vision of an individual and therefore may not be negotiable. When the mission statement comes from upper management, employees are more assured of the organization's commitment to the statement.

A word of caution should be noted when deciding whether to adopt a top down or a bottom up approach. If the mission statement is to be created with a wide variety of input from both employees and customers then it will take longer than a top down approach. There must be a sharing of views and ideas with compromises made.

A consensus should be developed without the problems associated with groupthink. There is always the possibility that too much compromise will distort the mission statement and the end result is something different from the original intent. The top down approach is not always effective because it rarely consults employees when making important decisions. Therefore, although it is the fastest route to take it is not always the most effective.

While the mission statement should be able to change with the times it is also understood to have a certain degree of permanence. As new businesses begin to grow and hire more employees the mission statement should provide a strong sense of stability and a clear definition of the culture.

A mission statement is worthless unless it has the support of the employees in the organization. It will only be successful if each employee commits to its success and internalizes it.

Once the statement is completed it is extremely important that the organization not put it on the shelf to collect dust. It should be shared with the entire company. The introduction of the mission statement should come directly from top management in order to set the example.

Organizations should be creative in making employees aware of the mission statement. Placing it strategically in locations where employees gather will increase awareness and remind them of the goals of the organization. Videos outlining the details of the new mission statement are often useful; however, it is critical that employees have the opportunity to discuss the statement with members of management.

Setting up meetings with members of management and frontline employees can often help uncover areas where the company does not meet the standards set by the mission statement. Communicating the mission statement to customers will make them feel valued and important. The mission statement can be sent to customers in a mass mailing or posted on signs in areas those customers frequent. It sets forth the goals of the organization so customers know what to expect when doing business with the company.

In his 2007 book *101 Mission Statements*, Jeffrey Abrahams suggests that companies can go even further and address themselves to specific groups within the mission statement. They can refer to these target audiences as headings. Some of the examples Abrahams gives include: "To our staff . . ." "To our employees . . ." "To our customers . . ." and "To our colleagues . . ." For the mechanics of the statement, various analyses can be used, such as the SWOT analysis, discussed next.

SWOT ANALYSIS

SWOT is an acronym for strengths, weaknesses, opportunities, and threats. SWOT analysis is a strategic planning tool that helps an organization match its internal strengths and weaknesses with external opportunities and threats. SWOT analysis is important and useful in creating and executing the organization's mission statement. Often the best strategies for accomplishing the organization's mission are revealed through the SWOT analysis. The best strategies are those that take advantage of strengths and opportunities, offset threats, and improve weaknesses.

Organizations should first begin by reviewing internal strengths and weaknesses. When analyzing an organization's strengths it is important to identify distinctive competencies or strengths possessed by only a few competing firms. These distinctive competencies often become the competitive advantages that are included in the mission statement. Distinctive competencies can be found in financial resources, quality products and services, proprietary technology, or cost advantages. Organizational weaknesses are skills and capabilities that prevent an organization from implementing strategies that achieve its mission. They can be problems with facilities, lack of a clear strategic direction, internal operating problems, too narrow a product line, weak market image, or the inability to finance changes.

The next step is to identify external opportunities and threats. Organizational opportunities are circumstances in an organization's environment that if capitalized on will result in above normal increases in economic performance. Examples of opportunities are related to the possibility of adding a new product line, increasing market growth, or

Figure 1

Organizational Mission Statement

Strategic Goals

| Tactical Goals & Objectives Operations | Tactical Goals & Objectives Sales | Tactical Goals & Objectives Finance |

| Operational Goals & Objectives Customer Service, Inventory, Billing | Operational Goals & Objectives Northern, Eastern, Central & Western Region | Operational Goals & Objectives Accounting, Accounts Payable, Accounts Receivable |

diversifying into related products. Threats are viewed as circumstances that give rise to normal or below normal economic performance. They can be found in the ease of entry of competitors, increased sales of substituted products, demographic changes, slowed market growth, or increased competition.

EVALUATION

Evaluation of the mission statement is necessary to ensure the organization is meeting its goals. If needed, new goals may have to be created in order to accommodate changes in the organization. It may be time to reevaluate what the organization is doing or where it is headed. This is a good time to think about entering into new areas or to begin doing things differently by rewriting part or all of the mission and vision statements.

It should be noted, however, that the stronger a mission statement is, the less it will need to be changed as the company progresses with time and technology. In a 2008 article, *Inc. Magazine* writer Professor Jay Ebben suggests that one of the questions mission statement creators should ask is, "What do we do?" This question, according to Ebben, should be answered in a psychological way in terms of meeting intrinsic customer needs so that the company and its products or services can evolve with time.

In evaluating an organization's performance, management must look at several different aspects of the organization. First, managers need to determine if the organization's

plans are clearly linked to its mission statement and related goals. Plans should be developed for both the short run and long run. Secondly, assigning jobs that are directly related to the achievement of organizational goals will help ensure they are attained. The goals should be communicated clearly so employees understand what tasks need to be carried out and what the rewards will be. Finally, when evaluating individual performance, the information gathered should be recent and compared to established standards.

Mission statements are often difficult to evaluate because of their abstract form. Poor mission statements are not directly measurable and are vaguely worded. Figure 1 presents an example of how mission statements can be measured from the top of the organization to the bottom. Strategic goals are directly tied to the organization's mission statement and apply to the organization as a whole. Tactical goals are departmental goals that support the strategic goals. Finally, operational goals are written at the individual level. Each one of these makes it possible to measure the organization's mission statements. An organization's likelihood of accomplishing its mission is increased as it creates strong and measurable goals at each level.

It is not necessary that the mission statement be measured in quantifiable terms. It may also be measured qualitatively. For example, "We will answer all of our customers' questions and if we do not know the answer, we will find out." While this is not a quantitative statement it can be measured by monitoring customer service

calls and setting operational goals for employees that revolve around follow up and thoroughness.

Mission and vision statements give organizations a focus and a strategy for the future. According to Bart and Tabone, they have become the cornerstones of organizations. They contribute to an organizations' success and can lead to increases in productivity and performance. They do not have to be reserved for the entire organization—each department or division can benefit from developing a mission statement, as long as they are not in contradiction to the company's overall mission. Preferably, an individual department's mission links it to the fulfillment of the overall company mission. Mission statements for functional departments provide the same benefits as they do for the entire organization.

In conclusion, mission statements provide a sense of direction and purpose. In times of change and growth they can be an anchor and a guide in decision making. The benefits far outweigh the disadvantages and challenges when looking at the potential for increases in profitability and returns. Defining an organization by what it produces and who it satisfies are major steps towards creating a sound and stable mission statement. Setting a company apart from the competition is probably one of the biggest advantages.

SEE ALSO *Strategic Planning Failure; Strategic Planning Tools; Strategy Formulation; Strategy Implementation; SWOT Analysis*

BIBLIOGRAPHY

Abrahams, Jeffrey. *101 Mission Statements from Top Companies: Plus Guidelines for Writing.* Ten Speed Press, 2007.

Bart, C.K., and J.C. Tabone. "Mission Statement Rationales and Organizational Alignment in the Not-For-Profit Health Care Sector." *Health Care Management Review,* Fall 1998, 54–69.

Collins, Jim. *Good to Great.* New York: Harpercollins Publishers, 2001.

David, Forest R., and Fred B. David. "It's Time to Redraft Your Mission Statement." *Journal of Business Strategy,* January/February 2003, 11–14.

———."Does Your Mission Statement Generate Results or Laughs?" *Pay for Performance Report,* October 2002, 6.

———.*The Drucker Foundation Self-Assessment Tool: Process Guide.* San Francisco: Jossey-Bass Publishers, 1999.

Ebben, Jay. "Developing Effective Mission and Vision Statements." *Inc.com* Mansueto Ventures LLC, 2008.

Karcher, J.N., et al. "The Bottom-Up Mission Statement: A Competitive Strategy for Midsized Accounting Firms." *CPA Journal,* June 1997, 36–40.

Miller, P.F., Jr. "Needed: A Mission Statement for Directors." *Directors & Boards,* Summer 1997, 27–30.

———."Mission Statement Myopia." *Training,* December 2004, 16.

Pakroo, Peri. *Starting and Building a Nonprofit: A Practical Guide.* Berkeley, CA: Nolo, 2007.

Radtke, Janel M. *Strategic Communications for Nonprofit Organizations: Seven Steps to Creating a Succesful Plan.* Indianapolis: John Wiley & Sons, Inc., 1998.

Robbins, S.P. *Essentials of Organizational Behavior.* Upper Saddle River, NJ: Prentice Hall, 1997.

Wickman, P.A. "Developing a Mission for an Entrepreneurial Venture." *Management Decision,* May-June 1997, 373–381.

Yeargin, B. "Creating the Mission Statement." *Boating Industry,* May 1996, 47.

MOBILE COMMERCE

The use of portable wireless electronic devices to conduct transactions through the Internet is commonly referred to as mobile commerce (m-commerce). Advanced wireless electronic gadgets such as mobile phones, personal digital assistants (PDAs), laptops, and smartphones are increasingly being used to access and execute electronic transactions through the Internet. M-commerce gadgets facilitate Internet access to customized news services, local maps, stock reports, and financial updates without the need for fixed plug-in accessories to Web servers.

Although m-commerce can easily be confused with e-commerce, the two electronic modes of transacting business are quite different; whereas m-commerce transactions can be accessed through wireless mobile electronic gadgets at anytime from any location, e-commerce transactions are limited to stationary computer networks. In a 2006 Internet article titled "Mobile Banking Stages a Remarkable Comeback," Rajnish Tiwari and Stephan Buse note that m-commerce applications draw usability convenience from the following characteristics:

- Real-time access to information and data
- Authenticity
- Ubiquitous features
- Customized contents
- Multiple communication functionalities
- Round-the-clock access

M-commerce devices come with many advantages that enhance the convenience of conducting business through the Internet without having access to fixed power portals and Internet connections. In addition to providing users with the advantage of instant access to the Internet even when out of their work stations or homes, the ubiquitous nature of m-commerce devices also enables users to access personalized or customized content services. Moreover, the unique user identification code of each m-commerce devices can provide users with security advantage through authenticating information and tailoring content to desired degrees of privacy.

ACCESS TO THE WEB

Internet access via wireless mobile technologies is not an entirely new phenomenon in the communications market because modem-connected laptops with access to the Internet have been used ever since the Global System for Mobile Communications (GSM) network was unveiled in the early 1990s. The ability of GSM to support wireless application protocol (WAP) connections prompted handset manufacturers to introduce new generation WAP-enabled mobile devices with instant access to the Internet. Mobile Internet access was later boosted by the arrival of high-speed Internet infrastructures such as the High Speed Circuit Switched Data (HSCD) in 2000, General Packet Service Radio (GPRS) in 2001, and Enhanced Data Rates for Global Evolution (EDGE) in 2002.

Each preceding network infrastructure is characterized by advanced technological features and enhanced speed for displaying and relaying text-based data, in addition to instant access capabilities that are charged according to megabytes per second (Mbps) usage. The 2003 arrival of 3G, a third-generation broadband mobile network service which is supported by the Universal Mobile Telecommunications System (UMTS) has introduced much convenience in the m-commerce industry. The 3G broadband network facilitates the use of mobile devices to transmit high-speed video downloads and chat services in addition to relaying text-based data and instant Internet.

The concept of m-commerce is mainly based on the WAP technology. Mobile phones, PDAs, smartphones, and dashboard phones are equipped with standardized features tailored to accommodate small-screen data displays. The use of mobile devices to execute commercial transactions can be used in combination with other wireless technology applications such as the wireless-fidelity (Wi-Fi) mobile access, Bluetooth technology, and radio frequency identification devices (RFID), which transmit data between mobile electronic gadgets and service terminals without the need to swap card readers.

Wi-Fi technology enables Internet access through mobile devices in specially selected areas commonly referred to as "hotspots". Hotspots are usually high traffic areas such as cities, airports, rail stations, and hotels. Internet access via Wi-Fi can be facilitated by equipping laptops with mobile chips which act as routers from hotspots. In the book titled *E-Business and E-Commerce Management*, Dave Chaffey confirms that Wi-Fi networks use the 802.11 a, b, or g standard protocol which provides an average speed of 11 Mbps, subject to the strength of the signal from service providers.

American Airlines is one example of a company that has taken the lead in the use of Wi-Fi technology to access the Internet via wireless devices. According to the American Airlines Web site, the airline launched its first ever in-flight Internet access via Wi-Fi technology in August 2008 in a bid to gain competitive advantage over its competitors.

Bluetooth wireless technology is particularly applied over short-distance data exchange between electronic devices to transfer or convert information from mobile devices to storage devices. Bluetooth technology relies on the capacity to beam commands and data information between wireless devices such as a wireless mouse and a computer, a wireless keyboard and a computer, a PDA and a computer, or a laptop and a printer. The increase in the use of Bluetooth-enabled mobile phones to connect to the Internet has prompted leading handset manufactures to increase the production of WAP-enabled smartphones such as Blackberry, which among many other technical features, are equipped with fax, phone, and e-mail capabilities.

M-COMMERCE BUSINESS APPLICATIONS

Just like e-commerce, m-commerce has eliminated the need for processing transactions through paperwork. Wide-ranging business transactions such as ticketing, content purchasing, banking, advertising, electronic payments, and auctions can be carried out through m-commerce devices.

M-Ticketing. Mobile ticketing is an m-commerce business application that uses advanced electronic technologies to deliver tickets to mobile phones, thereby providing customers with immediate and convenient access to their tickets by simply presenting their mobile phones to service vendors. This mode of ticketing is mainly used by car hire companies, public transport companies, airlines, events organizers, night clubs, cinema houses, and train stations. Trinity and bCode are some of the companies in the United States that offer mobile ticketing services to other companies.

M-Purchasing and Delivering Content. The use of mobile devices to purchase and deliver content rank among the most successful m-commerce activities in the mass markets, because it involves convenient transfer of services and products such as mobile phone ring tones, games, and wallpapers that are always sought by mobile phone users. The unprecedented success of sales volumes that Apple's iPods registered as a result of the rush for Apple iTunes serves as a testimony of how the use of mobile devices to purchase and download content has penetrated the mass markets. The impending upgrade of speed capacities of 3G broadband network to fourth generation (4G) will facilitate the purchase of video content such as movies through mobile devices.

M-Shopping. Mobile phones are used to purchase products and services from e-commerce sites such as Amazon.com and eBay.com and other sites that offer online shopping services.

M-Banking. Mobile banking enables bank account holders to access and track the trends of activities in their accounts using mobile phones. Individuals can use mobile phones to check balances, remit money to and from online sources such as PayPal, make bank transfers, and fund stock purchases from different stock exchange markets around the world. However, m-banking is characterized by security concerns because of phishing, sniffing, and theft concerns. Sniffers can easily intercept wireless communications by using appropriate software to break security codes. In an Internet article titled *New E*Trade App Lets BlackBerry Users Wheel and Deal*, Keith Regan notes that companies are adopting sophisticated software to guard m-commerce applications against probable security risks. The author notes the example of *E*Trade Mobile Pro*, a customized mobile service which was launched by E*Trade in June 2008 to enhance security of wireless access to the E*Trade Web site by limiting access strictly to BlackBerry smart phones, which are equipped with advanced user interface and security features for banking and trading services.

M-Marketing and Advertising. Mobile phones are gaining increased acceptance as effective tools for marketing and advertising. Token items such as newsletters, business vouchers, and coupons can be distributed to mobile phones and other mobile devices, especially in instances where a firm seeks to benefit from the advantages of target marketing. In the United States, for example, businesses use the *vSnax* mobile service to advertise by providing free video access to different services, such as news, weather, and stock updates, and attaching matching advertisements on them.

INDUSTRY TRENDS AND PREDICTIONS

Unlike e-commerce, the emergence of m-commerce did not register much enthusiasm and acceptance among the masses, a situation that led to low purchases and minimal use of WAP-enabled mobile phones for Internet content access during the introductory phase. This caused the collapse of many early m-commerce service providers in Europe, such as Sweden's M-box.

However, these trends are set to reverse with the rapid commercialization and widespread availability of the 3G broadband network as well as the introduction of upgraded network applications such as fourth generation (4G). This is because 3G broadband networks do wonders with suitable mobile access devices such as BlackBerry smartphones that facilitate the fast transmission of colored content and graphical images.

IDC statistics predict that the twenty-first century will experience an unprecedented surge in the use of mobile devices and applications in commercial activities to levels that will exceed the use of fixed Internet and PCs. This will result from the increased coverage of the 3G network and unveiling of the 4G broadband network. Designed to transmit wireless broadband services at a speed ten to twenty times higher than previous broadband wireless applications, 4G broadband will run on the Worldwide Interoperability for Microwave Access (WiMAX) network infrastructure. As such, the arrival of the 4G broadband network is expected to introduce new dimensions in visual entertainment applications by enabling users to download video images and movies using mobile phones.

A good example of how network structures with enhanced transmission capabilities for m-commerce devices can attract unprecedented levels of purchases is the enthusiasm with which i-Mode (a mobile accessory gadget that provides the platform for content subscription services and graphical display of colors) was received in the Japanese market immediately after it was unveiled. i-Mode registered unprecedented success through music and ring tone purchases as well as subscription services in the Japanese market.

Apple's iPhone, a phone that also doubles as a mini-computer, has registered tremendous success in penetrating the mobile phone markets because of its unique performance features and advanced user interface. For example, iPhone enables users to access advertised products in the market by simply pressing on the appropriate icons on the phone's screen to be directed to dealers.

Therefore, companies can achieve increased sales volumes of products and services by focusing on appropriate m-commerce strategies and technologies that enhance access to mass markets. The youth segment of the market is particularly known for having strong preferences for new mobile technologies and premier mobile content such as mobile phone games, ring tones, wall papers, and visual graphics. The fact that youths exhibit low sensitivity to prices allows vendors, distributors, and marketers of m-commerce devices to use the youth mind-set as a market penetration strategy for accessing the mass markets.

SEE ALSO *Electronic Commerce*

BIBLIOGRAPHY

Boudreau, John. "iPhone App Store: A beacon for Mobile Devs?" *San Jose Mercury News,* 17 June 2008. Available from: http://www.ecommercetimes.com/story/63424.html.

Chaffey, Dave. *E-Business and E-Commerce Management.* Pearson Education, 2007.

Emberly, David, and Eve Griliches. "Worldwide Telecommunications Equipment 2008-2012 Forecast". *IDC,* August 2008. Available from: http://www.idc.com/getdoc. jsp;jsessionid=FA2IKAPBBB WB0CQJAFDCFFAKBEAV AIWD?containerId=213435.

Lysons, Kenneth, and Brian Farrington. *Purchasing Supply Chain Management, 7th ed.* Pearson Education, 2006.

Regan, Keith. "New E*Trade App Lets BlackBerry Users Wheel and Deal." *E-Commerce Times.* Available from: http://www.ecommercetimes.com/story/m-commerce/63290.html.

Tiwari, Rajnish, and Stephan Buse. "Mobile Banking Stages a Remarkable Comeback." *Press Release*, 2006. Available from: http://www1.uni-hamburg.de/m-commerce/banking/index_e.html.

Tiwari, Rajnish, Stephan Buse, and Cornelias Herstatt. "Mobile Services in Banking Sector: Role on Innovative Business in Generating Competitive Advantage." *The International Research Conference on Quality, Innovation, and Knowledge Management,* New Delhi. (2007).

MODELS AND MODELING

A model is an abstraction of reality or a representation of a real object or situation. In other words, a model presents a simplified version of something. It may be as simple as a drawing of house plans, or as complicated as a miniature but functional representation of a complex piece of machinery. A model airplane may be assembled and glued together from a kit by a child, or it actually may contain an engine and a rotating propeller that allows it to fly like a real airplane.

A more useable concept of a model is that of an abstraction, from the real problem, of key variables and relationships. These are abstracted in order to simplify the problem itself. Modeling allows the user to better understand the problem and presents a means for manipulating the situation in order to analyze the results of various inputs ("what if" analysis) by subjecting it to a changing set of assumptions.

In the business world, models can be used for many different types of analysis, and created models are considered to be intellectual property under U.S. law.

MODEL CLASSIFICATIONS

Some models are replicas of the physical properties (relative shape, form, and weight) of the object they represent. Others are physical models but do not have the same physical appearance as the object of their representation. A third type of model deals with symbols and numerical relationships and expressions. Each of these fits within an overall classification of four main categories: physical models, schematic models, verbal models, and mathematical models.

Physical Models. Physical models look like the finished object they represent. Iconic models are exact or extremely similar replicas of the object being modeled. Model airplanes, cars, ships, and even models of comic book superheroes look exactly like their counterpart but in a much smaller scale. Scale models of municipal buildings, shopping centers, and property developments such as subdivisions, homes, and office complexes all hopefully look exactly as the "real thing" will look when it is built. The advantage is the models' correspondence with the reality of appearance. In other words, the model user can tell exactly what the proposed object will look like, in three dimensions, before making a major investment.

Figure 1

Types of Models

PHYSICAL		
Iconic		Analog

SCHEMATIC		
Graphs & Charts		Diagrams & Drawings

VERBAL

MATHEMATICAL					
Use		Degree of Randomness		Degree of Specificity	
description	optimization	deterministic	probabilistic	specific	general
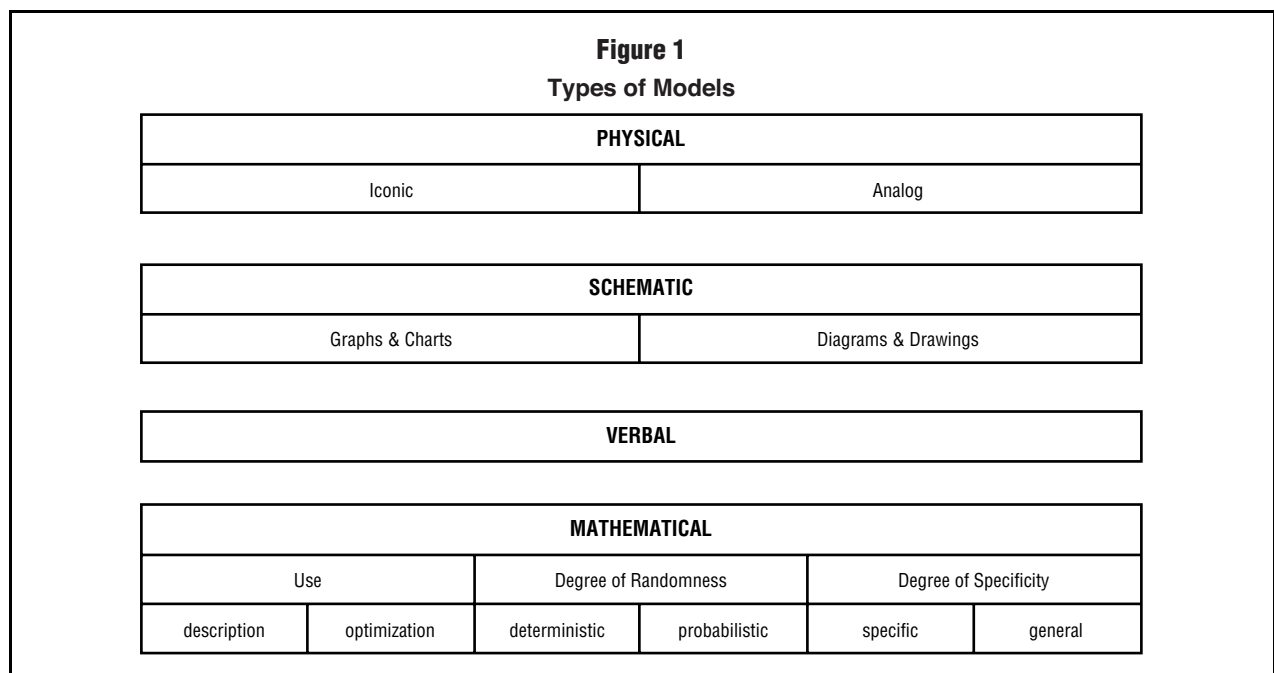
In addition to looking like the object they represent, some models perform as their counterparts would. This allows experiments to be conducted on the model to see how it might perform under actual operating conditions. Scale models of airplanes can be tested in wind tunnels to determine aerodynamic properties and the effects of air turbulence on their outer surfaces. Model automobiles can be exposed to similar tests to evaluate how wind resistance affects such variables as handling and gas mileage. Models of bridges and dams can be subjected to multiple levels of stress from wind, heat, cold, and other sources in order to test such variables as endurance and safety.

A scale model that behaves in a manner that is similar to the "real thing" is far less expensive to create and test than its actual counterpart. These types of models often are referred to as prototypes.

Additionally, some physical models may not look exactly like their object of representation but are close enough to provide some utility. Many modern art statues represent some object of reality, but are so different that many people cannot clearly distinguish the object they represent. These are known as analog models. An example is the use of cardboard cutouts to represent the machinery being utilized within a manufacturing facility. This allows planners to move the shapes around enough to determine an optimal plant layout.

Schematic Models. Schematic models are more abstract than physical models. While they do have some visual correspondence with reality, they look much less like the physical reality they represent. Graphs and charts are schematic models that provide pictorial representations of mathematical relationships. Plotting a line on a graph indicates a mathematical linear relationship between two variables. Two such lines can meet at one exact location on a graph to indicate the break-even point, for instance. Pie charts, bar charts, and histograms can all model some real situation, but really bear no physical resemblance to anything.

Diagrams, drawings, and blueprints also are versions of schematic models. These are pictorial representations of conceptual relationships. This means that the model depicts a concept such as chronology or sequence. A flow chart describing a computer program is a good example. The precedence diagrams used in project management or in assembly-line balancing show the sequence of activities that must be maintained in order to achieve a desired result.

Verbal Models. Verbal models use words to represent some object or situation that exists, or could exist, in reality. Verbal models may range from a simple word presentation of scenery described in a book to a complex business decision problem (described in words and numbers). A firm's mission statement is a model of its beliefs

about what business it is in and sets the stage for the firm's determination of goals and objectives.

Verbal models frequently provide the scenario necessary to indicate that a problem is present and provide all the relevant and necessary information to solve the problem, make recommendations, or at least determine feasible alternatives. Even the cases presented in management textbooks are generally verbal models that represent the workings of a business without having to take the student to the firm's actual premises.

Oftentimes, these verbal models provide enough information to later depict this problem in mathematical form. In other words, verbal models frequently are converted into mathematical models so that an optimal, or at least functional, solution may be found utilizing some mathematical technique. A look in any mathematics book, operations management book, or management science text generally provides some problems that appear in word form. The job of the student is to convert the word problem into a mathematical problem and seek a solution.

Mathematical Models. Mathematical models are perhaps the most abstract of the four classifications. These models do not look like their real-life counterparts at all. Mathematical models are built using numbers and symbols that can be transformed into functions, equations, and formulas. They also can be used to build much more complex models such as matrices or linear programming models.

A common mathematical model used by businesses is the bell curve, which shows the statistical occurrence of data. The user can then solve the mathematical model (seek an optimal solution) by utilizing simple techniques such as multiplication and addition or more complex techniques such as matrix algebra or Gaussian elimination. Since mathematical models frequently are easy to manipulate, they are appropriate for use with calculators and computer programs.

Mathematical models can be classified according to use (description or optimization), degree of randomness (deterministic and stochastic), and degree of specificity (specific or general). Following is a more detailed discussion of mathematical model types.

TYPES OF MATHEMATICAL MODELS

Descriptive Models. Descriptive models are used to merely describe something mathematically. Common statistical models in this category include the mean, median, mode, range, and standard deviation. Consequently, these phrases are called "descriptive statistics." Balance sheets, income statements, and financial ratios also are descriptive in nature.

Table 1

	Type 1	Type 2
Profit per unit	$60	$50
Assembly time per unit	4 hours	10 hours
Inspection time per unit	2 hours	1 hour
Storage space per unit	3 cm^3	3 cm^3
Resource	**Amount available**	
Assembly time	100 hours	
Inspection time	22 hours	
Storage space	39 cm^3	

Optimization Models. Optimization models are used to find an optimal solution. The linear programming models are mathematical representations of constrained optimization problems. These models share certain common characteristics. Knowledge of these characteristics enables the user to recognize problems that can be solved using linear programming.

For example, a firm that assembles computers and computer equipment is about to start production of two new types of computers. Each type will require assembly time, inspection time, and storage space. The amounts of each of these resources that can be devoted to the production of the computers is limited. The manager of the firm would like to determine the quantity of each computer to produce in order to maximize the profit generated by their sale. In order to develop a suitable model, the manager has obtained the information in Table 1.

In this problem, the total impact of each type of computer on the profit and each constraint is a linear function of the quantity of that variable. By completing the model with the relevant constraints, the user has a suitable model for determining the quantity of each computer to produce in order to maximize (the optimum) the firm's profit. Optimization also can mean minimization when referring to financial losses, scrap, rework, time, or distance. Again, optimization models may be used in this sense.

Deterministic Models. Deterministic models are those for which the value of their variables is known with certainty. In the previous example, the manager knew profit margins

Table 2

	High demand (70%)	Low demand (30%)
Large facility	$5,000.00	(-$2,000.00)
Small facility	$3,000.00	$3,000.00

and constraint values with certainty. This makes the linear programming model a deterministic optimization model.

Models that have values that are not known with certainty are said to be *stochastic or probabilistic models.* For example, a manufacturer that is having trouble deciding whether to build a large or small facility knows that the solution to this capacity problem depends upon the volume of demand that materializes. High demand would require a large facility while low demand would require a small facility. While the manufacturer has no way of knowing with certainty what demand will be, it can at least determine the probability of the occurrence of each. For example, if the manufacturer estimates that the probability of the occurrence of high demand is 70 percent and the occurrence of low demand is 30 percent, it can use this information along with the monetary value (expected payoff) of each situation to construct mathematical models such as payoff matrices or decision trees to find an optimal decision (see Table 2).

This type of model can be said to be a stochastic optimization model. Some models can be very similar with the degree of randomness being the key differentiator. For example, in project management techniques, program evaluation and review technique (PERT) and the critical path method (CPM) are very similar except that CPM is used whenever the required time to complete the activities is known and PERT is used whenever the required activity times are not known but can be estimated. CPM is considered to be deterministic while PERT generally is said to be probabilistic. Once the activity times are established, the two techniques are virtually the same throughout the remainder of the problem's completion.

Specific Models. Specific models apply to only one situation or model one unique reality. The previous examples of profit function (descriptive), objective function (optimization), and payoff matrix (probabilistic), are all specific models. In other words, the values established in the model are relevant for that one unique situation. Linear programming models can be said to be deterministic specific, while decision trees can be called probabilistic specific models.

General Models. General models can be utilized in more than one situation. For example, the question of how much to order is determined by using an economic order quantity (EOQ) model. EOQ models identify the optimal order quantity by minimizing the sum of certain annual costs that vary with order size. On the other hand, the question of how much should be ordered for the next (fixed) interval is determined by the fixed order interval (FOI) model, which is used when orders must be placed at fixed time intervals (weekly, twice, etc.).

USING THE CLASSIFICATIONS

Knowing the type of model that is required provides the user with some advantage when converting a verbal model to a mathematical model. For example, if the decision maker reads the verbal model and determines that the situation is probabilistic and uses situation-specific variables, he or she might seek to convert the verbal model to a payoff matrix or a decision tree (both examples of stochastic/probabilistic specific models).

BENEFITS OF MODEL USE

The goal of modeling use is to adequately portray realistic phenomenon. Once developed properly, a great deal can be learned about the real-life counterpart by manipulating a model's variables and observing the results.

Real-world decisions involve an overwhelming amount of detail, much of which may be irrelevant for a particular problem or decision. Models allow the user to eliminate the unimportant details so that the user can concentrate on the relevant decision variables that are present in a situation. This increases the opportunity to fully understand the problem and its solution.

In his book, *Operations Management,* William J. Stevenson lists nine benefits of models:

1. Models generally are easy to use and less expensive than dealing with the actual situation.

2. Models require users to organize and sometimes quantify information and, in the process, often indicate areas where additional information is needed.

3. Models provide a systematic approach to problem solving.

4. Models increase understanding of the problem.

5. Models enable managers to analyze "what if" questions.

6. Models require users to be very specific about objectives.

7. Models serve as a consistent tool for evaluation.

8. Models enable users to bring the power of mathematics to bear on a problem.

9. Models provide a standardized format for analyzing a problem.

With the advent of Internet business, web business models were born, and these are considered especially helpful in allowing companies to view complex relationships that exist only in cyberspace. According to Michael Rappa's 2008 article "Business Models on the Web," basic business models such as the advertising model or the infomediary model can now be applied to Internet companies, replacing physical departments and processes with virtual components.

MODEL CONSTRUCTION

The accuracy of the results of the model analysis is dependent upon how well the model represents reality. The closer the model is to its actual counterpart, the more accurate the conclusions drawn and the predictions made about the object of attention. Hence, the model user must strive for the most accurate representation possible.

Model users also must be careful to identify the decision variable values that provide the best output for the model. This is referred to as the model's optimal solution. However, irrelevant variables may cloud the picture and cause inaccurate conclusions or sluggish analysis.

In their book *Operations Management: Concepts, Methods, and Strategies,* Mark Vonderembse and Gregory White present a step-by-step process for successfully building a useful model:

1. Define the problem, decision, situation, or scenario and the factors that influence it.

2. Select criteria to guide the decision, and establish objectives. A perfect example of this is the use of heuristics in assembly-line balancing to guide the decision and the criteria of maximizing efficiency/minimizing idle time as an objective.

3. Formulate a model that helps management to understand the relationships between the influential factors and the objectives the firm is trying to achieve.

4. Collect relevant data while trying to avoid the incorporation of superfluous information into the model.

5. Identify and evaluate alternatives. Once again, the example of assembly-line balancing is appropriate. The user can manipulate the model by changing the heuristics and comparing the final results, ultimately finding an optimal solution through trial-and-error. However, the production of alternatives may not be necessary if the model in use initially finds an optimal solution.

6. Select the best alternative.

7. Implement the alternative or reevaluate.

If the user is not familiar with models and their use, he or she would be wise to study the variety of models that are available for use and seek to understand their purpose and how each is used to generate results. Additionally, the user would be well served to learn how the individual model's results are interpreted and used, and what assumptions and limitations apply to each.

ADVANTAGES AND DISADVANTAGES

Models provide the most effective means developed for predicting performance. It is hard to conceive a prediction system that is not finally a model. To construct a model of a real process or system, careful consideration of the

system elements that must be abstracted is required. This in itself usually is a profitable activity, for it develops insights into the problem.

Lack of information quickly appears when beginning to build a model. Companies may consider asking the following questions: What do we really know? Where are the gaps in available data? It is often impractical or impossible to manipulate the real world system in order to determine the effect of certain variables. The dangers in using predictive models lie in the possibility of oversimplifying problems to keep models in workable form. The decision maker may place too much faith in a seemingly rigorous and complete analysis.

It is important for the model user to realize that model development and model solution are not completely separable. While the most accurate representation possible may seem desirable, the user still must be able to find a solution to the modeled problem. Model users need to remember that they are attempting to simplify complex problems so that they may be analyzed easily, quickly, and inexpensively without actually having to perform the task. Also desirable is a model that allows the user to manipulate the variables so that "what if" questions can be answered.

Models come in many varieties and forms, ranging from the simple and crude to the elegant and exotic. Whatever category they are in, all models share the distinction of being simplifications of more complex realities that should, with proper use, result in a useful decision-making aid.

Models are important and widely used in management. Marketing managers utilize the product life cycle model to facilitate understanding of the phases of product life. Accounting managers use ratios, such as the current ratio and the quick ratio, to quickly grasp the ability of an organization to pay its bills in the short term. Information systems managers have flow diagrams to depict the logic needed to develop a computerized order-entry system. Financial managers use net present value and internal rate of return in analyzing investment alternatives. Operations managers have precedence diagrams, decision trees, lot sizing models, material requirements planning, assembly-line balancing, and a host of other models they can use to make better decisions. Organizational performance is a result of the decisions that management makes. Models make these decisions easier to understand and often can lead to an optimal choice.

SEE ALSO *Decision Rules and Decision Analysis; Decision Support Systems*

BIBLIOGRAPHY
Buffa, Elwood S. *Operations Management: Problems and Models.* 3rd ed. New York: Wiley, 1972.
Meredith, Jack R., and Scott M. Shafer. *Operations Management for MBAs.* New York: John Wiley & Sons, 1999.
Rappa, Michael. "Business Models on the Web." *Managing the Digital Enterprise.* Available from: http://digitalenterprise.org/index.html. Updated 2008.
Stevenson, William, J. *Operations Management.* 7th ed. Boston: McGraw-Hill/Irwin, 2002.
Vonderembse, Mark A., and Gregory P. White. *Operations Management: Concepts, Methods, and Strategies.* 3rd ed. Minneapolis/St. Paul, MN: West Publishing Company, 1996.

MORALE

From a managerial perspective, morale embodies the collective spirit and motivation of a group of employees. Other terms used to designate this concept include *esprit* and *esprit de corps.* In fact, esprit de corps was one of the first management principles identified by Henri Fayol in the early twentieth century. Employee morale is how employees actually feel about themselves as workers, their work, their managers, their work environment, and their overall work life. It incorporates all the mental and emotional feelings, beliefs, and attitudes that individuals and groups hold regarding their job.

Consideration of employee morale and job satisfaction was a major emphasis of the behavioral school of management that started with the famous Hawthorne Experiments in the late 1930s. The behavioral school held that employee morale influences employee productivity. Theorists (such as Frederick Herzberg) conducted research in the 1950s and 1960s indicating that employees' satisfaction and motivation were influenced more by how employees felt about their work than the specific attributes of their job, including pay and workplace surroundings.

Since Herzberg's findings, different studies have found different links between employee morale and productivity. For example, according to a 2007 study conducted by research and consulting firm LLC, employee morale is connected to customer satisfaction, which directly relates to the bottom line. The study found that the most effective organizational strategy for boosting morale in the workplace is the use of cross-functional teams, which involves different departments—such as finance and marketing—collaborating on a single project.

Additionally, almost half of the companies in the survey responded that connecting with employees on a personal level is important for employee morale. The study also found that different organizational strategies are suited to larger and smaller companies. Large companies tend to manage morale using communication and rewards, where employees at smaller companies value flexibility and recognition.

Some organizations try to measure morale on a formal basis by conducting morale audits or attitude surveys that indicate the level of employee job satisfaction. Such

measures, however, are fraught with ambiguities; it is difficult, if not impossible, to determine the level of truthfulness of employees' answers or the complexity of the variables. For instance, employees may have a very different level of job satisfaction regarding their company, their pay, their benefits, their profession, and their specific department's policies. A true overall measure of what employees are feeling about their work is therefore difficult to obtain and to interpret. Since there are many variables at play, morale is not always directly linked to productivity, absenteeism, turnover, sales, etc. Nonetheless, morale is widely accepted as important to motivation and team building. The challenge for managers, then, is to negotiate these disparate factors in the manner that most contributes to the overall spirit of the employees.

In "Tips for Increasing Employee Morale and Reducing Absenteeism," Melissa Bushman lists the typical causes of low morale in the workplace and how they can most effectively be resolved. One of the most common causes of low morale is stress, which employees often experience as a result of problems with their manager. Bushman suggests that management training can be useful in this instance. Rumors, negativity, and gossip can also drag down morale in the workplace, which is why Bushman emphasizes the importance of teambuilding to encourage camaraderie and respect among employees. Finally, the author makes the case for incentive programs, which she claims can clearly communicate the goals of the organization, motivate employees to perform well, and give employees a sense of accomplishment.

The major determinant of morale is, in fact, the manager. Employees form their attitudes about work based primarily on their interactions with the supervisors and managers they work with every day. Since no two employees or companies are the same, it is not easy to construct a stable model of managerial techniques that will consistently contribute to high morale across the board. Nevertheless, most employees respond positively to certain managerial practices. Some suggested morale-boosters include:

- Practicing of fairness and consistency

- Bestowing praise in public while leveling criticism in private

- Encouraging humor and fun in the workplace

- Communication

- Listening and remaining receptive to new ideas

- Getting to know something about employees' personal lives and treating them as individuals

- Creating opportunities for employees to learn and grow

- Sharing decision making and offering employees choices

- Promoting from within

- Leading by example

Organizations have tried many techniques to increase morale. The National Alliance for Youth Sports believes creating an atmosphere of fun and camaraderie goes a long way toward maintaining a high level of morale. Every Friday morning the first 30 minutes of the workday is spent with the 35-member staff broken into five teams to compete in different types of games, including miniature golf and Frisbee football. Symbiosis Corporation, a producer of medical products, uses mentors to build morale of nonexempt hourly employees by supporting personal growth and promoting a sense of belonging. After the pilot project recorded improvements in attitudes, productivity, and morale, Symbiosis expanded the program.

In order to allow employees a sense of balance in their lives, some companies provide benefits that help employees run a household and put in a productive day at the office. Employees at Wilton Connor Packaging in Charlotte, North Carolina, can take their laundry to work and have it washed, dried, and folded for the cost of the soap; while at PepsiCo's headquarters employees are provided an on-site dry cleaning drop-off. Some companies offer concierge services that run errands and send someone to be at an employee's home for a delivery. Many companies also provide on-site child care, elder care, and fitness centers for their employees and their families.

To retain employees in an increasingly competitive marketplace, organizations must reinforce managerial techniques that foster a high degree of employee morale. Managers can make a difference by following common morale-boosting strategies, trying to provide their employees with supportive working environments, and incorporating creative techniques that make employees feel fulfilled personally and as part of a larger entity in which they feel integrated. The best managers take care of their employees so their employees can take care of business.

SEE ALSO *Human Resource Management; Motivation and Motivation Theory; Quality of Work Life*

BIBLIOGRAPHY
Acland, Holly. "Morale Boosters." *Marketing,* 24 September 1998, 36—38.

Bushman, Melissa. "Tips for Improving Employee Morale and Reducing Absenteeism." *Associated Content,* 23 January 2007. Available from: http://www.associatedcontent.com/article/124133/tips_for_improving_employee_morale.html?cat=3.

Dolan, Kerry. "When Money Isn't Enough." *Forbes,* 18 November 1996, 164—170.

"Employee Morale Dictates Profits." *Management Matters,* Reaction Search International, 1 July 2007. Available from:

http://www.executivesearchfirmnews.com/articles/
management_matters/employee_morale_dictates_profits.htm.

Ensman, Richard, Jr. "Morale Audit." *Incentive,* October 1998, 177–178.

Gillette, Becky. "Employee Morale Investments Often Pay Big Dividends." *Mississippi Business Journal,* 29 March 2004, 22.

———. "Have Fun Improving Morale." *Association Management,* July 1996, 24.

Johnson, Gail. "Retention Reality Check." *Training,* September 2004, 17.

MOTIVATION AND MOTIVATION THEORY

The term *motivation* is derived from the Latin word *movere,* meaning "to move." Motivation can be broadly defined as the forces acting on or within a person that cause the arousal, direction, and persistence of goal-directed, voluntary effort. Motivation theory is thus concerned with the processes that explain why and how human behavior is activated.

The broad rubric of motivation and motivation theory is one of the most frequently studied and written-about topics in the organizational sciences, and it is considered one of the most important areas of study in the field of organizational behavior. Despite the magnitude of the effort that has been devoted to the study of motivation, there is no single theory of motivation that is universally accepted. The lack of a unified theory of motivation reflects both the complexity of the construct and the diverse backgrounds and aims of those who study it. To delineate these crucial points, it is illuminating to consider the development of motivation and motivation theory as the objects of scientific inquiry.

HISTORICAL DEVELOPMENT

Early explanations of motivation focused on instincts. Psychologists writing in the late nineteenth and early twentieth centuries suggested that human beings were basically programmed to behave in certain ways, depending upon the behavioral cues to which they were exposed. Sigmund Freud, for example, argued that the most powerful determinants of individual behavior were those of which the individual was not consciously aware.

According to Steers, Porter, and Bigley in *Motivation and Leadership at Work,* in the early twentieth century researchers began to examine other possible explanations for differences in individual motivation. Some researchers focused on internal drives as an explanation for motivated behavior. Others studied the effect of learning and how individuals base current behavior on the consequences of past behavior. Still others examined the influence of individuals' cognitive processes, such as the beliefs they have about future events. Over time, these major theoretical streams of research in motivation were classified into two major schools: the content theories of motivation and the process theories of motivation.

MAJOR CONTENT THEORIES

Content (or need) theories of motivation focus on factors internal to the individual that energize and direct behavior. In general, such theories regard motivation as the product of internal drives that compel an individual to act or move (hence, "motivate") toward the satisfaction of individual needs. The content theories of motivation are based in large part on early theories of motivation that traced the paths of action backward to their perceived origin in internal drives. Major content theories of motivation are Maslow's hierarchy of needs, Alderfer's ERG theory, Herzberg's motivator-hygiene theory, and McClelland's learned needs or three-needs theory.

Maslow's Hierarchy of Needs. Abraham Maslow developed the hierarchy of needs, which suggests that individual needs exist in a hierarchy consisting of physiological needs, security needs, belongingness needs, esteem needs, and self-actualization needs. Physiological needs are the most basic needs for food, water, and other factors necessary for survival. Security needs include needs for safety in one's physical environment, stability, and freedom from emotional distress. Belongingness needs relate to desires for friendship, love, and acceptance within a given community of individuals. Esteem needs are those associated with obtaining the respect of one's self and others. Finally, self-actualization needs are those corresponding to the achievement one's own potential, to the exercising and testing of one's creative capacities, and, in general, to becoming the best person one can possibly be. Unsatisfied needs motivate behavior; thus, lower-level needs such as the physiological and security needs must be met before upper-level needs such as belongingness, esteem, and self-actualization can be motivational.

Applications of the hierarchy of needs to management and the workplace are obvious. According to the implications of the hierarchy, individuals must have their lower level needs met by, for example, safe working conditions, adequate pay to take care of one's self and family, and job security before they will be motivated by increased job responsibilities, status, and challenging work assignments.

Alderfer's ERG Theory. The ERG theory is an extension of Maslow's hierarchy of needs. Alderfer suggested that needs could be classified into three categories, rather than five. These three types of needs are existence, relatedness, and growth. Existence needs are similar to Maslow's

physiological and safety need categories. Relatedness needs involve interpersonal relationships and are comparable to aspects of Maslow's belongingness and esteem needs. Growth needs are those related to the attainment of one's potential and are associated with Maslow's esteem and self-actualization needs.

The ERG theory differs from the hierarchy of needs in that it does not suggest that lower-level needs must be completely satisfied before upper-level needs become motivational. ERG theory also suggests that if an individual is continually unable to meet upper-level needs that the person will regress and lower-level needs become the major determinants of their motivation. ERG theory's implications for managers are similar to those for the needs hierarchy: managers should focus on meeting employees' existence, relatedness, and growth needs, though without necessarily applying the provision that job-safety concerns necessarily take precedence over challenging and fulfilling job requirements.

Motivator-Hygiene Theory. Frederick Herzberg developed the motivator-hygiene theory. This theory is closely related to Maslow's hierarchy of needs but relates more specifically to how individuals are motivated in the workplace. Based on his research, Herzberg argued that meeting the lower-level needs (hygiene factors) of individuals would not motivate them to exert effort, but would only prevent them from being dissatisfied. Only if higher-level needs (motivators) were met would individuals be motivated.

The implication for managers of the motivator-hygiene theory is that meeting employees lower-level needs by improving pay, benefits, safety, and other job-contextual factors will prevent employees from becoming actively dissatisfied but will not motivate them to exert additional effort toward better performance. To motivate workers, according to the theory, managers must focus on changing the intrinsic nature and content of jobs themselves by "enriching" them to increase employees' autonomy and their opportunities to take on additional responsibility, gain recognition, and develop their skills and careers.

McClelland's Learned Needs Theory. McClelland's theory suggests that individuals learn needs from their culture. Three of the primary needs in this theory are the need for affiliation (n Aff), the need for power (n Pow), and the need for achievement (n Ach). The need for affiliation is a desire to establish social relationships with others. The need for power reflects a desire to control one's environment and influence others. The need for achievement is a desire to take responsibility, set challenging goals, and obtain performance feedback.

The main point of the learned needs theory is that when one of these needs is strong in a person, it has the

potential to motivate behavior that leads to its satisfaction. Thus, managers should attempt to develop an understanding of whether and to what degree their employees have one or more of these needs, and the extent to which their jobs can be structured to satisfy them.

MAJOR PROCESS THEORIES

Process (or cognitive) theories of motivation focus on conscious human decision processes as an explanation of motivation. The process theories are concerned with determining how individual behavior is energized, directed, and maintained in the specifically willed and self-directed human cognitive processes. Process theories of motivation are based on early cognitive theories, which posit that behavior is the result of conscious decision-making processes. The major process theories of motivation are expectancy theory, equity theory, goal-setting theory, and reinforcement theory.

Expectancy Theory. In the early 1960s, Victor Vroom applied concepts of behavioral research conducted in the 1930s by Kurt Lewin and Edward Tolman directly to work motivation. Basically, Vroom suggested that individuals choose work behaviors that they believe lead to outcomes they value. In deciding how much effort to put into a work behavior, individuals are likely to consider:

- Their expectancy, meaning the degree to which they believe that putting forth effort will lead to a given level of performance

- Their instrumentality, or the degree to which they believe that a given level of performance will result in certain outcomes or rewards

- Their valence, which is the extent to which the expected outcomes are attractive or unattractive

All three of these factors are expected to influence motivation in a multiplicative fashion, so that for an individual to be highly motivated, all three of the components of the expectancy model must be high. And, if even one of these is zero (e.g., instrumentality and valence are high, but expectancy is completely absent), the person will have no motivation for the task. Thus, managers should attempt, to the extent possible, to ensure that their employees believe that increased effort will improve performance and that performance will lead to valued rewards.

In the late 1960s, Porter and Lawler published an extension of the Vroom expectancy model, which is known as the Porter-Lawler expectancy model or simply the Porter-Lawler model. Although the basic premise of the Porter-Lawler model is the same as for Vroom's model, the Porter-Lawler model is more complex in a number of ways. It suggests that increased effort does not automatically lead to improved performance because individuals may not

possess the necessary abilities needed to achieve high levels of performance, or because they may have an inadequate or vague perception of how to perform necessary tasks. Without an understanding of how to direct effort effectively, individuals may exert considerable effort without a corresponding increase in performance.

Equity Theory. Equity theory suggests that individuals engage in social comparison by comparing their efforts and rewards with those of relevant others. The perception of individuals about the fairness of their rewards relative to others influences their level of motivation. Equity exists when individuals perceive that the ratio of efforts to rewards is the same for them as it is for others to whom they compare themselves. Inequity exists when individuals perceive that the ratio of efforts to rewards is different (usually negatively so) for them than it is for others to whom they compare themselves.

There are two types of inequity—under-reward and over-reward. Under-reward occurs when a person believes that he or she either puts in more efforts than another, yet receives the same reward, or puts in the same effort as another for a lesser reward. For instance, if an employee works longer hours than her coworker, yet receives the same salary, the employee would perceive inequity in the form of under-reward. Conversely, with over-reward, a person will feel that his efforts-to-rewards ratio is higher than another person's, such that he is getting more for putting in the same effort, or getting the same reward even with less effort. While research suggests that under-reward motivates individuals to resolve the inequity, research also indicates that the same is not true for over-reward. Individuals who are over-rewarded often engage in cognitive dissonance, convincing themselves that their efforts and rewards are equal to another's.

According to the equity theory, individuals are motivated to reduce perceived inequity. Individuals may attempt to reduce inequity in various ways. A person may change his or her level of effort; an employee who feels under-rewarded is likely to work less hard. A person may also try to change his or her rewards, such as by asking for a raise. Another option is to change the behavior of the reference person, perhaps by encouraging that person to put forth more effort. Finally, a person experiencing inequity may change the reference person and compare him or herself to a different person to assess equity. For managers, equity theory emphasizes the importance of a reward system that is perceived as fair by employees.

Goal-Setting Theory. The goal-setting theory posits that goals are the most important factors affecting the motivation and behavior of employees. This motivation theory was developed primarily by Edwin Locke and Gary Latham. Goal-setting theory emphasizes the importance of specific and challenging goals in achieving motivated behavior. Specific goals often involve quantitative targets for improvement in a behavior of interest. Research indicates that specific performance goals are much more effective than those in which a person is simply told to do their best. Challenging goals are difficult but not impossible to attain. Empirical research supports the proposition that goals that are both specific and challenging are more motivational than vague goals or goals that are relatively easy to achieve.

Several factors may moderate the relationship between specific and challenging goals and high levels of motivation. The first of these factors is goal commitment, which means that the more dedicated the individual is to achieving the goal, the more they will be motivated to exert effort toward goal accomplishment. Research suggests that having employees participate in goal setting will increase their level of goal commitment. A second factor relevant to goal-setting theory is self-efficacy, which is the individual's belief that he or she can successfully complete a particular task. If individuals have a high degree of self-efficacy, they are likely to respond more positively to specific and challenging goals than if they have a low degree of self-efficacy.

Reinforcement Theory. This theory can be traced to the work of the pioneering behaviorist B.F. Skinner. It is considered a motivation theory as well as a learning theory. Reinforcement theory posits that motivated behavior occurs as a result of reinforcers, which are outcomes resulting from the behavior that makes it more likely the behavior will occur again. This theory suggests that it is not necessary to study needs or cognitive processes to understand motivation, but that it is only necessary to examine the consequences of behavior. Behavior that is reinforced is likely to continue, but behavior that is not rewarded or behavior that is punished is not likely to be repeated. Reinforcement theory suggests to managers that they can improve employees' performance by a process of behavior modification in which they reinforce desired behaviors and punish undesired behaviors.

MYERS-BRIGGS TYPE INDICATOR (MBTI)

The Myers-Briggs Type Indicator is a personality survey designed during WWII when women were entering the industrial workforce. The idea behind the questionnaire was to use women's personality preferences to place them in the positions where they would be most effective. In 2005, Steven Flannes and Ginger Levin came up with the idea that the MBTI could be used to determine what motivation strategies would be most effective on individual employees. The test analyzes four traits: the need for personal contact with others, the application of realism,

the ability to apply logic, and influences of judgment. According to this theory, this information enables managers to tailor their communication approach according to the personality preferences of each individual.

SEE ALSO *Goals and Goal Setting; Operant Conditioning; Organizational Behavior; Reinforcement Theory; Theory X and Theory Y; Theory Z*

BIBLIOGRAPHY

Adams, J. Stacy. "Toward an Understanding of Equity." *Journal of Abnormal and Social Psychology,* November 1963, 422–436.

Alderfer, Clayton P. *Existence, Relatedness, and Growth: Human Needs in Organizational Settings.* New York: Free Press, 1972.

Foss, Nicolai. "Agency Theory and Intrinsic Motivation." *Organizations and Markets,* 20 November 2007. Available from: http://organizationandmarkets.com/2007/11/20agency-theory-and-intrinsic-motivation/.

Gordon, Judith R. *Organizational Behavior: A Diagnostic Approach.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2001.

Herzberg, Frederick, B. Mausner, and B. Snyderman. *The Motivation to Work.* New York: McGraw-Hill, 1959.

Jones, Gareth R., Jennifer M. George, and Charles W.L. Hill. *Contemporary Management.* 2nd ed. Boston: Irwin/McGraw-Hill, 2000.

Locke, Edwin A. "Toward a Theory of Task Motivation and Incentives." *Organizational Behavior and Human Performance,* May 1968, 157–189.

Maslow, Abraham H. *Motivation and Personality.* New York: Harper & Row, 1954.

McClelland, David C. "Business Drive and National Achievement." *Harvard Business Review,* July-August 1962, 99–112.

Mitchell, Terence R. "Matching Motivational Strategies with Organizational Contexts." *Research in Organizational Behavior* 19 (1997): 57–149.

Peterson, Tonya M. "Motivation: How to Increase Project Team Performance." *Project Management Journal,* 1 December 2007. Available from: http://www.allbusiness.com/management/management-theory/10205140-1.html/.

Porter, Lyman W., Gregory Bigley, and Richard M. Steers. *Motivation and Work Behavior.* 7th ed. New York: McGraw-Hill/Irwin, 2002.

Robbins, Stephen P., and Mary Coulter. *Management.* 8th ed. Upper Saddle River, NJ: Prentice Hall, 2004.

Steers, Richard M., Lyman W. Porter, and Gregory A. Bigley. *Motivation and Leadership at Work.* 6th ed. New York: McGraw-Hill, 1996.

Vroom, Victor H. *Work and Motivation.* New York: John Wiley & Sons, 1964.

MULTIMEDIA

Multimedia is the term used to describe two or more types of media combined into a single package—usually denoting a combination of some or all of the following: video, sound, animation, text, and pictures. Multimedia gives the user the opportunity to influence the presentation of material. The selection and manipulation of various aspects of the presentation material is the interactive aspect of a multimedia presentation. Interactive features could range from a question-and-answer function to choosing from a menu of particular subjects or aspects of a presentation. One application of multimedia, for example, involves presenting the user with a "what if" scenario, in which the choices the user makes affect the outcome of the presentation. This affords the user a degree of control, not unlike directing a motion picture and having the opportunity to make changes to the plot at various junctures.

TYPES OF MEDIA

There are certain types of media used in multimedia presentations, from simple to complex visual and audio devices. Multimedia components are divided into:

- **Text.** This refers to written documents, the words seen in handouts, powerpoint presentations, Web sites, and reports. One of the most simple types of media, text is also used to communicate the most information and appears in conjunction with visual aids.

- **Audio.** This is the sounds that often accompany visual presentations. Sound by itself can be used in radio broadcasts or online audio files, but in multimedia presentations audio is used as a complementary media. Sound effects can help make a presentation more memorable, while hearing the main points of information spoken can help listeners focus.

- **Still images.** Photographs, taken either by digital or analog means, are an important part of multimedia productions. Well-placed visual aids can explain concepts with clarity.

- **Animation.** Animations are graphics that move, accompanied by audio effects.

- **Video.** Video media is used to spread interviews, create movies, and post personal updates to communicate business messages. Currently, businesses can use videos online or create CDs to spread for instructional use within their company.

- **Interactivity.** The newest form of multimedia, interactivity, is a computer-based tool which allows users to choose to learn different parts of information on their own terms. By highlighting or choosing links and sections, users can manipulate the information environment, examining whatever knowledge is important to them.

ANALOG AND DIGITAL MEDIA

Analog media saves sounds, pictures, and text in non-electronic forms. This can include more traditional types of media, such as cassette tapes, records, and videocassettes, which use waves to transmit information. Analog equipment is generally more specialized than digital. Analog devices rely on tape recorders, video cameras, and older playback equipment to edit their contents.

Digital media transmits the information recorded in the waves into a more flexible format, namely, digitized code that can be transferred across a variety of devices, such as computers, internet systems, digital cameras, and more. Scanners, sound cards, and video compression are all used to record these types of media. Businesses currently use digital media most often in their multimedia applications, such as:

- Accounting and employee records management
- CDs for catalogs, records, and presentations
- Interactive training sessions for employees
- Internet tools such as company Web sites
- Product refinement and development using various computer-assisted design programs
- Sales presentations, and other communication to a wide audience.
- Self-running media presentations that can be used for commercial purposes

THE MECHANICS OF DIGITAL MULTIMEDIA

The CD-ROM and its successor, the DVD-ROM, store data in the form of a binary code. The binary code is placed onto the discs by a stamping process that impresses lands (flat areas that represent the zero in binary code) and hollows (pits that represent the one in binary code) onto the surface of the disc. When the discs are placed into a player or computer drive, the playing mechanism spins the disc and flashes a laser beam over the surface of the disc. The reflected light patterns caused by the embossed data contained on the surface of the disc are then decoded by the reader/player and translated back into audio and video. The storage capacity of a CD-ROM disc is 635 megabytes, while the storage capacity of a DVD-ROM disc can be as great as 5.2 gigabytes. Since sound, graphics, and other visuals take up considerably more data space than text alone, the increased storage capacities of the CD-ROM and DVD-ROM discs have played an integral part in making the use of multimedia more commonplace. The durability, portability, and relatively low manufacturing cost of the discs also play a critical role in their proliferation. While the Read Only Memory (ROM) format is still the most common

for both CDs and DVDs, today recordable disc drives are widely available to enable users to "burn" data (write, erase, and/or rewrite data) to a disc on their own.

RICH MEDIA

Rich media is a term referring to digital, interactive multimedia programs, the newest type of multimedia, most often found online via company Web sites or social networks. Rich media involves a combination of sound, pictures, animations, and video with integrated interactivity so that users, by pointing and clicking, can access online information as they desire. Rich media, because of its use of video and animation, can be built in two different formats. The first type is downloadable, which means Internet users can download the presentation and view it with a media player of their own, such as Apple's Quick-Time, Microsoft's Media Player, or Real Network's Real-Player. The second type of rich media is embedded into a Web site, meaning that it does not need to be downloaded, only accessed by the online user. This involves more cost on the producer's part, but makes it easier for users to have a seamless, interactive experience.

As the use of rich media increases, so do the benefits and complications. More and more companies are making use of rich media as marketing tools and training programs. However, downloadable media is dependent on its format, and problems can arise when transmitting rich media from one player to another. Animations and audio files may play differently from one media player to another. A successful rich media presentation will be interesting, informative, and easily accessed by any user.

HYPERMEDIA

Hypermedia, used in online multimedia presentations such as rich media, refers to the hyperlinks embedded in visual media. When a customer or employee clicks on a Web site link to learn more about a subject or choose a certain option, this is an example of hypermedia. It is ideal as a tool for allocating information on appropriate levels, giving users knowledge in pertinent pieces.

These types of nonlinear interaction are becoming increasingly common in the business world. As more people internationally gain access to hypermedia, companies are beginning to develop multimedia presentations to communicate their visions, opportunities, outsource training, and updates.

USES OF MULTIMEDIA

Multimedia devices have an almost innumerable variety of applications. They are used in home-entertainment systems and can be extremely powerful educational tools. Educators, for example, have been exceptionally creative in combining some of the exciting elements of video-game

applications with select features of educational material. By doing this, the concept of "edutainment" was created. The goal of using the multimedia edutainment approach is to entertain the user so effectively that the user remains unaware that he or she is actually learning in the process.

Multimedia can also offer critical services in the business world. While information can certainly be conveyed adequately by the singular use of still pictures, video, film, audio, or text, multimedia potentially multiplies the degree of effectiveness, in no small part due to the added entertainment value and the extent to which the viewers feel a part of the action. Such benefits can't easily be matched by the application of a singular medium. The effectiveness of teaching, selling, informing, entertaining, promoting, and presenting are all dependent upon one factor: the ability of the presented material to hold the attention of the desired audience. A dynamic multimedia presentation can usually be more effective than earlier methods at accomplishing this task with an audience that was raised on television and motion pictures. The computerized multimedia presentation offers the added benefit of cost-effective flexibility, allowing easy editing of the basic materials in order to tailor them to specific target audiences.

Training, informational and promotional materials, sales presentations, and point-of-sale displays that allow for customer interaction and communication both within and outside the organization are all common applications of multimedia in the business world. Multimedia presentations for many such applications can be highly portable, particularly in the cases of the CD-ROM, DVD-ROM, and videotape. The equipment required to produce these presentations is relatively commonplace or otherwise easy to access.

Perhaps the vanguard application of multimedia is virtual reality, a combination of video, stereo, and computer graphics that attempts to create an interactive three-dimensional environment that immerses the user within the simulation. Virtual reality has been employed in a wide range of practical applications: to train military troops, to streamline manufacturing and architectural design processes, to create simulated test environments for industry, and as a form of public entertainment.

One should still keep in mind, however, that even if rendered in a highly advanced multimedia format, an ineffectual presentation is still an ineffectual presentation. One should remain focused on the message being conveyed while shaping the choice and use of materials in accordance with that message.

SEE ALSO *Technology Management; Training Delivery Methods*

BIBLIOGRAPHY
"Hypertext and Hypermedia: Definition." *New Jersey Institute of Technology,* 2008. Available from: http://www.cis.njit.edu/~bieber/pub/cs-encyclopedia/hypertext.html.

Li, Nian-Ze, and Mark S. Drew. *Fundamentals of Multimedia.* New York: Prentice Hall, 2003.

Mayer, Richard E. *Multimedia Learning.* Cambridge: Cambridge University Press, 2001.

"Multimedia Uses." *Woodridge Data Solutions, Inc.,* 2008. Available from: http://www.wdsi.ca/multimedia/mm-uses.htm.

"What is rich media and how can I learn more about its accessibility?" *University of Washington,* 2008. Available from: http://www.washington.edu/accessit/articles?146.

MULTINATIONAL CORPORATIONS

Multinational corporations have existed since the beginning of overseas trade. They have remained a part of the business scene throughout history, entering their modern form in the seventeenth and eighteenth centuries with the creation of large, European-based monopolistic concerns such as the British East India Company during the age of colonization. Multinational concerns were viewed at that time as agents of civilization and played a pivotal role in the commercial and industrial development of Asia, South America, and Africa.

By the end of the nineteenth century, advances in communications had more closely linked world markets, and multinational corporations retained their favorable image as instruments of improved global relations through commercial ties. The existence of close international trading relations did not prevent the outbreak of two world wars in the first half of the twentieth century, but an even more closely bound world economy emerged in the aftermath of the period of conflict.

In particular, the period after World War Two is described as the "American era" by business historians Louis Galambos and Joe Pratt. During this era (which lasted until the late 1960s), many U.S. companies began or increased international expansion. Firms also expanded operations and businesses, resulting in large conglomerates that spanned different countries. Though this era came to a close with the economic turmoil of the early 1970s, multinational corporations have remained. Since the late 1990s and early 2000s, the term "globalization" has been closely linked with multinational corporations. Some see multinationals as the driving force behind this phenomenon.

While multinational corporations have grown in power and visibility, they have also come to be viewed more ambivalently by both governments and consumers

worldwide. Indeed, multinationals today are viewed with increased suspicion given their perceived lack of concern for the economic well-being of particular geographic regions and the public impression that multinationals are gaining power in relation to national government agencies; international trade federations and organizations; and local, national, and international labor organizations.

Despite such concerns, multinational corporations appear poised to expand their power and influence as barriers to international trade continue to be removed. Furthermore, the actual nature and methods of multinationals are in large measure misunderstood by the public, and their long-term influence is likely to be less sinister than imagined. Multinational corporations share many common traits, including the methods they use to penetrate new markets, the manner in which their overseas subsidiaries are tied to their headquarters operations, and their interaction with national governmental agencies and national and international labor organizations.

WHAT IS A MULTINATIONAL CORPORATION?

As the name implies, a multinational corporation is a business concern with operations in more than one country. These operations outside the company's home country may be linked to the parent by merger, operated as subsidiaries, or have considerable autonomy. Multinational corporations are sometimes perceived as large, utilitarian enterprises with little or no regard for the social and economic well-being of the countries in which they operate, but the reality of their situation is more complicated.

There are tens of thousands of multinational corporations currently operating in the global economy, in addition to hundreds of thousands of overseas affiliates running cross-continental businesses. The top multinational corporations are headquartered in the United States, Western Europe, and Japan; they have the capacity to shape global trade, production, and financial transactions. Multinational corporations are viewed by many as favoring their home operations when making difficult economic decisions, but this tendency is declining as companies are forced to respond to increasing global competition.

The World Trade Organization (WTO), the International Monetary Fund (IMF), and the World Bank are the three institutions that underwrite the basic rules and regulations of economic, monetary, and trade relations between countries. Many developing nations have loosened trade rules under pressure from the IMF and the World Bank. The domestic financial markets in these countries have not been developed and do not have appropriate laws in place to enable domestic financial institutions to stand up to foreign competition. The administrative setup, judicial systems, and law-enforcing agencies generally cannot guaran-

tee the social discipline and political stability that are necessary in order to support a growth-friendly atmosphere. As a result, many multinational corporations invest only in geographic locations that they believe are politically stable (such as Latin America).

Multinational corporations are often viewed as being exploitative of both their workers and the local environment, given their relative lack of association with any given locality. This criticism of multinationals is valid to a point, but it must be remembered that no corporation can successfully operate without regard to local social, labor, and environmental standards, and that multinationals in large measure do conform to local standards in these regards.

Multinational corporations are also seen as acquiring too much political and economic power in the modern business environment. Indeed, corporations are able to influence public policy to some degree by threatening to move jobs overseas, but companies are often prevented from employing this tactic given the need for highly trained workers to produce many products. Such workers can seldom be found in low-wage countries. Furthermore, once they enter a market, multinationals are bound by the same constraints as domestically owned concerns, and find it difficult to abandon the infrastructure they produced to enter the market in the first place.

Because so many early multinational corporations were originally based in the United States, some of these corporations—especially consumer businesses with well known brands—came to be seen as symbols of "Americanization." However, the modern multinational corporation is not necessarily headquartered in a wealthy nation. Many countries that were recently classified as part of the developing world, including Brazil, Taiwan, Kuwait, and Venezuela, are now home to large multinational concerns. The days of corporate colonization seem to be nearing an end. At the most extreme end, in 2008 *Business Week* featured a story on Lenovo, a multinational that does not have a headquarters, effectively denying the company's ties to a single nation as its home.

ENTRY OF MULTINATIONAL CORPORATIONS INTO NEW MARKETS

Multinational corporations follow three general procedures when seeking to access new markets: merger with or direct acquisition of existing concerns; sequential market entry; and joint ventures.

Merger or direct acquisition of existing companies in a new market is the most straightforward method of new market penetration employed by multinational corporations. Such an entry, known as foreign direct investment, allows multinationals, especially the larger ones, to take full advantage of their size and the economies of scale that this provides. The rash of mergers within the global automotive

industries during the late 1990s are illustrative of this method of gaining access to new markets and, significantly, were made in response to increased global competition.

Multinational corporations also make use of a procedure known as sequential market entry when seeking to penetrate a new market. Sequential market entry often also includes foreign direct investment, and involves the establishment or acquisition of concerns operating in niche markets related to the parent company's product lines in the new country of operation. Japan's Sony Corporation made use of sequential market entry in the United States, beginning with the establishment of a small television assembly plant in San Diego, California, in 1972. For the next two years, Sony's U.S. operations remained confined to the manufacture of televisions, the parent company's leading product line. Sony branched out in 1974 with the creation of a magnetic tape plant in Dothan, Alabama, and expanded further by opening an audio equipment plant in Delano, Pennsylvania, in 1977.

After a period of consolidation brought on by an unfavorable exchange rate between the yen and dollar, Sony continued to expand and diversify its U.S. operations, adding facilities for the production of computer displays and data storage systems during the 1980s. In the 1990s, Sony further diversified it U.S. facilities and now also produces semiconductors and personal telecommunications products in the United States. Sony's example is a classic case of a multinational using its core product line to defeat indigenous competition and lay the foundation for the sequential expansion of corporate activities into related areas.

Finally, multinational corporations often access new markets by creating joint ventures with firms already operating in these markets. This has particularly been the case in countries formerly or presently under communist rule, including those of the former Soviet Union, Eastern Europe, and the People's Republic of China. In such joint ventures, the venture partner in the market to be entered retains considerable or even complete autonomy, while realizing the advantages of technology transfer and management and production expertise from the parent concern. The establishment of joint ventures has often proved awkward in the long run for multinational corporations, which are likely to find their venture partners are formidable competitors when a more direct penetration of the new market is attempted.

Multinational corporations are thus able to penetrate new markets in a variety of ways, which allows existing concerns in the market to be accessed with a varying degree of autonomy and control over operations.

CONCERNS ABOUT MULTINATIONAL CORPORATIONS

While no one doubts the economic success and pervasiveness of multinational corporations, their motives and actions have been called into question by social welfare, environmental protection, and labor organizations and government agencies worldwide.

National and international labor unions have expressed concern that multinational corporations in economically developed countries can avoid labor negotiations by simply moving their jobs to developing countries where labor costs are markedly less. Labor organizations in developing countries face the converse of the same problem, as they are usually obliged to negotiate with the national subsidiary of the multinational corporation in their country, which is usually willing to negotiate contract terms only on the basis of domestic wage standards, which may be well below those in the parent company's country.

Offshore outsourcing, or offshoring, is a term used to describe the practice of using cheap foreign labor to manufacture goods or provide services only to sell them back into the domestic marketplace. Today, many Americans are concerned about the issue of whether American multinational companies will continue to export jobs to cheap overseas labor markets. In the fall of 2003, the University of California-Berkeley showed that as many as 14 million American jobs were potentially at risk over the next decade. Opponents of offshoring claim that it takes jobs away from Americans, while also increasing the imbalance of trade.

When foreign companies set up operations in America, they usually sell the products manufactured in the United States to American consumers. However, when U.S. companies outsource jobs to cheap overseas labor markets, they usually sell the goods they produce to Americans, rather than to the consumers in the country in which they are made. In 2004, the states of Illinois and Tennessee passed legislation aimed at limiting offshoring; in 2005, another sixteen states considered bills that would limit state aid and tax breaks to firms that outsource abroad.

However, foreign multinationals may also outsource their operations to the United States. For example, many non-U.S. auto manufacturers have built plants in the United States, thus ensuring access to American consumers. For example, Toyota now makes approximately one-third of its profits from U.S.-built car sales.

Social welfare organizations are similarly concerned about the actions of multinationals, which are presumably less interested in social matters in countries in which they maintain subsidiary operations. Environmental protection agencies are equally concerned about the activities of multinationals, which often maintain environmentally hazardous operations in countries with minimal environmental protection statutes.

Business and social developments can also produce new criticisms of multinational corporations. In 2007, widely publicized recalls of toys containing lead paint that

were manufactured in China for multinational corporations illuminated other issues with outsourcing. As multinationals outsource operations, they lose accountability and control over manufacturing, environmental, and safety standards. Even if a multinational requires certain standards, the ability to ensure that they are followed is diminished. This can be exacerbated by even further subcontracting of already-outsourced tasks.

Finally, government agencies fear the growing power of multinationals, which once again can use the threat of removing their operations from a country to secure favorable regulation and legislation. In effect, a multinational corporation has the ability to shift capital, resources, and operations around the world as it sees fit. The mobility inherent in capital investment also means that some locations and local governments might compete with one another in attracting a multinational corporation by creating favorable business conditions. Scholars and others have debated whether or not this development is positive or negative. For example, Thomas Friedman has developed what he calls the "McDonald's Theory of Conflict Prevention," which states that any two countries that have the same economic standing (represented by McDonald's) will not go to war. In effect, Friedman sees multinationals as a stabilizing force in that it links different nations together in a world economy. On the other hand, others see multinationals as thriving through exploiting economic differences across the globe, what some geographers term "uneven development." Some point out that different parts of the production process happen in different parts of the world. Because of this, multinational corporations actually contribute to spatial, economic, and power inequalities.

All of these concerns are valid, and abuses have undoubtedly occurred, but many forces are also at work to keep multinational corporations from wielding unlimited power over even their own operations. Increased consumer awareness of environmental and social issues and the impact of commercial activity on social welfare and environmental quality have greatly influenced the actions of all corporations in recent years, and this trend shows every sign of continuing. Multinational corporations are constrained from moving their operations into areas with excessively low labor costs given the relative lack of skilled laborers available for work in such areas. Furthermore, the sensitivity of the modern consumer to the plight of individuals in countries with repressive governments mitigates the removal of multinational business operations to areas where legal protection of workers is minimal. Examples of consumer reaction to unpopular action by multinationals are plentiful, and include the outcry against the use of sweatshop labor by Nike and activism against operations by the Shell Oil Company in Nigeria and PepsiCo in Myanmar (formerly Burma) due to the repressive nature of the governments in those countries.

Multinational corporations are also constrained by consumer attitudes in environmental matters. Environmental disasters such as those which occurred in Bhopal, India (the explosion of an unsafe chemical plant operated by Union Carbide, resulting in great loss of life in surrounding areas) and Prince William Sound, Alaska (the rupture of a single-hulled tanker, the Exxon Valdez, causing an environmental catastrophe) led to ceaseless bad publicity for the corporations involved and continue to serve as a reminder of the long-term cost in consumer approval of ignoring environmental, labor, and safety concerns.

Similarly, consumer awareness of global issues lessens the power of multinational corporations in their dealings with government agencies. International conventions of governments are also able to regulate the activities of multinational corporations without fear of economic reprisal, with examples including the 1987 Montreal Protocol limiting global production and use of chlorofluorocarbons and the 1989 Basel Convention regulating the treatment of and trade in chemical wastes.

In fact, despite worries over the impact of multinational corporations in environmentally sensitive and economically developing areas, the corporate social performance of multinationals has been surprisingly favorable to date. The activities of multinational corporations encourage technology transfer from the developed to the developing world, and the wages paid to multinational employees in developing countries are generally above the national average. When the actions of multinationals do cause a loss of jobs in a given country, it is often the case that another multinational will move into the resulting vacuum, with little net loss of jobs in the long run. Subsidiaries of multinationals are also likely to adhere to the corporate standard of environmental protection even if this is more stringent than the regulations in place in their country of operation, and so in most cases create less pollution than similar indigenous industries.

THE FUTURE FOR MULTINATIONAL CORPORATIONS

Current trends in the international marketplace favor the continued development of multinational corporations. Countries worldwide are privatizing government-run industries, and the development of regional trading partnerships such as the North American Free Trade Agreement (a 1993 agreement between Canada, Mexico, and United States) and the European Union have the overall effect of removing barriers to international trade. Privatization efforts result in the availability of existing infrastructure for use by multinationals seeking to enter a new market, while removal of international trade barriers is obviously a boon to multinational operations.

Perhaps the greatest potential threat posed by multinational corporations would be their continued success in a still underdeveloped world market. As the productive capacity of multinationals increases, the buying power of people in much of the world remains relatively unchanged. This could lead to the production of a worldwide glut of goods and services. Such a glut, which has occurred periodically throughout the history of industrialized economies, can in turn lead to wage and price deflation, contraction of corporate activities, and a rapid slowdown in all phases of economic life. Such a possibility is purely hypothetical, however, and for the foreseeable future the operations of multinational corporations worldwide are likely to continue to expand.

SEE ALSO *Free Trade Agreements and Trading Blocs; International Business; International Management; Transnational Organization*

BIBLIOGRAPHY

Barton, Ron, and Michael Bishko. "Global Mobility Strategy." *HR Focus* March 1998.

Brenner, Neil, and Nik Theodore. "Cities and the Geographies of 'Actually Existing Neoliberalism.' " *Spaces of Neoliberalism.* Neil Brenner and Nik Theodore, eds. Malden, Massachusetts: Blackwell Publishing, 2002, 2–32.

Burton, Daniel F., Jr., Erich Bloch, and Mark S. Mahomey. "Multinationals." *Challenge* September-October 1994.

Castells, Manuel. *The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process.* Cambridge, Massachusetts: Basil Blackwell, 1991.

Chang, Sea-Jin, and Philip M. Rosenzweig. "Industry and Regional Patterns in Sequential Foreign Market Entry." *Journal of Management Studies* November 1998.

Chen, Shu-Ching Jean. "Choi's Toys." forbes.com 28 January 2008. Available from: http://www.forbes.com/global/2008/0128/026.html.

Choucri, Nazli. "The Global Environment and Multinational Corporations." *Technology Review* April 1991.

Francis, Diane. "The New Love Affair with Transnationals." *Maclean's,* 20 December 1993.

Friedman, Thomas L. "It's a Flat World, After All." *New York Times Magazine* 3 April 2005, 33.

Galambos, Louis, and Joseph Pratt. *The Rise of the Corporate Commonwealth: U.S. Business and Public Policy in the Twentieth Century.* New York: Basic Books, 1988.

Giddens, Anthony. "Globalization" in *International Views: America and the Rest of the World.* Keith Gumery, ed. New York: Pearson Longman, 2007, 14–22.

Hamm, Steve. "Levono: A Company without a Country." *BusinessWeek* 23 January 2008. Available from: http://www.businessweek.com/globalbiz/blog/globespotting/archives/2008/01/lenovo_a_compan.html.

Hatfield, John. "At the Mercy of the Monsters." *CA Magazine* September 1998.

Jane, Wills. "Taking on the CosmoCorps?" *Economic Geography* April 1998.

———. *Lexus and Olive Tree.* New York: Anchor Books, 2000.

Mataloni, Raymond J. "U.S. Multinational Companies Operations in 1996." *Survey of Current Business* September 1998.

Miller, William H. "A Force for Good." *Industry Week* 19 April 1999.

Nuruzzaman, Mohammed. "Economic Liberalization and Poverty in the Developing Countries." *Journal of Contemporary Asia* March 2005, 109.

Prahalad, C.K., and Kenneth Lieberthal. "The End of Corporate Imperialism." *Harvard Business Review* July-August 1998.

Stopford, John. "Multinational Corporations." *Foreign Policy* Winter 1998.

———."Time to Bring it Back Home?" *The Economist* 5 March 2005, 63.

Tsang, Eric W.K. "Internationalization as a Learning Process: Singapore MNCs in China." *Academy of Management Executives* February 1999.

Tyler, Gus. "The Nation-State vs. the Global Economy." *Challenge* March-April 1993.

Woollacott, Martin. "Are Businesses Forced to Keep Bad Company?" *Business and Society Review* Fall 1995, 45.

———."Worldbeater Inc." *Economist* 22 November 1997.

Zhao, Laixun. "Labour-Management Bargaining and Transfer Pricing in Multinational Corporations." *Canadian Journal of Economics* October 1998.

MULTIPLE-CRITERIA DECISION MAKING

Real-world decision-making problems are usually too complex and ill-structured to be considered through the examination of a single criterion, attribute, or point of view that will lead to the optimum decision. In fact, such a unidimensional approach is merely an oversimplification of the actual nature of the problem at hand, and it can lead to unrealistic decisions. A more appealing approach would be the simultaneous consideration of all pertinent factors that are related to the problem. However, through this approach some very essential issues/questions emerge: how can several and often conflicting factors be aggregated into a single evaluation model? Is this evaluation model a unique and optimal one?

Researchers from a variety of disciplines have tried to address the former question using statistical approaches, artificial intelligence techniques, and operations research methodologies. The success and usefulness of these attempts should be examined with regard to the second question. Obviously, a decision problem is not addressed in the same way by all decision makers. Each decision maker has his or her own preferences, experiences, and decision-making policy; thus one person's judgment is expected to differ from another's. This is a significant issue that should be considered during the development of decision-making models.

Addressing such issues constitutes the focal point of interest in multiple-criteria decision making (MCDM). MCDM constitutes an advanced field of operations research that is devoted to the development and implementation of decision support tools and methodologies to confront complex decision problems involving multiple criteria, goals, or objectives of conflicting nature.

The tools and methodologies provided by MCDM are mathematical models aggregating criteria, points of view, or attributes, and they are decision-support oriented as well. Actually, support is a key concept in MCDM, implying that the models are not developed through a straightforward sequential process where the decision maker's role is passive. Instead, an iterative process is employed to analyze the preferences of the decision maker and represent them as consistently as possible in an appropriate decision model. This iterative and interactive preference modeling procedure constitutes the underlying basis of the decision-support orientation of MCDM, and it is one of the basic distinguishing features of the MCDM as opposed to statistical and optimization decision-making approaches.

However, the use of one decision-maker's set of preferences to formulate a model for assisting decision making means that the final decision is subject to the priorities of one person. Thus the multi-objective model cannot yield a single best solution because the decision varies according to the decision-maker's value system. In "Multi-Criteria Analysis in Environmental Decision-Making" (2007), Mohan Munasinghe suggests "MCA used in conjunction with a variety of models, and effective stakeholder consultations, could help to reconcile the differences between individual versus social, and selfish versus altruistic preferences."

HISTORICAL OVERVIEW

From the beginning of mankind, decision making always involved multiple criteria that have been treated either implicitly or explicitly, although no specific mathematical framework existed for this purpose. Pareto was the first to study, in an axiomatic way, the aggregation of conflicting criteria into a single evaluation index. He was also the first to introduce the concept of efficiency, one of the key aspects of the modern MCDM theory.

Several decades later, Koopmans extended Pareto's work introducing the notion of efficient vector, or the non-dominated set of alternatives. During the same period (1940s to 1950s), von Neumann and Morgenstern introduced the expected utility theory, thus setting the foundations of another MCDM approach. In the 1960s the concepts and procedures described in these early works were extended by Charnes and Cooper and Fishburn. By the end of the 1960s significant research started

to be undertaken in this field by the European operational research community. Roy, the founder of the European stream of MCDM, developed a new theoretical approach based on the concept of outranking relations.

From the 1970s to the 1990s, MCDM evolved rapidly, scientific MCDM associations were formed, and numerous advances were published in the international literature, both on the theoretical aspects of MCDM as well as on its practical implementation. The field has benefited significantly from the widespread use of personal computers, which enabled the development of software packages employing MCDM methods. These software packages, known as multicriteria decision support systems, provide the means to implement the theoretical advances in MCDM in user-friendly systems that enable real-time decision making through interactive and iterative procedures that enhance the decision maker's perception of the problem and his or her judgment and decision-making policy.

THEORETICAL APPROACHES TO MCDM

Among the MCDM methods and tools, several approaches and theoretical disciplines can be defined, although their distinctions and boundaries are often difficult to determine. This discussion adopts the classification of MCDM approaches proposed by Pardalos et al. It distinguishes four categories: (1) multi-objective mathematical programming, (2) multi-attribute utility theory, (3) outranking relations approach, and (4) preference disaggregation approach.

Multi-Objective Mathematical Programming. Multi-objective mathematical programming (MMP) is an extension of the well-known single-objective mathematical programming framework. It involves the optimization of a set of objectives that are expressed in the form of linear or nonlinear functions of some decision variables. The optimization of these objectives is performed subject to constraints imposed either by the decision environment or by the decision maker.

The conflicting nature of the objectives in real-world decision problems makes their simultaneous optimization impossible. Thus, the decision maker cannot obtain an optimum solution, but has to consider finding a satisfying one. The determination of this satisfying solution depends on the decision maker's preferences, judgment, and decision policy.

The MMP techniques that have been developed aim to determine initially the set of efficient solutions (solutions that are not dominated by any other solution with respect to the specified objectives) and then to identify a specific solution that meets the decision maker's preferences, through an interactive and iterative procedure.

More details on this category of methods can be found in the books of Zeleny and Steuer.

Multi-Attribute Utility Theory. The multi-attribute utility theory (MAUT) is an extension of the classical utility theory. Its aim is to represent/model the decision maker's preferences through a utility function $u(g)$ aggregating all the evaluation criteria: $u(g) = u(g_1, g_2, \ldots, g_n)$, where g is the vector of the evaluation criteria $g_1, g_2, \ldots, g_n$. In general, it is possible to decompose a multicriteria utility function in real functions $u_1, u_2, \ldots, u_n$ concerning the independence of criteria. Thus, different utility function models are obtained. The most studied form of utility function, from a theoretical point of view, is the additive form: $u(g_1, g_2, \ldots, g_n) = u_1 g_1) + u_2(g_2) + \ldots + u_n(g_n)$, where $u_1, u_2, \ldots, u_n$ are the marginal utilities defined on the scales of criteria. On the basis of the utilities of the alternatives that are determined through the developed utility function, the decision maker can rank them from the best alternatives (alternatives with the higher utility) to the worst ones (alternatives with the lower utility), classify them into appropriate classes through the definition of appropriate utility thresholds, or select the alternative with the higher utility as the best one. The books of Zeleny and Keeney and Raiffa provide a comprehensive discussion of MAUT, its axiomatic foundations, and the forms of utility functions that are commonly employed in decision-making problems, both under certainty and uncertainty.

Outranking Relations Approach. The outranking relations approach was developed in Europe with the presentation of the ELECTRE methods (*ELimination Et Choix Traduisant la REalité*) by Roy. An outranking relation allows one to conclude that an alternative *a* outranks an alternative *b* if there are enough arguments to confirm that *a* is at least as good as *b*, while there is no essential reason to refuse this statement.

To develop the outranking relation, the decision maker, in collaboration with the decision analyst, must specify the weights of the evaluation criteria as well as some technical parameters (preference, indifference, and veto thresholds). The definition of these parameters enables the examination of whether there is a sufficient majority of criteria for which *a* is better than *b* (concordance) and if the unfavorable deviations for the rest of the criteria (discordance) are not too high. In this case it is possible to conclude that alternative *a* outranks alternative *b*.

Furthermore, through this modeling procedure it is possible to identify the cases where the performances of two alternatives on the evaluation criteria differ significantly, thus making impossible their comparison (incomparability). A detailed presentation of all outranking methods can be found in the works of Vincke and Roy and Bouyssou.

Preference Disaggregation Approach. The preference disaggregation approach refers to the analysis (disaggregation) of the global preferences (judgment policy) of the decision maker in order to identify the criteria aggregation model that underlies the preference result (ranking or classification/sorting). Similar to MAUT, preference disaggregation analysis uses common utility decomposition forms to model the decision maker's preferences. Nevertheless, instead of employing a direct procedure for estimating the global utility model (MAUT), preference disaggregation analysis uses regression-based techniques (indirect estimation procedure).

More specifically, in preference disaggregation analysis the parameters of the utility decomposition model are estimated through the analysis of the decision maker's overall preference on some reference alternatives, which may involve either examples of past decisions or a small subset of the alternatives under consideration. The decision-maker is asked to provide a ranking or a classification of the reference alternatives according to his or her decision policy (global preferences). Then, using regression-based techniques the global preference model is estimated so that the ranking or classification specified by the decision maker can be reproduced as consistently as possible through the developed decision model. A rather exhaustive bibliography of the methods of the disaggregation of preferences can be found in the works of Jacquet-Lagrèze and Siskos, and Pardalos, Siskos, and Zopounidis.

Differences in the Approaches. Except for the functional and methodological differences among the four aforementioned MCDM approaches, their differences with regard to the types of decision problems that they address should also be pointed out. Real-world decision problems can be categorized into two groups:

1. Problems where the decision maker must evaluate a finite set of alternatives in order to select the most appropriate one, to rank them from the best to the worst, to classify them into predefined homogeneous classes, or to describe them. Typical examples involve the selection among different investment projects, personnel evaluation (ranking problem), and financial distress prediction (classification problem; i.e., discrimination between healthy and financially distressed firms). These type of problems are referred to as discrete MCDM problems.

2. Problems where there is an infinite set of alternatives. Thus the decision maker must construct the most appropriate one according to his or her goals or objectives. Recourse allocation problems are a typical example of this kind. For instance, a portfolio manager faces the problem of constructing a portfolio of securities according to his specific investment policy

and objectives. Different combinations of securities can result in numerous portfolios. Thus, it is impossible to define an exhaustive set of portfolios for evaluation and selection of the most appropriate one. Instead, the portfolio manager must construct the most appropriate portfolio through the determination of the amount of capital that should be invested in each security. These type of problems are referred to as continuous MCDM problems.

Discrete MCDM problems are addressed through MAUT, the outranking relations approach, and preference disaggregation, while continuous MCDM problems are addressed through MMP.

MCDM APPLICATIONS

In the international literature on management science and operations research there is an increasing number of real-world applications of MCDM. The following list outlines some of the most significant areas to which MCDM has contributed:

1. Finance and economics

   - Business failure prediction
   - Credit risk assessment
   - Portfolio selection and management
   - Company mergers and acquisitions
   - Financial planning
   - Supply chain management
   - Country risk evaluation
   - Regional economic policy specification

2. Environmental management and energy planning

   - Forest management
   - Waste management
   - Power plant siting
   - Water resources planning
   - Nuclear power management
   - Energy intensity evaluation

3. Marketing

   - Customer satisfaction
   - Design of market penetration strategies
   - Retail evaluation

4. Transportation

   - Highway planning
   - Subway design

5. Human resources management

   - Job evaluation
   - Personnel selection

6. Education

7. Agriculture

Extensive information on these applications can be found in the books of Vincke, Pardalos et al., and Roy.

The complexity of real-world decisions and the plethora of factors and criteria that are often involved necessitate the implementation of a sound theoretical framework to structure and model the decision-making process. MCDM provides such a framework, as well as a wide variety of sophisticated methodological tools that are oriented towards the support of the decision makers in facing real-world decision problems.

This decision-support orientation of MCDM, in combination with the focus given by researchers in this field to develop advanced and realistic preference modeling techniques, is its main distinguishing feature as opposed to statistical analysis and optimization theory. The advances in the field continue rapidly. According to Fishburn and Lavalle, they involve foundation aspects of MCDM such as the interface between behavioral decision theory and prescriptive practice and the underlying assumptions of MCDM methods, methodological aspects involving the development of more effective methods, and implementation aspects through the development of multicriteria decision-support systems. Along with these advances, researchers are also exploring the application of MCDM to other fields, including artificial intelligence (neural networks, expert systems, genetic algorithms) and fuzzy sets. The integration of the diverse nature of these fields within the MCDM framework increases the potentials regarding the development of advanced decision-support tools to confront the complexity of real-world decisions.

SEE ALSO *Decision Rules and Decision Analysis; Decision Support Systems*

BIBLIOGRAPHY

Brugha, C.M. "Structure of Multi-Criteria Decision-Making." *The Journal of Operational Research Society* 55, no. 11 (2004): 1156–1169.

Figueira, J., S. Greco, and M. Ehrgott, eds. *Multiple Criteria Decision Analysis: State of the Art Surveys.* New York: Springer, 2004.

Fishburn, P.C., and I.H. Lavalle. "MCDA: Theory, Practice and the Future." *Journal of Multi-Criteria Decision Analysis* 8, no. 1 (1999): 1–2.

Keeney, R.L., and H. Raiffa. *Decisions with Multiple Objectives: Preferences and Value Trade-Offs.* Cambridge: Cambridge University Press, 1993.

Munasinghe, Mohan. "Multi-Criteria Analysis in Environmental Decision-Making." *The Encyclopedia of Earth,* 28 May 2007. Available from: http://www.eoearth.org/article/Multi-criteria_analysis_in_environmental_decision-making.

Pardalos, P.M., Y. Siskos, and C. Zopounidis. *Advances in Multicriteria Analysis.* Dordrecht: Kluwer Academic Publishers, 1995.

Roy, B. *Multicriteria Methodology for Decision Aiding.* Dordrecht: Kluwer Academic Publishers, 1996.

Vincke, P. *Multicriteria Decision Aid.* New York: John Wiley and Sons, 1992.

Zopounidis, C., and M. Doumpos. *Multicriteria Decision Aid Classification Methods.* New York: Springer, 2002.

N

NAICS

SEE *North American Industry Classification System*

NANOTECHNOLOGY

Applied to various materials across many industries, nanotechnology is the science of the very small. Originally, it dealt with the engineering of nanoparticles to build mechanisms on an atomic level, but this has become only one definition, now referred to as MNT, or molecular nanotechnology. The meaning of nanotechnology has evolved to now include all scientific endeavors below "micro technology," thereby encompassing any products and materials dealing with nanoscale operations. Due to the possibilities of nanotechnology in so many fields, the science has received increased attention from both businesses and media in recent years.

"Nano" refers to the infinitesimal nanometer, one billionth of a meter; at this level, the components of molecules, atoms, and their parts are large enough to be physically manipulated, arranged, and built into layers. At the technical level, nanotechnology is interested in using these molecular construction abilities to create machines and computers at this nanoscale. In theory, these tiny systems will be capable of incredible speed and atomic precision performance. On a more universal and practical level, nanotechnology can arrange molecules to help create every day, life-size products with new qualities such as weather resistance, conductivity, and enhanced efficiency.

The predicted uses for nanotechnology are myriad, covering nearly all industries from fashion to medical procedures, but in reality only a handful of marketable products are currently being created by nanotechnology methods. Certain cosmetics and sunscreens are amplified by nano-engineered substances derived from certain metals. Healthcare devices, such as testing tools and treatments, are being produced to carry entire laboratories on computer chip-sized areas. Coatings and fabrics are being created with nanotechnology protection. However, the large scale investment in nanotechnology still outpaces its current profits, if not its expectations.

THE HISTORY OF NANOTECHNOLOGY

Nanotechnology has had a long and colorful history, due to the large number of predictions made concerning its powers and world-changing abilities—abilities which have been neither disproved nor fully confirmed in the continuing study of nano mechanisms. In 1959, Richard Feynman gave a famed speech to the American Physical Society in which he explored the possibility of engineering molecules to contain information (specifically writing); from there, Feynman extrapolated to mention possible biological and computorial applications. This speech was the first notable exploration into nanotech science.

The term "nanotechnology" was not coined until 1974, when Japanese Professor Norio Taniguchi used it to describe production technology capable of working in the nanometer range, such as the thin film deposition and ion beam milling used in semiconductor creation processes. In 1977, engineer K. Eric Drexler (1955–) again used the word nanotechnology in his studies on molecular engineering and his influential books *Engines of Creation:*

The Coming Era of Nanotechnology and *Nanosystems Molecular Machinery Manufacturing and Computation.* Drexler was one of the first scientists to work with practical nanotechnology theory, creating such key concepts as the nano assembler, an atomic-scale machine that would be capable of replicating itself and creating other simple constructions. He also explored the biological and ethical implications in depending on nanotechnology.

In the 1980s and 1990s many processes vital to nano theory were formed. STM, or scanning tunneling microscopy, was invented in 1981 and allowed researchers to analyze and manipulate atoms. In 1985, spherical fullerenes were discovered and nicknamed "buckyballs"; these complex carbon molecules became the basis for the first practical nanoengineering. The late 1980s blossomed the science as the first books, journals, classes, and organizations of nanotechnology were created. Goals and research grants become much more common, and in 1993 the first Feynman Prize in Nanotechnology was awarded to Charles Musgrave. As the 1990s progressed, government interest and involvement in nanotechnology increased. The first nano company, Zyvex, was founded in 1997, the first possible designs of nanorobotics and nanobio ideas being developed around the same time.

Into the Twenty-First Century. The 2000s began several close inspections of the societal implications involved in the rising nanotechnology. Congressional hearings were conducted to investigate the dangers and necessary safety protocols, and the Nanotechnology R&D Act of 2003 required that all federally supported nanotechnology research consider the new societal and ethical implications of nanotechnology (SEIN). The year 2003 also saw the publication of the debate between scientists Eric Drexler and Rice University professor Richard Smalley (1943–2005) concerning the future of nanotechnology. Smalley, winner of a Nobel Prize in chemistry, argued against many of the entrenched ideas developed by Drexler, including the concept of molecular assemblers, which he thought badly conceptualized. To explain his argument, Smalley created the "sticky fingers" and "fat fingers" problems, which proposed that technicians could not be precise enough—given current nano theory—to create and maintain the sort of assemblers Drexler visualized. His counter-theories involved a much heavier emphasis on catalysts and chemical progression in nanotechnology. Smalley also disagreed with the rising speculation on the dangers of nanotechnology, especially the doomsday scenarios which he found to be impossible.

Mihail Roco of the U.S. National Nanotechnology Initiative has given a description of four stages in the evolutionary history of nanotechnology. The first stage, he suggested, was the passive stage, in which simple materials are made with passive nanotech abilities, such as coatings, fabrics, aerosols, and many construction elements. This is the stage which nanotechnology has currently reached. The second stage, active nanostructures, includes biological and computer-related nanosystems that can carry out specific operations. Biological nanostructures can consist of disease-targeting drugs, and computer structures can be mini-transistors and amplification systems. In the late 2000s, this is the stage nanotechnology is beginning to enter. The third stage, which the science is currently still experimenting with, sees nanotechnology expanding to include nano systems that can assemble and plot various three-dimensional operating structures (simple robotics). The fourth stage occurs when nanotechnology reaches the creation of molecular nanosystems which can produce complex computer devices at the nano level.

TYPES OF NANOMATERIALS

There are many different types of nano-produced substances, each with its own abilities and uses in multiple industries. Most involve simple structures, all with functional properties:

- **Nanocomposites**. Nanocomposites are materials that are infused into other objects so that products gain new properties or abilities. A silica-based nanocomposite is currently being used in experimental removal of toxic waste, creating a semiporous bundle of coated silica that can attach to some heavy metals and cleanse them from liquids such as water. Other more simple nanocomposites are being used in vehicle construction, especially plastic add-ons like bumpers, protectors, and steps. The composites are more resistant, stronger, less prone to damage, and more lightweight than the normal plastics they replace. Given these qualities, it is no surprise that many companies are beginning to use nanocomposites across different industries, such as the creation of sports equipment such as golf clubs and tennis rackets.

- **Nanocrystals**. The nanoparticles infused into other materials are often nanocrystals, or molecules created in multiple-layered crystals with special characteristics. For instance, metal aligned in these crystalline forms has proven to be much stronger and longer lasting than normal metal composition. Due to the arrangement of nanocrystals, a metal nanocrystal structure is able to support itself so thoroughly that it becomes 100 to 200 percent stronger than more commonly used metal compositions. Other crystals are able to absorb light and refract it in a different color, a property useful in microscopic inspections. Because of these light-

changing qualities, nanocrystals play an important role in solar-energy panels.

- **Nanoparticles**. Nanoparticles are single nanomaterials that are not joined together in specific structures the way composites and crystals are, but instead are strewn along and amidst the affected item to give it certain abilities. Many of the new stain-warding fabrics used in khakis, dress shirts, and ties are made with nanoparticles attached to fibers; this allows spills or stains to slide off the material. Types of paint also make use of polymer nanoparticles to repel water. Types of medicine can also be administered using nanoparticular technology, which transforms normal pills into highly soluble, bio-absorbable materials made completely of nanoparticles.

- **Nanopowders**. Nanopowder is part of a manufacturing process to create superior products. Often, nanopowders can be a beginning stage of materials that will be refined to become nanocomposites. An excellent example is the carbide nanopowder, the grains of which are 15 nanometers or less. This powder is used to make an alloy nearly as hard as diamond; this has multiple applications, from drill bits to bulletproof armor.

- **Nanoclays**. Nanoclay is made of volcanic minerals, or smectite, structured into plates so thin they are approximately only one nanometer thick but several hundred nanometers in width and length. These nanoclays are often put through a process (known as intercalation) to make them more integratable into organic polymers. Once intercalated, nanoclays and polymers are mixed to create many kinds of composite products. Such products have the inherent strength and protective abilities common in nano-created materials. These clay composites account for about one quarter of the nano market today.

- **Nanocomposite coatings**. These coatings are nanocomposite in form, made from synthetic nanocrystals or the carefully mixed nanoclays and polymers. However, instead of being fully integrated into the material, these coatings are preserved in liquid form and painted on the surface of items to instill nano qualities in them. Uses include the area of electronics, where a sprayed nanocomposite coating can protect the screens of phones and other handheld devices. The attractiveness of nano coatings in manufacturing is increased by their non-toxic nature and environmentally friendly composition, different from many of the chemicals used today.

- **Nanotubes**. Most often made of carbon, nanotubes are structured in a honeycomb pattern that doubles over itself to form a tube-like shape. These tubes can be combined in many layers to form a fiber that is intensely strong and also has unique electrical properties. The way a nanotube is formed, molecule by molecule, can make it into either a type of semiconductor (such as silicon) or a metal. The semiconductive properties of nanotubes means that they could be used to make more efficient electronic viewing screens than those currently in use today.

- **Nanocatalysts**. Nanocatalysts are used to begin chemical reactions that change the properties of materials. Many nanoparticles have exceptionally large surface areas relative to the total amount of material, and so they serve as a better catalyst, since a chemical catalyst depends on how much of one substance comes in contact with another. The incredibly small nanoparticles are able to affect catalysts very efficiently in processed reactions. Current experiments are using gel-based nanocatalysts to transform coal into oil products. The use of nanocatalysts as enzyme-like actors in chemical processes was a process supported by scientist Richard Smalley, and such reactions could be used in both biological manipulating and purification processes.

- **Nanofilters**. Nanofilters operate by forming nanofibers of incredible complexity that can allow only certain particles through, based on what the nanofiber is made of and how tightly it is structured. The better types of nanofilters can attract and trap amazingly small particles, such as those micron-sized and below. This allows nano-designed filters to trap nearly all possible contaminants, letting only water or other liquids through. They also act much more efficiently than other kinds of filters, which allows water to pass through them at much higher speeds. Nanofilters can be used to help sterilize serums and protect people against biological warfare.

BUSINESS APPLICATIONS

Thanks to the theory called the "precautionary principle," legislation has encouraged developing nanotechnology to progress very slowly, making sure that each experimental step is free of harmful possibilities. For this reason, many nanotech applications forecasted are being stalled as scientists work on removing flaws and perfecting processes. Many industries, such as pharmaceutical companies, are currently hesitant about embracing the promising technology when results are sure but still very slow. Also, due to the complexity of nanotechnology, the number of scientists working with it in companies is not increasing nearly as fast as the number of nano technicians—the people who actually put the technology into practice

and develop, coat, and fuse nanoparticles to the products. Technician positions, then, are the fastest-growing positions in the nanotechnology field, creating an entirely new workforce class with new training required. Despite certain setbacks, there are several key areas in which nanotechnology is directly affecting the business world.

There is a small number of fields in which business investment in nanotechnology has reaped profitable rewards, and these areas can be expected to continue embracing nanotechnology and growing in size and influence. One of these promising fields is in the development of silver nanoparticles, which are currently being used in a wide number of products, from clothing and toys to food and food utensils. Since many substances gain new properties when reduced to nano-sized pieces, common elements such as silver can be used in innovate processes—for example, as an antimicrobial treatment. Nanoparticle silver, it turns out, kills germs and is easily spread, so it has found a strong market in products meant for young children, many types of food production, and simple utensils such as forks and chopsticks.

The coatings, fibers, and compositions developed through nanotechnology have become successful fields in which better materials have been and are being developed. Nanomedicine is also a very important field, although its current success is limited to drug delivery. Thanks to nanoparticle creation, drugs are being marketed that have greater longevity, more effective cell penetration, and specific disease targeting. This has lead to the production of several helpful oral medications. There are also promising early results from some of the more entrepreneurial nanomedicine experiments.

There are also several nanotech applications that affect businesses directly through manufacturing and technology development. In manufacturing and production, nanotechnology allows for the creation of incredibly detailed and smooth machine parts, literally constructed to molecular plans. Production machines can then run more quickly, needing far less maintenance and wearing down much more slowly.

Many nanotech applications have occurred in the technology field, especially in computer devices that can be constructed on a microscopic level to perform more efficiently or carry tasks they could not from normal production methods. Tolfree and Jackson, in their 2007 *Commercializing Micro-technology Products*, give several examples of computer systems effectivly built by nano-construction. Called micro-electromechanical systems (MEMS), these devices have been produced mostly in Germany, Japan, and the United States, and they include:

- Ink-jet head markets, which are created through nanotechnology to be very precise. These ink-jet heads are being developed primarily by Hewlett-

Packard, which has designed a model that does not require complete replacement.

- Pressure sensors, which have some medical uses but are popular in the automotive industry. These MEMS can monitor tire pressure for automobiles, a technology that is growing more quickly than other sensor applications.

- Silicone microphones, a line of products that is growing rapidly.

- Accelerometers, which are used not only in vehicles but also a number of handheld applications, such as cell phones, global positioning systems, and simple pedometers. This is considered a strong market, but difficult to profit in because of price pressures and competition.

- Gyroscopes, which like accelerometers are used in automobiles and phones.

- Optical MEMS, pioneered by Texas Instruments, deal with imaging sensors and televideo communications.

- Microfluidics is a fairly small market that works with polymers to create chemical reactions or detection screens.

- Micro fuel cells are a new market that uses nanotechnology to form microscopic fuel cells that usually use hydrogen or methanol to create energy.

The twenty-first century has also seen the rise in nanotechnology patents, as more products and processes become open to nanotech possibilities, and more companies claim to be using nanotechnology to create their products and technology. Because of the myriad possible applications, it is difficult to be sure what companies are truly using nanotech abilities and what patents will prove successful.

Entrepreneurs have an exciting new field to invest in and explore with technology, but the new science also requires several important choices. Should entrepreneurs attempt to incorporate nanotechnology into existing business systems and manufacturing, or should they develop a new business structure to market purely nanotech products? How can performance and efficiency be improved by nano-designed properties? Amanda Kooser gives several guidelines for such entrepreneurial questions in her article, "Think Big with a Nanotechnology Business:"

1. Look to the labs. The pioneering of nanotechnology is being conducted in company and university labs where scientists are exploring the possibilities of different particles. To begin an effective entrepreneurial endeavor in nanotechnology, it is important to take

advantage of the newest discoveries, and these discoveries begin in the laboratory.

2. Find the business connection. Nanotechnology will not be profitable unless it helps an existing industry or creates a new market. Entrepreneurs need to connect a particular business need with a solution that nanotechnology can currently provide.

3. Leverage new discoveries. With all the hype concerning nanotechnology, many companies are curious to see what products and abilities will be developed next. Keeping an eye on new discoveries will lead to profitable solutions for business systems.

4. Uncover the compelling reasons. Why should a business use the entrepreneur's nanoproduct? Or, if the entrepreneur is incorporating nanotechnology into an existing system, what are the clear benefits?

5. Keep up on the latest and greatest. Subscribing to nanotechnology journals and attending nano conferences are great ways to keep up on the latest scientific events. For more simple research, there are many Web sites and several helpful books, too.

NANOTECHNOLOGY ETHICS AND RESPONSIBILITY

There are several concerns about nanotechnology, and most center on the fact that nanoparticles are recent creations, not fully understood, often with different properties than the same element in a normal size. The British Royal Society even petitioned, in 2004, for nanoparticles to be branded as new substances and so subject to stringent definition and testing. The common concern is that nanoparticles will have harmful, toxic effects on both humans and the environment. Many biological rules do not apply to nanoparticles—they can travel easily through tissue, they are often not affected by antibodies, and they can accumulate in organs such as the brain. Most nanoparticles can also be spread through the air and pass through filters that would keep larger particles out.

Because every new nanoparticle created has unknown, possible harmful biological consequences (especially in the long term), scientists apply what is now known as the "precautionary principle" to current nano research. Coined as a political and ethical standpoint, the precautionary principle states that any scientific endeavor that has any potential to cause harm to society or the environment should first be agreed upon as safe by a consensus of the applicable scientific community. In other words, if there is doubt, the research is out. However, despite ethic frameworks put into place to guide nanotech science, some argue that key issues have not yet been addressed.

A European team headed by scientist Stephen Hansen released a 2008 report that suggested several problems with current attitudes toward nanotechnology. In general, they said, scientists and governments have ignored early warning signs and stand to suffer from the same mistakes that have been made in the past with such science as atomic radiation. The call for more information can sometimes be used as an excuse for not taking action by involved governments. Hansen also pointed out that many governments that legislate rules for nanotechnology also openly support it, leading to accountability problems. The team also discovered that the critical ethical questions about nanotechnology do not seem to be answered by the current research.

The key to responsible discoveries in nanotechnology appears to be a mixture of applying the precautionary principle and being innovative in the uses of nanotechnology. Even with the enormous pressure placed on it by businesses and media, nanotechnology is a highly promising field that could provide an entire array of revolutionary products.

BIBLIOGRAPHY

Allhof, Fritz, and Patrick Lin. *Nanotechnology and Society: Current and Emerging Ethical Issues.* Springer, 2007.

Angelucci, Rocky. "A beginner's guide to technology." *Dallas Business Journal* 7 Sept 2001.

Baker, Stephen, and Adam Aston. "The Business of Nanotechnology." *BusinessWeek.* 14 Feb 2005.

Berger, Michael. "The Current Status of Nanotechnology-Based Therapeutics in Humans." *Nanowerk,* 2008. Available from: http://www.nanowerk.com/spotlight/spotid=6516.php,.

Berger, Michael. "Late Lesson from Early Warnings for Nanotechnology." *Nanowerk.* Nanowerk LLC, 2008.

Jones, K.C. "Nanocrystal Discovery Has Solar Sell Potential." *Techweb News.* Information Week, 2006.

Kanter, James. "As nanotechnology gains ground, so do concerns." *International Herald Tribune,* 2008. Available from: http://www.iht.com/articles/2008/06/24/business/greencol25.php.

Kooser, Amanda. "Think Big with a Nanotechnology Business." *Entrepreneur.com,* 2006. Available from: http://www.entrepreneur.com/startingabusiness/businessideas/article170774.html.

———."A Little Risky Business." *The Economist.* 22 Nov 2007.

Mendelson, Abbey. "The Big Business of Nanotechnology." *Popcity,* 2007. Available from: http://www.popcitymedia.com/features/0508nanotech.aspx.

"The Nanotech Industry Is Moving from Research to Production." *Business Wire,* 14 Feb 2008. Available from: http://www.allbusiness.com/science-technology/materials-science/6786843-1.html.

"A Short History of Nanotechnology." *Foresight Nanotech Institute,* 2008. Available from: http://www.foresight.org/nano/history.html.

Tolfree, David, and Mark J. Jackson. *Commercializing Nanotechnology Products.* CRC Press, 2007.

"V.H. Crespi: Carbon Nanostructures." *Penn State Physics,* 2007. Available from: http://www.phys.psu.edu/people/display/

index.html?person_id=202;mode=research;research_
  description_id=419.

"What is Nanotechnology?" *Center for Responsible Nanotechnology,*
  2008. Available from: http://www.crnano.org/whatis.htm.

NEGOTIATION

SEE *Conflict Management and Negotiation*

NEPOTISM

Nepotism describes a variety of practices related to favoritism; it can mean simply hiring one's own family members, or it can mean hiring and advancing unqualified or under-qualified family members based simply on the familial relationship. The word *nepotism* stems from the Latin word for "nephew," especially the nephews of the prelates in medieval times. While attitudes toward nepotism vary according to cultural background, nepotism is a sensitive issue in American business. Many companies and individuals consider the practice to be unethical, largely due to its conflict with traditional American values of self-reliance and fairness.

However, nepotism may have played a role in the success stories of such self-made men as Andrew Carnegie. The business historian Pamela Laird has shown how various personal networks can contribute to career success. Laird has shown that kin networks can be an early and crucial aid in business success.

In Western societies nepotism raises legal concerns. Although U.S. laws do not specifically prohibit hiring one's relatives, studies show that between 10 and 40 percent of U.S. companies maintain formal policies prohibiting such a practice. Many of these anti-nepotism rules were instituted in the 1950s with the aim of preventing the hiring of incompetent male relatives of male employees. In the 1960s and 1970s the same rules applied but failed to reflect the change in the workforce as more women entered the job market; females were often the victims of these rules, however, and many were forced to quit.

Nepotism is also tied to discrimination issues and pragmatic concerns. There is substantial debate over whether employers with any form of biased preferences for hiring, including nepotism, can even survive in the business market, ethical issues notwithstanding. On the other hand, a 2006 report noted that approximately one-third of all Fortune 500 firms are family owned, and that family-owned businesses accounted for about half of the country's gross domestic product. In addition, these firms accounted for about three-fifths of all employment, and an even higher proportion of new job creation. The success of these businesses can be viewed as an implicit endorsement of nepotism.

Larry Singell and James Thornton identify four levels of anti-nepotism rules. They note that companies may institute policies that prohibit the employment of a current employee's relatives in any of the following situations:

- Anywhere in the organization
- At the same facility
- In the same department or work group
- In positions where one may immediately influence the compensation, promotion, or work situation of the other

Even if a company has a clearly stated policy, complications may follow in its enforcement. For example, the increase in dual-career marriages increased legal challenges to nepotism issues. Employees occasionally meet at work, socialize, fall in love, and eventually marry. In some cases, couples have had to decide which spouse has to quit, as company policy would not allow them to work for the same organization. Do practices such as hiring (or even not firing) family actually constitute discrimination?

Further, even if there is no complication between the two individuals as a result of marriage, there is sometimes pressure from in-laws and even close friends of in-laws for favoritism in hiring. There appear to be differences in nepotism practices between family-owned businesses and publicly owned businesses. Most family-owned businesses simply expect family to be involved in the future, as do the in-laws who join the family. However, there are usually more formal rules for publicly held companies; these companies must therefore be cautious, since they are open to outside scrutiny over their hiring and promotion practices.

ADVANTAGES

If practiced fairly (itself a contentious term in this regard), nepotism can be a true asset, Sharon Nelton suggests, citing the example of Thomas Publishing Company. In 1998 there were seven third- and fourth-generation family members working for the company. The third-generation president, Tom Knudson, encouraged nepotism among their independent sales contractors because he believed it resulted in high performance, stability, and long-term commitment.

Chad Kaydo also writes that nepotism may be viable. For example, a top salesperson's relative may have many of the same qualities that make the representative successful. Recruiting family members can therefore boost both performance as well as retention. For instance, one senior contractor began working for Thomas in 1940. By 1998

his wife and three of his adult children (two daughters and a son) all worked for the company. The son encountered a challenge when calling on a client at odds with the senior contractor. He easily and politely diffused the situation using the diplomacy techniques he had gleaned from his father, the very senior contractor the client disliked, and gained a larger-than-usual sale.

Wrigley is another successful company that has been run by a family for many years. One *Business Week* story noted that family-run businesses can have lower employee turnover rates as specific managerial values are passed down from generation to generation.

In the 2000s the tide in business seemed to be turning toward policies that encouraged hiring qualified relatives and spouses, with idea that good people tend to associate with good people. Jacquelyn Lynn noted that such policies can promote employee satisfaction by aiding individual efforts to balance professional and personal lives. Hiring family members can also provide benefits to companies, for example by reducing their health insurance costs. Nepotism can also extend to older family members. Bill Gates's father serves as the Gates Foundation's chairman.

Adam Bellow has coined the term "new nepotism" in his book, *In Praise of Nepotism*. Bellow and others have commented that nepotism can be a savvy business strategy, especially when a family is closely associated with a particular company or brand. In these cases, nepotism can work to bolster confidence in a firm.

DISADVANTAGES

There are, to be sure, nepotism disasters. Lines Brothers in Britain, once a highly successful maker of Triang toys, was rendered worthless in just a few years by its second generation of leadership. Yale Express, a U.S. delivery company, was bankrupt within five years of the second generation assuming the presidency. The Great Atlantic and Pacific Tea Company (A&P) was once the largest supermarket chain in the United States, but went bankrupt under its heir.

Linda Wong and Brian Kleiner suggest that trouble arises most often when family and business needs conflict. A family's purpose is to care for and nurture family members; a business must produce quality goods and/or services as efficiently and as profitably as possible. If a company hires or promotes an incompetent family member, other employees may see this is a gross injustice and many complications may result. More directly, the unqualified heir may simply instill policies that drive the company into the ground.

Nepotism can also publicize family disagreements and prejudices to those within the company. It may even cause a company to lose valued executives and make it very difficult to attract and retain high-quality newcomers. Family squab-

bles can also serve as bad publicity. For example, the CEO of Carlson Cos. fired her son, prompting a series of lawsuits between the two. Likewise, Viacom's Sumner Redstone has been embroiled in public disputes with his children who also worked in the business. On the other hand, some see the DuPont family's competition among members as having contributed to that company's success.

Adelphia Communications represents what is perhaps one of the most disastrous instances of corporate nepotism. In 2004, John Rigas and his two sons were disgraced in a highly publicized case of corporate fraud. This can be seen as a case where nepotism ruined a company not by placing incompetents in powerful positions, but rather by generating a corrupt culture at the company's top.

INTERNATIONAL ASPECTS

Abdalla Hayajenh, Ahmen Maghrabi, and Taher Al-Dabbagh note that nepotism has maintained a particularly strong footing in the Arab world. They indicate that there are several major factors behind nepotism in Arab business:

- Socio-cultural structure (tribal and kinship relations)
- Economic structure (a tight labor market making it difficult to find a job in other ways)
- Educational structure (poor preparation of workers for economic development)
- Political structure (governments' assignation of educated tribal chiefs and their sons to key positions in return for loyalty)

In Asia the majority of entrepreneurs look to the family, rather than the broader populace, for the succession of the business. Studying Asian nepotism practices, Leon Richardson holds that nepotism works as well as any other management choice as long as one never tolerates incompetence. He notes that the Japanese successfully use nepotism, with senior men and women enjoying power and not hesitating to fire an incompetent "nephew."

In addition, many Latin American countries accept nepotism as the norm and are baffled by the often-negative U.S. attitude toward the practice. As one South American executive commented, "If I cannot hire and trust my own family, just who can I trust?"

However, attitudes towards nepotism in foreign countries can also change over time. In 2008, Italy's supreme court decided that nepotism was illegal. Still, one London newspaper reported that the vast majority of businesses in that country were family owned.

GUIDELINES

Craig Aronoff and John Ward argue that the key to the successful use of nepotism is clear communication of the

rules before they are needed and fair application of the rules as needed. They believe in holding relatives to at least three standards in hiring:

1. Appropriate education for the job

2. Three to five years of outside work experience

3. Entry into an already existing and vital position with determined pay and performance expectations

Many experts believe that outside experience is vital to the potential family-member hire. They feel the family member should establish his or her own competence and professional sense of worth before assuming work responsibilities within the family's firm. Testing and honing his or her skill set and abilities allows one to bring expertise to the enterprise.

In the first sixteen years of business, CAM Specialty Products practiced a strict policy of not hiring family members. However, in 1997 an opportunity to invest in Deckare appeared and co-owner Gordon Hammett hired his son as work crew chief to handle on-site fieldwork. Hammett interviewed his son like all other candidates and honestly felt his son was a perfect fit for the job; he was familiar with his son's work ethic and knew his son enjoyed the type of work. As a result, the decision met with great success. The key was to have clear criteria for the job and to apply it consistently for all candidates, neither favoring nor discriminating against family members.

Nepotism is not a new phenomenon in business, but it is of particular interest as the world of business shrinks due to rapid travel and convenient and fast technological communication. As business becomes increasingly globalized, it is crucial to understand how cultural attitudes toward nepotism vary between the different countries in which a business operates. Furthermore, as more families rely on multiple incomes for their standard of living, the ethical and pragmatic considerations regarding nepotism must be carefully negotiated to ensure the most effective overall business strategy. While certain guidelines have been known to effect a smooth incorporation of nepotism into a successful business, there are no definitive strategies. Clearly, however, nepotism can lead to success if applied appropriately, or to disaster if applied without careful consideration of all the variables involved.

SEE ALSO *Employee Recruitment Planning; Entrepreneurship; Human Resource Management; Succession Planning*

BIBLIOGRAPHY
Arnott, Sarah. "Murdoch Looks to Cut Losses at News International's Magazine Unit." *The Independent,* 18 June 2008, 34.

Aronoff, Craig E., and John L. Ward. "Rules for Nepotism." *Nation's Business,* January 1993.

Bellow, Adam. *In Praise of Nepotism.* New York: Doubleday, 2003.

———."Blood Ties." *Management Today,* 1 March 2008, 48.

Clarke, Steve. "A Chip off the Murdoch Block." *Variety,* 13 November 2006, 25.

Demos, Telis. "Hiring Parents—Masters Division." *Fortune,* 25 June 2007, 134.

Egan, Mary Ellen. "Family Feud." *Forbes,* 7 January 2008, 38.

Elstrodt, Heinz-Peter. "Keeping the Family in Business." *McKinsey Quarterly* no.4 (2003), 94–103.

Gideon Haigh, Gideon. "Big Shoes to Fill." *The Age,* 6 March 2004, 1.

Hayajenh, Abdalla F., Ahmed S. Maghrabi, and Taher H. Al-Dabbagh. "Research Note: Assessing the Effects of Nepotism on Human Resource Managers." *International Journal of Manpower* 15, no. 1 (1994).

Kaydo, Chad. "Does Nepotism Work?" *Sales & Marketing Management,* July 1998.

Laird, Pamela. *Pull.* Cambridge: Harvard University Press, 2006.

Lynn, Jacquelyn. "Lawful Wedded Employees." *Entrepreneur,* April 2000.

Masters, Brooke A., and Ben White. "Adelphia Founder, Son Convicted of Fraud." *The Washington Post,* 9 July 2004, E01.

Moore, Malcolm. "Italian Court Rules Nepotism Is Illegal." *The Daily Telegraph,* 25 March 2008, 18.

Nelton, Sharon. "The Bright Side of Nepotism." *Nation's Business,* May 1998.

Padgett, Margaret Y., and Kathryn A. Morris. "Keeping it 'All in the Family': Does Nepotism in the Hiring Process Really Benefit the Beneficiary?" *Journal of Leadership and Organizational Studies* (winter 2005).

Richardson, Leon. "Family Planning Can Work Wonders." *Asian Business,* September 1993, 72.

Sanderson, Rhonda. "Father & Son Pair Up for Deckare." *Franchising World,* May-June 1998.

Siklos, Richard. "Like Father, Like Son: Recipe for a Family Brawl." *New York Times,* 19 February 2006, Sec. 3, 3.

Singell, Larry D., Jr., and James Thornton. "Nepotism, Discrimination and the Persistence of Utility-Maximizing, Owner-Operated Firms." *Southern Economic Journal* 63, no. 4 (1997).

Weber, Joseph, Louis Lavelle, Tom Lowry, Wendy Zellner, and Amy Barrett. "Family, Inc." *Business Week,* 10 November 2003, 100–110.

Wong, Linda C., and Brian H. Kleiner. "Nepotism." *Work Study,* September–October 1994.

Wright, Ed. "Relatively Famous." *Sydney Morning Herald,* 9 January 2007, 15.

NEW PRODUCT DEVELOPMENT

The dynamics of markets, technology, and competition have brought changes to virtually every market sector and have made new product development one of the most powerful business activities. The monumental changes that constantly impact commerce have forced companies to innovate with an increasing amount of speed, efficiency,

and quality. In turn, this has made new product development one of the most complex and difficult business functions. However, firms must innovate in order to survive. The power of innovation is revealed in numerous studies, which show that companies leading their industries attribute about half of their revenues to products developed in the most recent five years. By comparison, companies at the bottom of their industries achieve approximately one-tenth of their sales from new products.

In a larger sense, new product development can be seen as a facet of "creative destruction." Companies that fail to innovate will eventually be toppled by those that do.

A firm's new product development efforts are shaped by its size, as well as the nature of the industry in which it operates. New products may be defined as any product, service, or idea not currently made or marketed by a company, or which the consumer may perceive as new. Many types of new products exist, from never-seen-before products like Apple's personal communicator, to repositioned standards like Sears's shift to Sears Brand Central. Various studies suggest that between 50 and 80 percent of new products fail—the greater the rate of new product development, the higher the failure rate. *New Product News* predicts that more than 36,000 new products will be brought to market in 2005. Although there are numerous reasons why new products fail, faulty management and planning are at the core of most failures. Therefore, managing the new product development process is a key to a healthy organization.

HISTORY

Ford Motor Company provides the classic cautionary tale for new product development. After numerous attempts, Ford found success with its Model T in the early twentieth century. The Model T was reliable, and Ford nearly perfected the production process (so much so that "Fordism" became the model for production for much of the twentieth century). Through this production process, Ford was able to produce a reliable product as well as reduce production costs, allowing the company to offer the Model T at increasingly lower cost.

However, during this time the company did not offer any new products, focusing completely on the Model T. This left an opening for Ford's competitors; notably, General Motors was able to segment the automobile market in the United States by offering a range of makes and models. Furthermore, General Motors (under the leadership of Alfred P. Sloan) introduced annual model changes, in effect making new product development a large part of its overall strategy. As a result, Ford lost its vaunted position, and was forced to introduce newer products in the 1920s.

New product development became key following World War II. After experiencing wartime shortages of goods, Americans were eager to buy the many new products manufactured during the post-war era. Engineers, who were more product-oriented than consumer-oriented, designed new products that might or might not find places in consumers' hearts and minds. This was a product-oriented process in which the market was considered the receptacle for products that emerged from the firm's research and development efforts. This is known as the product-oriented or technology-pushed stage.

However, competition escalated and consumers became more skeptical and selective about the types of products they purchased. Marketers found it increasingly difficult to rely on persuasive sales techniques to move products. Retailers grew restless when these products did not move off shelves as quickly as planned. Companies had to know more about their target markets. What were the wants and needs of the people who were buying their products? How could their firm satisfy these wants and needs?

The second stage was marked by the emergence of the market as the driver of innovation. Instead of being technology-driven, new product development evolved into a market-led process in which new products emerged from well-researched customer needs. The new product development process was placed in the hands of marketers who knew consumers' wants and needs. Customer demand "pulled" the product through the development process.

Modern new product development is a blending of these two orientations into a "dual-drive" approach to innovation. Companies recognize that innovation is a complex process that requires sound investment in research and development, as well as significant marketing expertise that focuses on satisfying consumers' wants and needs.

The rapid pace of change that engulfed businesses toward the end of the twentieth century put an even greater burden on companies to build adaptive capabilities into their organizations. Global competition means there are more competitors capable of world-class performance. This has made competition more intense, rigorous, and aggressive than ever before. Fragmenting and more sophisticated markets mean that consumers demand more from products in terms of quality, differentiation, and "meaningfulness."

New technologies have had two important outcomes in regards to innovation. First, new technologies are responsible for this new market sophistication in which consumers have more choices and are thus more demanding. Secondly, new technology has increased manufacturers' capabilities for rapid response to shifting market needs.

Finally, product life cycles have become more compressed as the skills required for developing new products increase in complexity. For example, consider the development of a new type of computer software. The expertise needed to develop the software from conception to commercialization might take years. The product's life cycle in such a competitive and turbulent environment might last only a few months. Therefore, companies have embraced the view that new products are transient, whereas the skills and expertise needed to develop these products are a much more persistent requirement for success. Instead of the mono-approach, in which technology or markets drive innovation, new product development now requires a convergence of technology, marketing, product design, engineering, and manufacturing capabilities. Speed, efficiency, and quality in product development are the challenges that new product development faces in today's intense competitive environment.

TYPES AND SOURCES OF NEW PRODUCTS

There are five categories of new products. New-to-the-world products or services are new inventions like in-line skates and health maintenance organizations. New category entries, such as sport utility vehicles, are products or services that are new to a firm. Additions to product lines add products or services to a firm's current markets. For example, when a powder laundry detergent offers a liquid version, it is considered a line extension. Product improvements are another type of new product and are common to every product category. Repositionings target products to new markets or for new uses.

Firms also employ what is known as "planned obsolescence." Here, a firm plans a specific shelf-life for a product. The concept was described in 1959 by the author Vance Packard in *The Waste Makers*. In high-technology markets, this term can sometimes refer to the idea of updating and improving a product. While the product might not be functionally obsolete, like earlier instances of planned obsolescence, the updated product will constitute a dramatic improvement over the old one.

Firms can obtain new products internally or externally. External sourcing means the company acquires the product or service, or obtains the rights to market the product or service, from another organization. Internal development means the firm develops the new product itself. This is riskier than external development because the company bears all of the costs associated with new product development and implementation. Collaborations, which include strategic partnerships, strategic alliances, joint ventures, and licensing agreements, occur

when two or more firms work together on developing new products.

NEW PRODUCT DEVELOPMENT PROCESS

Historically, the new product development process has been conceived in discrete terms with a beginning and an end. Different companies and different industries may alter this seven-step process for different products, or the steps themselves may become blurred as companies become engaged in several stages at the same time.

The process begins with idea generation. For every successful new product, many new product ideas are conceived and discarded. Therefore, companies usually generate a large number of ideas from which successful new products emerge.

Idea screening, the second step, considers all new product ideas in the idea pool and eliminates ones that are perceived to be the least likely to succeed. Not only should the firm's manufacturing, technology, and marketing capabilities be evaluated at this stage, but also how the new idea fits with the company's vision and strategic objectives.

The third stage, concept development and testing, requires formal evaluations of the product concept by consumers, usually through some form of marketing research. New product ideas with low-concept test scores are discarded or revised. While the Internet is making it easier to gather consumer data, there are limitations. As people get deluged with an increasing number of surveys and solicitations, it is possible that they will grow tired of helping marketers.

The business analysis stage is next. At this point the new product idea is analyzed for its marketability and costs. After passing the first three stages an idea may be discarded once marketing and manufacturing costs are analyzed, due to limited potential for profitability or commercial success. Throughout these four stages, the new idea has remained on paper requiring relatively small investment.

The fifth stage, prototype development, is the first stage where new product costs begin to escalate. Because of this, many companies have placed greater emphasis on the first four stages and reduced the proportion of new products that reach the prototype stage from about 50 percent to around 20 percent. At this stage the concept is converted into an actual product. A customer value perspective during this phase means the product is designed to satisfy the needs expressed by consumers. Firms may use quality function deployment (QFD) as they develop the prototype. QFD links specific consumer requirements such as versatility, durability, and low maintenance with specific product characteristics (for example, adjustable

Figure 1

New Product Development Process, Factors and Strategies

Factors Influencing the New Product Development Process	New Product Development Process	Strategies for Improving Speed, Efficiency and Quality
Organizational Structure and Culture • Fast cycle capability • Autonomy • Planning and coordination	Idea generation	Product development maps
	Idea screening	
	Concept development and testing	Aggregate project plans
Leadership • Level of involvement • Clarity and vision • Project management • Tolerance for trial and error • Individual initiative	Business analysis	
	Prototype development	Project return maps
	Test marketing	
Team building • Reduced interdepart- mental conflict • Social cohesion • Frequency and direction- ality of communication	Commercialization	Purchasing expertise in process

shelves, a door-mounted ice and water dispenser, and touch controls for a refrigerator). The customer value perspective requires the new product to satisfy customer needs and meet desired quality levels at specified produc- tion costs.

Test marketing tests the prototype and marketing strategy in simulated or actual market situations. Because of the expense and risks associated with actual test mar- kets, marketers use them with caution. Products that test poorly are pulled back and reconceptualized or discarded.

Commercialization, the final stage, is when the prod- uct is introduced full scale to the marketplace. The level of investment and risk are highest at this stage. Consumer adoption rates, timing decisions for introduction, and coordinating efforts with production, distribution, and marketing should be considered.

FACTORS INFLUENCING NEW PRODUCT DEVELOPMENT

The seven-step process assumes a definite beginning and end. However, studies suggest that what goes on before and after new products are introduced is as important as the process itself. Organizational structure, leadership, and team building influence the speed and efficiency with which new products are introduced. Structure influences efficiency, autonomy, and coordination. New product innovation requires structure that optimizes direction and guidance. Structure that facilitates internal informa- tion exchange, decision-making, and material flow is essential. A "fast-cycle" structure allows more time for planning and implementing activities to gain competitive advantage. This type of structure also cuts costs because production materials and information collect less over- head and do not accumulate as work-in-process inventory.

Autonomy refers to the amount of decision-making allowed at lower levels of management. The coordination of the engineering, product design, manufacturing, and marketing is vital in the new product development process.

Leadership influences strategy, culture, and the firm's overall ability to undertake new product development. Top management can demonstrate involvement in the development process by providing career advancement for entrepreneurial skills and encouraging broad employee participation. Clarity and vision are crucial to ensuring that new product ideas are good strategic fits for the company. The degree to which leadership allows trial and error and promotes individual initiative positively influences the development of new products. This acceptance of risk and support for an entrepreneurial spirit within the organization are crucial in order for innovation to flourish. New products emerge in a variety of ways and their development does not always proceed in rational and consistent manners. It is necessary for leadership to view the process as iterative and dynamic, and to foster adaptation and flexibility. Management flexibility and responsiveness to change also are needed. This type of leadership is particularly important to the project manager who must coordinate and integrate the various parts of the new product development process so that a coherent system emerges that produces a product with compelling value. Initiative encourages creativity and problem-solving skills.

Teams provide mechanisms for breaking down functional biases created by a strict adherence to structure. The amount of interdepartmental conflict in the organization, the social cohesion among team members, and the frequency and directionality of interdepartmental communication influence team building. Through shared understanding of the objectives and purposes of the project, as well as the tasks required in the development process, teams can shape the project and influence how work gets done in the organization.

CONSUMERS AND NEW PRODUCT DEVELOPMENT

In many ways, consumers have played an active role in new product development. The business historian Regina Lee Blaszczyk has shown that as early as the eighteenth century, companies and manufacturers have had to learn what it is consumers wanted from a product. By simply rejecting or purchasing a product, consumers play a vital role in the production process. As the twentieth century progressed, companies developed ways to discover consumer tastes and used this information in product design.

The rise of software in the late twentieth century provided an even greater role for the consumer in new product development. Kevin Kelley has noted that releas-

ing beta versions and open source software for free can aid in product development. Savvy potential users will find and fix bugs in the product. GNU/Linux is a well-known example of software that has been developed using an open-source method.

Though open-source software has sometimes been seen as the province of hobbyists and computer programmers, open-source strategies can be used in other types of product development. Advanced Micro Devices (AMD) is one example. In 2007 AMD switched to an open-source graphics driver, a move that made its customers an essential part of the development process.

IMPROVING SPEED, EFFICIENCY, AND QUALITY

New products often fail because of unanticipated market shifts that result in missed opportunities and misused channels of distribution. Failures also occur because companies miscalculate their own technological strengths or the product's technological challenges. These potential problems often crop up in the latter stages and result in delays, redesigns, or poor quality products.

Companies are constantly seeking ways to avoid these pitfalls. One solution is new product development maps that chart the evolution of a company's product lines. This historical perspective helps the firm to identify and analyze functional capabilities in a systematic, repetitive fashion that allows for the development of linkages and the identification of resources for new endeavors. These maps can direct the firm to new market opportunities and point out technological challenges.

Aggregate plans for projects offer another solution. Rather than viewing each new product development project individually, they consider all of the new product development projects under consideration by the firm. This is particularly important in firms with hundreds of new product development projects going on at the same time. Projects are categorized according to resources required and contribution to the firm's bottom line. Aggregate project plans enable management to improve the handling of new product development by providing greater control over resource allocation and utilization. These plans help to point out where capabilities need to be improved, how sequencing projects may help, and how projects fit with the firm's development strategies.

Return maps graphically represent the contributions of all team members to product success in terms of time and money. Their focus is on the point at which product sales generate sufficient profit so that the firm's initial investment in development is returned. Return maps show team members the time and money needed to complete their tasks in the development process so that they may estimate and re-estimate their investment in the

process. In doing this return maps illustrate the impact of their actions on the project's overall success.

Another way to improve the speed and efficiency with which new products are introduced is to involve purchasing in the development process. When purchasing expertise is introduced into the development project team, quality may increase, time to market entry may decrease, investment in inventory may diminish, and costs may significantly decrease.

Technology continues to change and create new opportunities and threats. Customer requirements and expectations continue to shift and create new demands. Old channels of distribution are becoming obsolete and new channels are opening new opportunities. Some competitors are falling by the wayside while others are surging to the forefront by making new and unexpected moves to gain advantage. The very structure of industry is changing. A key to success in this tumultuous environment will continue to be the ability to sustain a competitive advantage through innovation. However, speed, efficiency, and quality in product development will be paramount. Building capabilities in all aspects of product creation and implementation, overcoming uncertainty and facilitating decision-making, ensuring these innovations are strategically linked to the firm's vision, and doing this on a continuous basis is the challenge of new product development in the next century.

SEE ALSO *Innovation; Product Design; Product Life Cycle and Industry Life Cycle*

BIBLIOGRAPHY

Blaszczyk, Regina Lee. *Imagining Consumers: Design and Innovation from Wedgwood to Corning.* Baltimore: Johns Hopkins University Press, 2000.

Clarke, Sally H. *Trust and Power: Consumers, the Modern Corporation, and the Making of the United States Automobile Market.* Cambridge, MA: Cambridge University Press, 2007.

Cooper, Robert G., Scott J. Edgett, and Elko J. Kleinschmidt. "Benchmarking Best NPD Practices." *Research-Technology Management* 47, no. 6 (2004): 43.

Crawford, C. Merle. *New Products Management.* 5th ed. Chicago: Irwin, 1997.

Kelley, Kevin. *New Rules for the New Economy.* New York: Penguin, 1998.

———."Making NPD Work." *Nilewide Marketing Review,* 10 October 2004.

Markoff, John. "Ideas & Trends; Is Planned Obsolescence Obsolete?" *New York Times,* 17 February 2002, Sec.4, 6.

Moorman, Christine, and Anne S. Miner. "The Convergence of Planning and Execution: Improvisation in New Product Development." *Journal of Marketing* 62, no. 3 (1998): 1–20.

Poolton, Jenny, and Ian Barclay. "New Product Development from Past Research to Future Applications." *Industrial Marketing Management* 27, no. 3 (1998): 197–212.

Schumpeter, Joseph A. *Capitalism, Socialism, and Democracy.* New York: Harper and Brothers, 1942.

Shankland, Stephen. "AMD Nurtures Open-Source Graphics." *CNET,* 6 September 2007. Available from: http://news. cnet.com/AMD-nurtures-open-source-graphics/2100-7344_ 3-6206581.html.

Steenkamp, Jan-Benedict E.M., Frenkelter Hofstede, and Michel Wedel. "A Cross-National Investigation into the Individual and National Cultural Antecedents of Consumer Innovativeness." *Journal of Marketing* 63, no. 2 (1999): 55–69.

Tedlow, Richard S. *New And Improved: The Story of Mass Marketing in America.* Boston: Harvard Business School Press, 1996.

Wells, Melanie. "Have It Your Way." *Forbes Global* 8, no. 3 (2005): 16.

NON-COMPETE AGREEMENTS

A non-compete agreement, or a covenant not to compete is a contract in which one party agrees not to compete with another party in exchange for payment of some consideration. Non-compete agreements are most commonly found in employment contracts, particularly with management or sales employees; in agreements among shareholders or partners of a business; in contracts for the sale of a business; and in agreements for the funding of a business. Non-compete agreements are difficult to enforce, and must be carefully drafted to conform to the regulations of the state in which the agreement is to be performed.

NON-COMPETE AGREEMENTS IN EMPLOYMENT CONTRACTS

In an employment setting, a non-compete agreement is a contract between an employer and an employee, which prevents the employee from working for a competing company and from divulging to third parties, including new employers, the confidential business and proprietary information, trade secrets, customer lists, and technical and manufacturing processes of the contracting employer. A non-compete agreement must seek to protect a company's legitimate business interests and property. Without such an agreement, employees can leave a company, and subject to state protection against misappropriating a company's trade secrets and federal intellectual property statutes, freely compete with their former employers.

With some exceptions, most states recognize non-compete agreements or restrictive covenants in employment contracts, either through specific provision in a state statute or through the state courts' application of a common law "rule of reason" analysis. The rule of reason analysis weighs the company's interest in protecting its

proprietary and confidential information in a geographic area for a period of time against the employee's need to have a way in which to earn a living. However, the specific provisions and types of non-compete agreements that the state will recognize varies among the states, and quite often a non-compete agreement which is found valid in one state is determined by the courts in another state to be unenforceable because, for example, it is too broad in scope or time.

Courts are generally not eager to broadly enforce such agreements because they may restrict an individual's ability to earn a living. Courts will also not enforce agreements that are merely broad-based attempts to prevent all competition. As a result, non-compete agreements must be drafted with care to conform with each state's requirements for a valid non-compete agreement.

Non-compete agreements in and of themselves do not change the nature of the employment relationship. If it is an at-will relationship, either party can terminate the relationship at any time, and the drafter of a non-compete agreement must be careful, in the attempt to restrict competition, that there is not instead a promise made that the employee will have a job with the employer for life.

One question regarding the at-will employment relationship when a non-compete agreement is in place is whether an employer can discharge an employee for refusing to sign a non-compete agreement, even if that agreement is deemed to be unreasonable. There is concern that such a discharge violates the public policy exception to employment-at-will; the non-compete agreement may have negative societal effects on the freedom of employees to seek or change jobs and limits to technological advancements. Whether a court will deem a discharge as a violation of public policy depends on the nature of that state's public policy exception and the nature of the state's laws regarding non-compete agreements.

Non-Compete Agreements and State Laws. The legality and enforceability of the non-compete agreement varies by state. Scott Westcott provides a rough guide to non-compete agreements in "The Legal Landscape." Non-compete agreements are the least enforceable in California, where (under section 16600 of the California Business & Professions Code) it states that, subject to statutory exceptions, any contract that restricts a person from engaging in gainful employment is void. Georgia and Wisconsin are less strict but if one item in an agreement is deemed unenforceable, the entire agreement is considered void. Non-compete agreements are rarely enforced in Colorado or Oregon. In fact, Oregon passed additional legislation to restrict non-compete agreements in January 2008.

The majority of states will enforce non-compete agreements if they are narrowly defined to protect intellectual property of customer relationships. Some states will revise a non-compete agreement by scratching out the terms that are not enforceable. Among the states that are reluctant to enforce non-compete agreements are New York, Massachusetts, and Illinois. Florida, Texas, Michigan, and New Jersey are more likely to enforce a non-compete agreement.

There are some common provisions in non-compete agreements that are required in all the states that have enforced such agreements. All contractual provisions that seek to restrict competition must be in writing. An oral contract between an employer and an employee, under which the employee promised to not work for a competing company, is not enforceable. As with any contract, there must be "valuable consideration" for the non-compete agreement. The definition of what is sufficient to constitute valuable consideration differs by locale, but generally if the non-compete provisions are part of the employment contract at the time of hire, being hired itself has been held to be sufficient consideration for a contract preventing competition if the employment relationship ends. If a non-compete agreement is presented to an employee after employment has commenced, there must be some payment, or at least the promise of a raise or promotion, to the employee in order for the agreement to be found to be based on sufficient consideration. While an employer could claim that continued employment itself was sufficient consideration and that the employee would have been fired if he or she had not signed the contract, such arguments are not favored by courts.

Most importantly, the provisions of the non-compete agreement regarding the geographic territory which the agreement covers, the areas of competition which the agreement protects, and the length of the time period of non-competition must be restricted. No court will enforce a contract that attempts to prevent an employee from ever working again. Accordingly, a non-compete agreement should include in very specific terms the interests which the employer wishes to protect from competition, such as technology, research and development efforts, customer lists, pricing information, suppliers, prospective customers and projects, the company's strategic planning efforts, and other confidential and proprietary business information. Companies commonly refer to these interests as "trade secrets."

Courts are most willing to set aside non-compete agreements, or at least modify them, on the issues of the length of the period of non-competition, and the geographic area which it covers. The basis for the time and geographic restrictions is that they must be "reasonable." This determination differs from state to state, and within

a state, from industry to industry. For instance, geographic restrictions tend to be broader on non-compete agreements regarding Internet commerce because web businesses often sell to customers worldwide. Anyone attempting to enforce a non-compete agreement must be aware that the agreement will not be looked upon with favor if the amount of time it extends or the geographic area it covers is too broad, based on the type of business, the location of the customer base, and the job duties of the employee restrained by the non-compete agreement. Recent court rulings indicate that the following time periods are likely to be upheld: up to five years for agreements regarding trade secrets, up to three years for agreements regarding sale of a business, and up to six months for other types of agreements (e.g., use of client lists).

NON-COMPETE PROVISIONS IN SHAREHOLDER/PARTNER, FUNDING, OR SALE OF A BUSINESS AGREEMENTS

Agreements among shareholders of or partners in privately held companies often contain non-compete provisions. These protect each of the parties to the agreement from competitive activities of another that would damage the business, since each of the shareholders or partners has access to the company's trade secrets and confidential and proprietary information. Similarly, in agreements to provide funds to a business, particularly where the funding is provided by a venture capital source, there regularly appear non-compete provisions. The funding source includes these provisions because it wants to ensure the likelihood of the business's success by preventing competition by the owners or key managers of the business.

In a sale of a business, the former owners are often restrained from setting up a new business within some geographic area that will compete with the business they just sold, for a specified period of time, again so that the business which was sold can have a chance to survive without competition from those who have information about the company's strengths and weaknesses. There is usually a separately negotiated payment for the non-compete provisions in a sale of a business agreement, and often the sold business will retain the former owners as consultants during the pendency of the non-compete period. Courts are more willing to enforce these types of non-compete agreements, as opposed to those in employment contracts, since the parties have received something of value—an ownership interest, proceeds of a sale, or funding—that is more than just continued employment.

NON-SOLICITATION AGREEMENTS

A non-solicitation contract, which is similar to an agreement not to compete, prevents one party to the contract from seeking business from clients of the other party to the contract. These kinds of contracts can also restrict one party from recruiting for hire people who work for the other party.

SEE ALSO *Employment Law and Compliance; Entrepreneurship*

BIBLIOGRAPHY
———."10 Mistakes to Avoid in Non-Compete Agreements." *HR Focus* 79, no. 10: 2.

Garrison, Michael J., and Charles D. Stevens. "Sign This Agreement Not to Compete or You're Fired! Noncompete Agreements and the Public Policy Exception to Employment at Will." *Employee Responsibilities and Rights Journal* 15, no. 3 (2003): 103–126.

Shaefer, Enrico. "What Every Employee Should Know About Non-Compete-Non-Solicitation Contracts."*Ezinearticles.com,* 16 June 2008. Available from: http://ezinearticles.com/?What-Every-Employee-Should-Know-About-Non-Compete-Non-Solicitation-Contract&id=442997.

Steinberger, Jeffrey. "Are Non-Compete Agreements Valid?" *Entrepreneur,* 2007. Available from: http://www.entrepreneur.com/management/legalcenter/legalissuescolumnistjeffreysteinberger/article179190.html.

Westcott, Scott. "The Legal Landscape." *Inc.com,* February, 2008. Available from: http://www.inc.com/magazine/20080201/the-legal-landscape.html.

Wirtz, David. "Tip the Scales on Non-compete Agreements." *HRMagazine,* 47, no. 11 (2002): 107–115.

NONPROFIT ORGANIZATIONS

In the United States, nonprofit organizations (NPOs) are organizations that qualify for tax-exempt status under the U.S. Internal Revenue Code. About half are public charities, to which donors can deduct contributions from their taxes. Private foundations also are charitable organizations, but they are not public charities. They exist primarily to fund charities or individuals. Other types of tax-exempt organizations include social welfare, labor, or agricultural organizations, business leagues, and fraternal beneficiary societies. Nonprofit organizations are not prohibited from earning a profit or paying salaries and wages, but they must devote any surplus to the organization.

Nonprofit organizations also are known as not-for-profit organizations, or as the "independent sector," as opposed to business or government. Nonprofits constitute about 10 percent of U.S. employees. These organizations play a unique role in society, falling between the concepts of public and private entities. Public agencies provide goods and services that are considered to be universally desirable (such as national security or infrastructure). Private enterprises serve individual tastes and preferences

and depend on market-based competition to prosper. By contrast, nonprofit organizations supply services that are considered good for the community as a whole or for specific community members, but which do not elicit widespread taxpayer support for direct provision. The distinction may be characterized as the difference between "it is right" that these services should exist, and the idea that all members of society "have a right" to such services.

While the nonprofit organization exists in many countries, the focus here is on the American NPO. The primary factors unique to this American sector are volunteers, contributions, and tax-exempt status.

THE ROLE OF NONPROFITS IN THE AMERICAN ECONOMY

Nonprofit organizations play a large role in the American economy. It is difficult to get an accurate count of nonprofits, because only organizations with more than $5,000 in annual gross receipts must register with the IRS and only those with receipts in excess of $25,000 must file with the IRS. According to the National Center for Charitable Statistics (NCCS), in 2006 there were 1.47 million total nonprofit organizations in the United States. This figure includes those registered and filing with the IRS. Of these, 904,313 were registered public charities, and 109,852 were private foundations. According to *The United States Nonprofit Sector 2003,* human services organizations make up 34 percent of the charitable nonprofits; education is the second largest field with 18 percent, and healthcare/mental health is the third with 13 percent. The remaining nonprofit categories include community improvement and social benefit groups; arts, culture, and humanities groups; environmental and animal groups; religious institutions; and various research organizations, which make up only 1 percent of all nonprofit organizations.

Though nonprofit organizations can be very large, most are small. *The United States Nonprofit Sector 2003* notes that 44 percent of such organizations have less than $100,000 in assets. Only 5 percent have more than $10 million.

It is estimated that there are twice as many organizations not required to file with the IRS because they did not take in $5,000 annually. This would include such familiar organizations as PTAs and Little Leagues. No statistics are available regarding these organizations.

The NCCS collects and disseminates statistics on the U.S. nonprofit sector. This data is gathered from the IRS and other government agencies, private sector service organizations, and the scholarly community. The NCCS builds compatible national, state, and regional databases and develops uniform standards for reporting on the activities of charitable organizations. Excellent charts rep-

resenting this data are presented in *The United States Nonprofit Sector 2003,* which is available from The National Council of Nonprofit Associations.

In 2004 nonprofit organizations contributed about 5 percent of the gross domestic product. In 2006 more than 12.9 million people were employed by nonprofit organizations. This means that employment in the nonprofit sector is significant. According to the Council of Foundations, the average annual turnover rate for associations is 24 percent, but there appears to be wide variation among nonprofit subsectors. For example, employee turnover in child welfare agencies can show rates between 100 and 300 percent.

The nonprofit sector relies heavily on volunteers. This can be a problem for nonprofit managers who must provide creative incentives in "psychic income," such as recognition to volunteers who are motivated to support a particular cause despite the lack of pay and benefits. In addition, attendance may be sporadic, leading to variable levels of capacity at any given time. Some organizations in this sector exist primarily to supply employment to those who have traditionally been considered unemployable, with the goal of boosting both morale and self-sufficiency.

FINANCIAL INFORMATION

To generate revenue, NPOs rely on direct appeal to those individuals, corporations, and other entities that value the underlying cause represented by the organization. Fundraising events, including door-to-door appeals and mass mailings, are highly visible means of garnering funds. According to *The United States Nonprofit Sector 2003,* charitable nonprofits had about $945 billion in expenditures in 2003. This revenue came primarily from fees, government grants and contracts, as well as investments. About 14 percent came from private contributions, while 72 percent came from what is termed "Program Service Revenue." Competition for funds is more complex than in the corporate world, as there is no financial reward for the contributor. Each year, the American Association of Fundraising Counsel (AAFRC) publishes national giving estimates in its *Giving USA* report. For 2006, *Giving USA* reported the following national totals:

- Individuals: $222.89 billion (75%)
- Foundations: $36.5 billion (13%)
- Bequests: $22.91 billion (8%)
- Corporations: $12.72 billion (4%)

Some organizations rely heavily on competitive grants from governmental or philanthropic institutions. Nationally generated funds may be redistributed to local communities on the basis of need, as is done by the United Way and the Red Cross. Increasingly, nonprofits have

Figure 1

National Taxonomy of Exempt Entities Summary

A - Arts, Culture & Humanities

B - Education

C - Environment

D - Animal-Related

E - Health Care

F - Mental Health & Crisis Intervention

G - Diseases, Disorders & Medical Disciplines

H - Medical Research

I - Crime & Legal-Related

J - Employment

K - Food, Agriculture & Nutrition

L - Housing & Shelter

M - Public Safety, Disaster Preparedness & Relief

N - Recreation & Sports

O - Youth Development

P - Human Services

Q - International, Foreign Affairs & National Security

R - Civil Rights, Social Action & Advocacy

S - Community Improvement & Capacity Building

T - Philanthropy, Voluntarism & Grantmaking Foundations

U - Science & Technology

V - Social Science

W - Public & Societal Benefit

X - Religion-Related

Y - Mutual & Membership Benefit

Z - Unknown

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relied on participant dues, fees, or charges. Such charges can range from the minimal "suggested contribution" for a senior center lunch to the bill for costly medical procedures at a major hospital.

The United States Nonprofit Sector 2003 states that in 2003, hospitals had the greatest percentage of total sector assets (about 30 percent), followed by higher education with approximately 20 percent. Human services, healthcare (excluding hospitals), and lower education, each had about 10 percent. Interestingly, lobbying accounts for a sizeable portion of nonprofit expenditures. According to the report, large nonprofit organizations spend the most on lobbying.

The accuracy of financial information regarding this sector of the economy is limited. First, the ongoing initiative to collect and computerize data in standardized form began in the late 1980s to early 1990s. While the Bureau of Labor Statistics tabulates employment figures, the financial information lags due to attempts to standardize and code the data. Second, while all tax-exempt organizations must apply for such status, only those with

total annual revenues of at least $25,000 are required to file a Form 990 with the Internal Revenue Service. These non-filers represent about two-thirds of all registered nonprofit organizations. Third, churches are not required to file a Form 990, leaving this data estimation to private sources. Fourth, pass-through contributions (for example, revenues to both the United Way and the local charities it supports) may be double-counted. Therefore, financial figures are at best an estimate.

There is no single agency with oversight for nonprofit organizations. The IRS serves as one control, but some states have instituted more rigorous guidelines than those at the federal level. The Financial Accounting Standards Board, a private self-regulatory body for the accounting profession, developed Financial Accounting Standards 116 and 117 covering nonprofits, but these prescriptions allow a different form of generally accepted accounting practices (GAAP) from private organizations with similar functions.

The BBB Wise Giving Alliance collects and distributes information on national nonprofit organizations. It routinely asks such organizations for information about their programs, governance, fund-raising practices, and finances. Although The BBB Wise Giving Alliance does not recommend charities, it does select charities for evaluation based on the volume of donor inquiries about individual organizations. The BBB Wise Giving Alliance was formed in 2001 with the merger of the National Charities Information Bureau and the Council of Better Business Bureaus Foundation and its Philanthropic Advisory Service. The BBB Wise Giving Alliance is a nonprofit charitable organization, affiliated with the Council of Better Business Bureaus.

TAX-EXEMPT STATUS

In exchange for the supply of quasi-public goods and services, nonprofit organizations are exempt from federal taxation on the excess of revenues over costs within the

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Figure 2

10 Broad Categories of the National Taxonomy of Exempt Entities

I. Arts, Culture, and Humanities A

II. Education B

III. Environment and Animals C, D

IV. Health E, F, G, H

V. Human Services I, J, K, L, M, N, O, P

VI. International, Foreign Affairs Q

VII. Public, Societal Benefit R, S, T, U, V, W

VIII. Religion Related X

IX. Mutual/Membership Benefit Y

X. Unknown, Unclassified Z

Table 1
Websites

Alliance for Nonprofit Management	Association of providers of support services to nonprofits	http://www.allianceonline.org
ARNOVA	International membership organization fostering research. Aimed at the academics, provides publications and organizes an annual meeting	http://www.arnova.org
BoardSource (formerly the National Center for Nonprofit Boards)	Practical information for board members	http://www.boardsource.org
Foundation Center	Information for grant makers, criteria for awarding grants and lists of grants	http://www.foundationcenter.org
GuideStar.org	Provides access to IRS filings by nonprofits	http://www.guidestar.org
Internet Nonprofit Center	Disseminates information, advice and statistics	http://www.nonprofits.org
National Center for Charitable Statistics	Collects and disseminates data on nonprofits. Publishes New Nonprofit Almanac & Desk Reference	http://nccs.urban.org
National Council of Nonprofit Associations	An association of state and regional associations of non profits that has the goal of making resources available	http://www.ncna.org
Society for Nonprofit Organizations	National association of nonprofit member organizations providing education and training. Publishes Nonprofit World, a bi-monthly magazine	http://www.snpo.org

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fiscal year. This practice was established in 1913 with the passage of the first federal income tax law. In addition, they also may be forgiven state and local property taxes, and may receive discount postal privileges. Thus, these organizations are publicly subsidized while not directly supported by all taxpayers.

To qualify for tax-exempt status, the nonprofit organization must satisfy a variety of prerequisites. Among these is the declaration of a primary purpose or cause that qualifies under the Internal Revenue Service code. There is no ownership of assets or income other than that of the organization itself. Externally, this implies that there is no income distribution in the form of dividends or other such payments. Internally, there is the further requirement that the organization does not exist for the benefit of individual employees or board members; the IRS scrutinizes payment to such individuals in the form of salary, rent, or contractual arrangement. However, the only available penalty is the withdrawal of tax-exempt status, a punishment that the IRS has historically rarely delivered.

Examples of nonprofit organizations include such well-known giants as the United Way, the Red Cross, and the Boy Scouts and Girl Scouts. At the other end of the spectrum are local volunteer fire departments, churches, crisis intervention centers, and civic centers.

Many hospitals and universities function as nonprofit institutions as well.

Figure 1 lists the full range of categories of American NPOs as defined by the National Taxonomy of Exempt Entities. This classification system offers a definitive classification system for nonprofit organizations recognized as tax-exempt under the Internal Revenue Code. Figure 2 lists the major categories by which summaries relating to this sector are frequently reported.

From 1940 to the early 1990s, human services and health accounted for approximately half of the NPOs in the United States. In some NPOs, benefits are limited to a select group, such as senior citizens (local agencies on aging) or those suffering from a specific disease (the American Cancer Society). Other groups have relatively open membership for those willing to pay the fee; an example is the YMCA, which provides recreational facilities.

CHALLENGES FOR NONPROFIT MANAGEMENT

Management must contend with the unique aspects of nonprofit organizations: volunteer labor, solicited contributions, and maintaining tax-exempt status. In addition, Herzlinger suggests that NPOs are highly antithetical to business in other important ways: they lack ownership,

competition, and the profit motive. Without these incentives it may be difficult to maintain effectiveness and efficiency. Even measurement of customer satisfaction may prove elusive, as customers may have no alternatives against which to compare the services received. Some controversy exists over several aspects of nonprofit organizations:

1. For example, some question the rationale of the tax-exempt status of open-membership facilities, such as the YMCA. For-profit providers of similar services submit that the subsidy of NPOs diminishes the for-profit organization's ability to compete. This situation has led to as yet unsuccessful legislative attempts to level the playing field.

2. Some people question how much nonprofits spend on programs. The BBB Wise Giving Alliance (a nonprofit organization itself) recommends that nonprofits spend at least 50 percent on program activity. Other organizations set this level as high as 80 percent. The remainder is to be spent on non-program expenses, such as administrative and fundraising costs. The amount spent on fundraising can vary widely based upon whether the nonprofit is new or established with many donors. However, no regulation exists to ensure that the majority of revenues are spent on the cause for which the funds were collected.

3. Others question how nonprofits are regulated and who regulates them. State agencies are increasingly requiring reports from active NPOs to monitor fundraising activity; the agency in turn responds to individual inquiries about the NPO's self-reported record. As in the corporate and governmental groups, administrative salaries occasionally make the news, encouraging contributors to reconsider how their contributions are being used.

Nonprofit organizations are a valuable part of the economy in America and many other countries, providing a broad range of services that might not otherwise be affordable or available without the subsidy of tax exemption. As NPOs grow in number and scope, there is increasing pressure to report on financial activity and performance fulfillment in this sector. The future of nonprofits may rely on disclosure and accountability.

SEE ALSO *Balance Sheets; Financial Issues for Managers; Income Statements*

BIBLIOGRAPHY
"BBB Wise Giving Alliance." *BBB Wise Giving Alliance*. Available from: http://Give.org

Council of Economic Advisors. *2005 Economic Report of the President*. Washington, D.C.: Government Printing Office, 2005. Available from: http://www.gpoaccess.gov/eop/

"FC Stats–Grantmaker." Foundation Center. Available at http://foundationcenter.org/findfunders/statistics/listing01.html.

Frequently Asked Questions, 2008. National Center for Charitable Statistics. Available at http://nccs.urban.org/resources/faq.cfm.

Herzlinger, R.E. "Can Public Trust in Nonprofits and Governments be Restored?" *Harvard Business Review* 74, no. 2 (1996): 97–107.

Langer, Stephen. "How Much Are You Really Worth? Here's the Latest on Nonprofit Salaries." *Nonprofit World* 23, no. 1 (2005): 27.

Lewis, Robert L. *Effective Nonprofit Management: Essential Lessons for Executive Directors*. Gaithersburg, MD: Aspen Publishers, 2001.

———.*The New Nonprofit Almanac & Desk Reference*. Washington, D.C.: Independent Sector/Urban Institute, 2002.

"Nonprofit Organizations Part II." *Journal of Business & Finance Librarianship* 10, no. 1 (2004): 63–79.

———.*The Non-Profit Sector in a Changing Economy*. Paris: Organisation for Economic Co-operation and Development, 2003.

Number of Nonprofit Organizations in the United States 1996–2004. The National Center for Charitable Statistics at the Urban Institute. Available from: http://nccsdataweb.urban.org/PubApps/profile1.php?state=US

Number of Nonprofit Organizations in the United States, 1996–2006. National Center for Charitable Statistics. Available at http://nccsdataweb.urban.org/PubApps/profile1.php?state=US.

Pidgeon, Walter P. *The Not-for-Profit CEO: How to Attain and Retain the Corner Office*. New York: John Wiley, 2004.

Taylor, Barbara E., Richard P. Chait, and Thomas P. Holland. "The New Work of the Nonprofit Board." *Harvard Business Review* 74, no. 5 (1996): 36–46.

"The United States Nonprofit Sector 2003," 2006. National Center for Charitable Statistics. Available at http://www.ncna.org/_uploads/documents/live//us_sector_report_2003.pdf.

White, Gary W. "Nonprofit Organizations." *Journal of Business & Finance Librarianship* 9, no. 1 (2003): 49–80.

NONVERBAL COMMUNICATION

People in the workplace can convey a great deal of information without even speaking; this is called nonverbal communication. Nonverbal communication can convey just as much as written and verbal communication, and human beings read and react to these nonverbal signals in the workplace.

Body language is nonverbal communication that involves body movement and gestures. The catalogue of these movements, together with attempts at defining their meaning, is called *kinesics*. Each culture is believed to possess a separate "language" of kinesics. This branch of study is used in matters of negotiation and interrogation, where reading nonverbal cues is of great importance. According to the 2008 Encyclopedia Britannica, *kinesics* is a primarily American attempt at movement-classification, designed to

create a vocabulary of gestures, "both amusing and potentially practical."

There are hundreds of thousands of possible signs that can be communicated through body movements and gestures. In addition to those movements and gestures, the nonverbal cues given through facial expressions and eye contact, personal space, and touch also influence individual interactions in the workplace. While this body language is generally well understood in each culture, there are major cultural differences in nonverbal communication.

EKMAN AND FRIESEN'S CATEGORIES

Albert Mehrabian, in his 2007 book *Nonverbal Communication*, focuses on the five categories of nonverbal communication developed by Ekman and Friesen in 1969 and widely used by sociologists since. These definitions are used to inspect and learn from movements in social interactions. A movement may belong to more than one of these categories.

The first category is *emblem*. These are movements so common that there are specific words used to designate them, such as the English "handshake" or "smile." Emblems often carry intrinsic meaning and are easy to understand to someone who has experience with them. Gestures, or movements of the head, hands, arms, and legs, can be used to convey specific messages that have linguistic translations. For example, a person might wave his or her hand rather than saying "hello," or nod his or her head in agreement, which means "yes" or "okay." These gestures can be very useful in the workplace because they are a quick way to convey thoughts and feelings without needing to speak or write. Additionally, many such gestures are generally widely understood, although they may carry different meanings in other cultures. For instance, although the "ok" sign that is made through the touch of the thumb and forefinger with the remaining fingers extended is seen as a positive gesture in the United States, in some other cultures, this is seen as a vulgar gesture.

The second category is *illustrator* movements. Illustrators accompany words in natural manners and are used to add meaning to verbal communication. An illustrator may be a particular nod to emphasize a phrase, or a wave of a hand to show an idea. In addition to the gestures that people use that have a particular meaning, people also use gestures that do not have specific, generally understood meanings. These gestures are the illustrators that add meaning to a verbal message. For instance, when giving a presentation, a person might use hand gestures to emphasize a point. Many people use gestures while speaking to others to accompany their words, and while these

body movements may not have a meaning that can be pinpointed, they serve to embellish a person's words.

The third Ekman and Friesen category is *affect display*, the category most important to Mehrabian. These are actions that are paired with emotions, such as the facial movements that indicate disgust or amusement. These body movements may indicate whether a person is open and receptive, angry, distracted, or a number of other emotions. Many affect displays are commonly interpreted; for instance, individuals who sit in a slumped position and frown are believed to be disinterested or unhappy. Those who sit upright, smile, and have raised eyebrows, are seen as interested and happy. While these affect displays are often appropriately interpreted, they may not be related to the interaction with another person, and thus may be misread. For instance, if a person has a terrible headache, he may squint, look down, and grimace during a conversation, indicating to the speaker that he disagrees with her, even if he is receptive to and in agreement with the speaker.

Regulator movements are the fourth category. These actions are seen in social interaction, and they are especially important in business and sales situations. Regulator actions are made by the listener to help the speaker improve communication. A listener may nod and move in an interested manner, urging the speaker to continue or give looks of confusion, urging the speaker to explain or repeat. Certain regulator movements can also communicate the listener's desire to end the discussion or embark on a new explanation.

The last category is *adaptor*. Adaptor actions are often unconscious movements made for reasons of comfort or clarity. This includes shifting positions in a chair or scratching an itch. Although these movements have less immediate meaning to the verbal communication, adaptors can still reveal attitudes and feelings that contribute to a mental state. Other examples of adaptors are adjusting one's clothes, biting one's nails, or fidgeting and toying with an object. Adaptors may indicate to others that a person is upset or nervous, and behavior such as this during a job interview or a meeting with a coworker may be interpreted very negatively. A person who engages in such behavior may be seen as preoccupied, anxious, or even as dishonest. As with affect displays, such body language may not convey true feelings; a person who fidgets and bites her nails may be exhibiting such behaviors for innocuous reasons. Thus, while such behaviors are often interpreted correctly as presenting anxiety, they do not necessarily indicate that a person is in any way dishonest.

When listening to others, individuals often convey messages nonverbally. Therefore, care should be taken to avoid the following:

- Sitting or leaning back is a body movement that may convey disinterest in a speaker's words or disagreement with the speaker. Additionally, resting

one's chin on his or her hand may convey boredom. Conversely, leaning forward slightly, raising eyebrows, and making eye contact indicates that one is receptive to the speaker.

- Crossed arms often connote a defensive posture, which can indicate that a person is unhappy with the speaker, feels threatened by the speaker, or does not want to listen to the speaker.

- Adaptors, such as fidgeting or playing with objects, may indicate that one is nervous around the speaker or disinterested in the speaker's message.

FACIAL EXPRESSIONS AND EYE CONTACT

Although facial expressions and eye contact are not kinesics and therefore technically not body language, they are types of nonverbal communication that can have an effect on business relations. Researchers have found that people can identify with great accuracy seven separate human emotions, even after seeing only facial and eye expressions: sadness, happiness, anger, fear, surprise, contempt, and interest. Therefore, without speaking a word, a facial expression can convey a great deal of information to others. Similarly, eye contact or lack of eye contact can also indicate a person's attitudes and emotions.

Research indicates that people use four different facial management techniques to control our facial expressions. First, people intensify their facial expressions, or exaggerate them, in order to show strong emotion. For example, a saleswoman who just made a major sale might intensify her positive expression by smiling more broadly and raising her eyebrows. Second, people may de-intensify their facial expressions when they control or subdue them. For instance, an employee who just found out that he got a raise might smile less or look less happy after finding out that his coworker did not get a raise. Third, a person neutralizes their expressions when they avoid showing any facial expression. A person might not show any emotion when being reprimanded in the workplace or when attempting to negotiate with another businessperson. Finally, humans mask their facial expressions. This occurs when a person hides his or her true emotions and conveys different emotions. For example, an employee might express enthusiasm to a manager who gives him an undesirable task in order to curry favor with that manager. Or, a customer service representative might express concern and caring in her facial expression, when in actuality she is annoyed by the customer. Each of these facial management techniques makes it possible for people to interact with one another in socially acceptable ways.

Making and maintaining eye contact can have positive outcomes in the workplace. Eye contact can be used to indicate receptiveness to what another person is saying.

Additionally, eye contact may indicate the desire to communicate with a person. Finally, eye contact can be used to express respect for a person by maintaining a longer gaze. Interestingly, refraining from making eye contact, such as looking down or away, may indicate a level of respect for someone of higher status. A lack of eye contact, or an unwillingness to maintain that eye contact may indicate discomfort with a situation, a disinterest in the other person's words, or a dislike of the person. However, the degree to which a person does or does not make eye contact may be dependent on their own level of shyness or extraversion and cannot always be interpreted as a reaction to a particular person or situation.

Certain business positions involve a large amount of nonverbal communication connected to the face and the eyes. Positions where interaction with people is common, such as bank tellers, profit by practicing better nonverbal communication. Marketing and auditing positions also go hand-in-hand with proper facial gestures. In William E. Nolen's article "Reading People—Nonverbal communication in internal auditing" (1995), Nolen suggests that smiles and eye contact can be used to relieve tension in normally serious business situations. Jeanne Segal and Jaelline Jaffe, in their 2007 article/resource "Nonverbal Communication: The Hidden Language of Emotional Intelligence," suggest using a digital camera or recorder to self-record one's facial movements and improve them, learning proper smiles and stopping stress signals.

PERSONAL SPACE

Researchers use the term *proxemic* to describe the way that a person uses space in communication. Individuals have a personal space that is like an invisible bubble surrounding them. This bubble becomes larger or smaller, depending on the person with whom we interact. We are comfortable standing or sitting closer to someone we like and more comfortable with someone we dislike or do not know well standing or sitting at a distance. However, the amount of personal space that a person desires depends on many characteristics, including gender and age.

The personal space that a person prefers also depends on the situation. When interacting with friends, relatives, or conducting casual business, most people prefer a distance of one and a half to four feet. When conducting formal or impersonal business, most individuals prefer a personal space of 4 to 8 feet. Therefore, a person is likely to be more comfortable standing closely to a trusted coworker than to a new customer.

Although there are broad norms for a comfortable personal space, it is not uncommon for a person to feel that his or her personal space has been violated when another person sits or stands too closely. When personal

space is violated, there are several reactions that people might have. First, they may withdraw by backing up or leaving the room. Second, if anticipating the possibility of a personal space violation, a person may avoid having their space violated by such actions as staying away from meetings, crowds, and parties. Third, people may insulate themselves from intrusion of personal space. A manager who puts her desk in her office in such a way that no one can sit near her is insulating. An employee who takes a seat at the end of a table during a meeting might be doing so to prevent others from sitting near him. Finally, a person may fight to keep his personal space by asking the other person to back up or move away.

In a business setting, it may be helpful to recognize the behaviors that others engage in when their personal space is violated. That is, if one notices that others step back from them when speaking, they may sit at more of a distance, or if they seem physically uncomfortable, they may have a larger personal space, which should be respected.

TOUCH

In the workplace, people may use touch to communicate nonverbally. The functional-professional touch is businesslike and impersonal. The touch that a physician uses when conducting a physical examination is a functional-professional touch. However, touch is not a part of most professions, and thus, this type of touch is not used often in business settings. The social-polite touch, such as a handshake, is much more common. This type of touch is used to recognize other individuals. It is an expected touch in many business settings. Finally, the friendship-warmth touch shows that one values another as a person. A pat on the back or a hug is a friendship-warmth touch. In most workplaces, the social-polite touch is the only necessary touch, and most managers and employees are encouraged to avoid using touch (particularly the friendship-warmth touch) in the workplace. While many people see a hand on a shoulder or a pat on the back as a useful touch to convey encouragement or concern for another's well-being, sexual harassment fears have made many avoid all types of touch beyond handshakes.

PARALANGUAGE

Often considered part of nonverbal communication, paralanguage involves the sounds and pitch of speech during social interaction. Paralanguage affects many business functions, such as meetings, conference calls, and personal evaluations. Constantly speaking in a shrill voice, for instance, is more likely to provoke irritation and annoyance no matter what is said. Pauses in speech, or sounds such as "ah" and "um", according to Segal and Jaffe, should be monitored and reduced to avoid causing boredom and lapses in attention.

ENVIRONMENT

An important aspect of nonverbal communication is the environment which the subject has control over. Most workers have a workspace that they can change, add items of their own, or organize to their liking. Many managers can decorate their offices and move furniture such as desks and chairs in whatever ways they want. In the 2008 article "Non-verbal Communication" by *bizmove.com*, the office environment is seen as divided into personal and nonpersonal sections. Managers can control communication by controlling the surroundings in which they conduct interviews, meetings, and so forth. This in turn changes the comfort levels of people in the environments.

SILENCE

In addition to using the environment, *bizmove.com* suggests that silence can be an integral part of many social interactions. The silence between phrases, the silence when waiting for questions, and the silence before responding are all examples of how silence can affect communication. Many people interpret silences as signs of emotional states. Does a silence show hesitance, thoughtfulness, or ignorance? This depends on the situation and the speakers. Silence should be considered in all business communication.

CULTURAL DIFFERENCES

Across the United States, most body language is consistently understood. However, in other nations and cultures, what is considered to be appropriate body language in one place, may be seen as highly inappropriate in others. As noted above, the American sign for "ok" may be seen as vulgar in other nations. Similarly, other types of gestures and body movements may convey unwanted negative meanings. Therefore, care should be taken before using gestures in other countries or with business partners from other parts of the world. Body movements can also be misinterpreted based on culture. Although most people in the world understand the movement of the head up and down to mean "yes" or "I agree," this is not the case in all countries.

Norms and expectations regarding facial expressions and eye contact also differ across cultures. Because different cultures have different norms for respect, eye contact that is seen as relationship-building and respectful in the United States may be seen as challenging and disrespectful in other cultures.

Personal space and touch are used differently in different nations. Americans tend to prefer larger amounts of personal space than do some Latin Americans, Italians, and Middle-Easterners. Germans, Chinese, and Japanese prefer larger amounts of personal space, similar to what Americans prefer. Thus, when conducting business with people from other cultures, it is important to understand and respect their personal space needs. Americans who do

business with those who prefer less personal space may have to fight the urge to step back and therefore avoid insulting a business partner.

However, many instances of nonverbal communication are considered to be nearly universal. Paul Ekman, in his 2007 book *Emotions Revealed*, discusses an experiment he helped conduct, in which a series of nine Pidgin speakers (who had limited experience in other languages) made a series of facial gestures. These gestures were in time with a story, the main character of which they were to mirror using nonverbal communication to describe emotion. These gestures, filmed, were then shown to American college students, who tried to define the emotions correctly. Overwhelmingly, the college students were able to perceive the emotions of the Pidgin speakers without flaw. Some of the emotions Ekman found to be easily understood included anger, enjoyment, sadness, and disgust. This study suggests that certain basic nonverbal communications are shared by most cultures throughout the world.

BIBLIOGRAPHY

Beall, Anne E. "Body Language Speaks." *Communication World,* March/April 2004, 18–20.

"Nonverbal Communication." *Managing a Small Business,* 2008. Available from: http://www.bizmove.com.2008

Ekman, Paul. *Emotions Revealed: Recognizing Face and Feelings to Improve Communication and Emotional Life* Macmillan, 2007.

———.Encyclopedia Britannica. "Nonverbal Communication." *Britannica Online* Updated 2008.

Knapp, M, L., and J.A. Hall. *Nonverbal Communication in Human Interaction.* 5th ed. Fort Worth, TX: Wadsworth, 2002.

Konnellan, Thomas K. "Great Expectations, Great Results." *HRMagazine,* June 2003, 155–158.

Mehrabian, Albert. *Nonverbal Communication.* Transaction Publishers, 2007.

Nolen, William E. "Reading People: Nonverbal Communication in Internal Auditing." *Internal Auditor,* April, 1995.

Ribbens, Geoff, and Richard Thompson. *Understanding Body Language.* Barron's Educational Series, 2001.

Segall, Jeanne, and Jaelline Jaffe. ed. Pat Davies. "Nonverbal Communication: The Hidden Language of Emotional Intelligence." *Helpguide.org* 2007. Available from: http://www.helpguide.org/mental/eq6_nonverbal_communication.htm#authors.

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM

The North American Industry Classification System or NAICS (pronounced "nakes") is a system for organizing data on industries and companies for standardized reporting. Implemented in 1997 for the United States and Canada and in 1998 for Mexico, the classification system replaced the U.S. Standard Industrial Classification (SIC) system, as well as the respective classification systems of the other two nations.

The system provides common industry definitions for Canada, Mexico, and the United States. It replaces the three countries' separate classification systems with essentially one uniform system, while allowing for nation-specific customization at the finest level of detail. This means at the broadest levels of the NAICS hierarchy the three countries share common industry codes, but at the most detailed level (represented by six-digit codes) each country may choose to recognize additional sub-industries that are of particular importance to their national economies, while remaining within the broader framework of the cross-national system.

The NAICS and previous SIC systems are administered by the U.S. Office of Management and Budget, but are used by numerous government agencies along with private firms and nonprofit organizations. The systems describe a company or organization, often termed an establishment, using a numerical code based on its type of economic activity or the kinds of products or services a company provides. Groups of firms in similar lines of business are thus grouped together under the same classification number. Companies are assigned a four-digit to six-digit code, with each additional code number adding more specific data to identify the exact activities of the organization. The first two digits indicate the broad business sector, the third digit designates the sub sector, the fourth digit identifies the industry group, the fifth digit indicates the industry, and the sixth digit designates national industries. For example, the broad category of "information" is winnowed down to groups such as "publishers" and "broadcasters," which are further narrowed to highly specific industry designations like "software publishers" and "radio stations." In light of such specific categories, many large and diversified firms fall into multiple NAICS categories; hence, the category that accounts for the largest share of sales is sometimes known as the company's "primary" industry classification.

Major libraries or the U.S. Government Printing Office in Washington, D.C., maintain detailed information to help researchers determine a particular firm's classification codes. Private publishers also produce listings and rankings of companies by their SIC and NAICS codes. The official NAICS codes assigned to specific companies by government agencies, such as the Census Bureau in its economic censuses, are usually considered confidential, although for the typical company the correct codes can be readily surmised based on public information.

Problems with the SIC system, including the under-reporting of services, led to the adoption of the NAICS

system. When the SIC system was created in the 1930s, the U.S. economy was heavily dependent on manufacturing. By 2000, however, services had grown to represent 80 percent of the U.S. Gross Domestic Product (GDP). As a result, the SIC codes were replaced in part to provide better information on service firms. However, the service-oriented data is not as detailed as it is for manufacturers and does not have the detailed historical data that is available for manufacturers. The NAICS system was also created to recognize developments in high technology—particularly Internet-related businesses—and increases in international trade following the North American Free Trade Agreement (NAFTA). The revised version known as NAICS 2002 included such new industries as Internet Service Providers, Data Processing Services, and Web Search Portals. NAICS classifications do not always correlate directly with the previous SIC codes. In NAICS 2002, 358 additional industry codes were included that had not been represented in the old system.

The NAICS was revised again in 2007, but the changes were minimal. Two new industries—executive search services and biotech research and development—were assigned codes in NAICS 2007. Additionally, some other industries have been integrated into broader classifications. For example, wireless telecommunication now includes paging, and wired telecommunication includes cable program distribution. The U.S. Census Bureau has published a detailed bridge to show the changes that were made to categories between 2002 and 2007.

Furthermore, in 1999 the statistical agencies in Canada, Mexico and the United States began work on the North American Product Classification System (NAPCS) as a complement to NAICS. The NAPCS aims to classify the products of services-producing industries. As of 2007 the services produced by NAICS sectors 48-49 to 81 have been classified. These product lists can be viewed on the U.S. Census Bureau Web site at www.census.gov.

The expanded and standardized coding system aids business reporting as well as assists researchers gathering and studying data across industries. The system provides a consistent framework for industrial statistics and can benefit anyone who uses industry-based data. According to the NAICS Web page sponsored by the Georgetown University Library, the system will most benefit economists, regulators, marketers, and publishers. Because the three governments designed the system jointly, it is expected to provide better standardization and comparability for nearly all North American industry data.

There are many uses of NAICS data. A firm can compare its own sales data in a particular NAICS classification to the total sales of all companies in the classi-

fication to estimate its market share and growth potential, or to gauge its general performance. If competitors have a larger market share, the firm may need to make adjustments in its strategy or target other subgroups within an industry that offer more sales or growth potential. Many organizations use these classifications; for example, Dun & Bradstreet publishes a plant list based on these codes that might be used by marketers or industry analysts to target particular types of firms.

Typical government census data arranged by NAICS classification include the number of establishments in a given category, the number of employees, payroll data, hours worked, value added by manufacturing, the quantity and value of products shipped, materials consumed, and even capital expenditures. Marketers can use the data to determine if categories are growing or not and thus discover new opportunities. Data will also aid in determining where particular industries are clustered.

The NAICS Association, a private company that markets NAICS-related information, lists four key questions that can be answered using their data:

- Who are potential customers?
- What industries should be targeted?
- How are lists of potential customers obtained?
- What are the NAICS or SIC codes of customers?

Manuals of NAICS information released by the U.S. government are available and include alphabetized lists of NAICS and codes. Data is also available on CD-ROM format for ease of database referencing.

SEE ALSO *Free Trade Agreements and Trading Blocs*

BIBLIOGRAPHY
Garritt, Fran. "Whatever Happened to the NAICS?" *RMA Journal,* May 2002.

Georgetown University. "North American Industry Classification System (NAICS)." Available from: http://www.gulib.lausun.georgetown.edu/swr/business/naics.htm.

NAICS Association. "North American Industry Classification System." Available from: www.naics.com.

Sabrosk, Suzanne. "NAICS Codes: A New Classification System for a New Economy." *Searcher,* November 2000.

U.S. Census Bureau. "Guide to the 2007 Economic Census." 17 July 2007. Available from: http://www.census.gov/econ/census/guide/g07work.htm.

U.S. Census Bureau. "North American Industry Classification System (NAICS)." Available from: http://www.census.gov/epcd/www/naics.html.

U.S. Census Bureau. "North American Product Classification System." 17 July 2007. Available from: http://www.census.gov/eos/www/napcs/napcs.htm.

O

O*NET

OCCUPATIONAL INFORMATION NETWORK

O*NET, or the Occupational Information Network, is an electronic replacement for the *Dictionary of Occupational Titles* (DOT). Like the DOT, which was last published in 1991, O*NET provides a comprehensive database of worker attributes and job characteristics. By describing the tasks to be performed and the levels of education that must be achieved, the O*NET database can be used as a tool for training and education, career guidance, employment counseling, and for writing job descriptions.

The U.S. Department of Labor developed the DOT in the mid-1930s, soon after the federal-state employment service system was established. O*NET was also developed by and is supported by the U.S. Department of Labor. The main difference between the DOT and the O*NET database is the flexibility of the new database and its depth of information. Rather than having information for 12,000 occupations, as the DOT did, the O*NET database has 974 occupations which are related to a common framework describing job requirements and worker characteristics, the content, and the context of work. A second difference between the DOT and the O*NET database is that O*NET can be updated more frequently; the Department of Labor uses a data collec-

tion program that provides for an update to the database twice annually. The most recent update was in December 2004. Additionally, there is now a Spanish-language version of the O*NET database available.

O*NET USES

O*NET can be used by many different people for a variety of reasons. Some of the uses for managers are:

- Writing and updating job descriptions and job specifications
- Developing criteria for recruitment and selection
- Developing criteria for performance appraisal systems
- Structuring training and development activities
- Structuring compensation systems
- Improving career counseling

O*NET DEVELOPMENT: COMMON LANGUAGE AND THE CONTENT MODEL

The O*NET database provides a common language that can be used to communicate in different areas of the economy and in workforce development efforts. This common language provides definitions and concepts for describing worker attributes and workplace requirements that can be widely understood and accepted. Knowledge, skills, and abilities (KSAs), interests, content, and context of work are described in comprehensive terms, and there is a common frame of reference in O*NET for understanding how these characteristics relate to successful job performance. O*NET's common language is intended to

aid those who communicate about jobs in understanding one another, even when operating in different segments of the economy. The goal is for job descriptions and worker requirements to have the same meaning for human resource professionals, employees, educators, and students.

The conceptual foundation of the O*NET database is the Content Model; it provides a framework that identifies the most important types of information about work, integrating them into one system. Information in the model reflects both the character of occupations and of people, and it allows for information to be applied across jobs, sectors, or industries and within occupations. The Content Model was developed using research on job and organizational analysis, and thus has a strong theoretical and empirical foundation.

The Content Model has six domains:

1. Worker Characteristics—enduring characteristics that might influence job performance and the ability to acquire knowledge and skills used for effective work performance; this includes abilities, interests, values, and work styles.

2. Worker Requirements—work-related attributes gained and/or developed through a worker's education or experience; this includes knowledge, experience, and skills (basic skills and cross-functional skills).

3. Experience Requirements—previous activities, linked specifically to certain types of work activities that are required for effective job performance; this includes formal education, certifications, licensures, and training.

4. Occupational Characteristics—global contextual characteristics that define and describe occupations and that may influence requirements for that occupation.

5. Occupational Requirements—detailed information regarding typical activities required in various occupations; generalized work activities (GWAs), or dimensions that summarize the kinds of tasks that may be performed within a single occupation are identified; additionally, information about the context, such as physical and social elements of the work, that may create specific demands on the worker are included.

6. Occupation-Specific Information—elements that apply only to a single occupation or a narrowly defined job family; this domain provides related information available in other areas of the Content Model, but is used when developing specific applications of O*NET information, such as writing a job description.

The O*NET—SOC taxonomy provides the background information for defining different classes of occupations. The information contained in the O*NET—SOC taxonomy is updated every two years with statistics derived from surveys conducted on serving employees. The 2006 update raised the number of occupations to 812.

The U.S. State Department, in conjunction with the National O*NET Center, are introducing translated versions of O*NET to give better access to populations, that do not speak English very well. For example, the U.S. State Department has released the Spanish O*NET 4.0 Database, a translated version that is designed to enable predominantly-Spanish speaking members of the population of the United States to access the latest career information in the country.

BIBLIOGRAPHY

Cassio, Jim. *Career Pathways Handbook*, Career Pathways Publications, 2007.

Hollander, Eran, and Robert, J. Harvey. "Generalizability Theory Analysis of Item-Level O*NET Database Ratings." Available from: http://209.85.141.104/search?q=cache:3eCcVHFt0w4J: harvey.psyc.vt.edu/Documents/SIOP-8-Hollander1.pdf+O*NET+database&hl=en&ct=clnk&cd=10.

U.S. Department of Labor. "Employment and Training Administration." 2007 Available from: http://www.doleta.gov/programs/ONET/glance.cfm.

U.S. Labor Department: Bureau of Labor Statistics. "Occupational Outlook Handbook, 2006-2007." November, 2005.

OFFSHORING

SEE *Outsourcing and Offshoring*

OPEN AND CLOSED SYSTEMS

A system is commonly defined as a group of interacting units or elements that have a common purpose. The units or elements of a system can be cogs, wires, people, computers, and so on. Systems are generally classified as open systems and closed systems and they can take the form of mechanical, biological, or social systems.

Open systems refer to systems that interact with other systems or the outside environment, whereas closed systems refer to systems having relatively little interaction with other systems or the outside environment. For example, living organisms are considered open systems because they take in substances from their environment, such as food and air and return other substances to their environment. Humans, for example, inhale oxygen out of the environment and

exhale carbon dioxide into the environment. Similarly, some organizations consume raw materials in the production of products and emit finished goods and pollution as a result. In contrast, a watch is an example of a closed system in that it is a relatively self-contained, self-maintaining unit that has little interaction or exchange with its environment.

All systems have boundaries, a fact that is immediately apparent in mechanical systems such as the watch, but much less apparent in social systems such as organizations. The boundaries of open systems, because they interact with other systems or environments, are more flexible than those of closed systems, which are rigid, and largely impenetrable.

A closed system perspective views organizations as relatively independent of environmental influences. The closed systems approach conceives of the organization as a system of management, technology, personnel, equipment, and materials, but tends to exclude competitors, suppliers, distributors, and governmental regulators. This approach allows managers and organizational theorists to analyze problems by examining the internal structure of a business with little consideration of the external environment.

The closed-system perspective basically views an organization much as a thermostat; limited environmental input outside of changes in temperature is required for effective operation. Once set, thermostats require little maintenance in their ongoing, self-reinforcing function. While the closed-system perspective was dominant through the 1960s, organization scholarship and research subsequently emphasized the role of the environment. Up through the 1960s, it was not that managers ignored the outside environment such as other organizations, markets, government regulations, and the like, but that their strategies and other decision-making processes gave relatively little consideration to the impact these external forces might have on the internal operations of the organization.

Open systems theory originated in the natural sciences and subsequently spread to fields as diverse as computer science, ecology, engineering, management, and psychotherapy. In contrast to closed systems, the open system perspective views an organization as an entity that takes inputs from the environment, transforms them, and releases them as outputs in tandem with reciprocal effects on the organization itself along with the environment in which the organization operates. That is, the organization becomes part and parcel of the environment in which it is situated and initiates feedback mechanisms to the results achieved by the outputs of the organization on the environment.

As an open-systems approach spread among organizational theorists, managers began incorporating these views into practice. Two early pioneers in this effort, Daniel Katz and Robert Kahn, began viewing organizations as open social systems with specialized and interdependent subsystems and processes of communication, feedback, and management linking the subsystems. Katz and Kahn argued that the closed systems approach fails to take into account how organizations are reciprocally dependent on external environments. For example, environmental forces such as customers and competitors exert considerable influence on corporations, highlighting the essential relationship between an organization and its environment as well as the importance of maintaining external inputs to achieve a stable organization.

Furthermore, the open systems approach serves as a model of business activity; that is, business as a process of transforming inputs to outputs while realizing that inputs are taken from the external environment and outputs are placed into this same environment. Companies use inputs such as labor, funds, equipment, and materials to produce goods or to provide services, and they design their subsystems to attain these goals. These subsystems are thus analogous to cells in the body, the organization itself is analogous to the body, and external market and regulatory conditions are analogous to environmental factors such as the quality of housing, drinking water, air, and availability of nourishment.

The production subsystem, for example, focuses on converting inputs into marketable outputs and often constitutes a primary purpose of a company. The boundary subsystem's goal is to obtain inputs or resources, such as employees, materials, equipment, and so forth, from the environment outside of the company, which are necessary for the production subsystem. This subsystem also is responsible for providing an organization with information about the environment. This adaptive subsystem collects and processes information about a company's operations with the goal of aiding the company's adaptation to external conditions in its environment. Another subsystem, management, supervises and coordinates the other subsystems to ensure that each subsystem functions efficiently. The management subsystem must resolve conflicts, solve problems, and allocate resources, and so on.

To simplify the process of evaluating environmental influences, some organizational theorists use the term "task environment" to refer to aspects of the environment that are immediately relevant to management decisions related to goal setting and goal realization. The task environment includes customers, suppliers, competitors, employees, and regulatory bodies. Furthermore, in contrast to closed-systems, the open-system perspective does not assume that the environment is static. Instead, change is the rule rather than the exception. Consequently, investigation of environmental stability and propensity to change is a key task of a company, making the activities of an organization contingent on various environmental forces.

As an open system, an organization maintains its stability through feedback, which refers to information about outputs that a system obtains as an input from its task environment. The feedback can be positive or negative and can lead to changes in the way an organization transforms inputs to outputs. Collier and Agyei-Ampomah point out that feedback data enable open system organizations to determine the impact of their inputs in the environment and the subsequent action for either maintaining positive impacts or correcting negative impacts.

The difference between closed systems and open systems, then, lies in the complexity of environmental interactions. Closed systems exhibit minimal interaction with the environment because of their tightly guarded and relatively impenetrable boundaries. Consequently, very little information exchange takes place between the organization and the environment in closed systems, a situation that denies management the opportunity to receive feedback from the environment. Moreover, closed systems are generally static and do not provide room for multiple alternatives for accomplishing the same result.

Conversely, open systems such as the human body and modern organizations are more intricately dependent on their environments. Organizations that observe open systems management design their operational strategies along the principles of continuous information exchange, continuous target market evaluation, and multiplicity of alternatives for achieving the same goal. The point is that closed systems and open systems represent a continuum along which organizations are more open or less open to their environments. The key defining variable governing this degree of openness is the complexity of the environment in which the organization is situated.

Managers must take into consideration their organization's position along the open-closed continuum. The Linux computer operating system, for instance, is opensource, and Red Hat, Inc., the corporation selling the bundled revisions—the multiple inputs from geographically dispersed users—represents an organization that would cease to exist if it were not for an open systems perspective. Thus, stable environments with low complexity are more consistent with a relatively closed system or mechanistic management style, while rapidly-changing environments are more consistent with flexible, decentralized, or "organic" management styles.

SEE ALSO *Managing Change*

BIBLIOGRAPHY
Chesbrough, Henry W. *Open Innovation: The New Imperative for Creating and Profiting from Technology.* Boston: Harvard Business School Press, 2003.

Collier, Paul, and Samuel Agyei-Ampomah. *Management Accounting: Risk and Control Strategy.* Elsevier Publishers, 2006.

Defillippi, Robert, Michael Arthur, and Valerie J. Lindsay. *Knowledge at Work: Creative Collaboration in the Global Economy.* Blackwell Publishing, 2006.

Katz, Daniel, and Robert L. Kahn. *The Social Psychology of Organizations.* New York: John Wiley & Sons, 1978.

Prahalad, Coimbatore K., and Venkat Ramaswamy. *The Future of Competition: Co-Creating Unique Value with Customers.* Boston: Harvard Business School Press, 2004.

"Role of Information Technology in Managing Organizational Change and Organizational Interdependence." *Brint.com*, 2007. Avaialable from: http://www.brint.com/papers/change/change.htm.

OPERANT CONDITIONING

Simply put, operant conditioning refers to a systematic program of rewards and punishments to influence behavior or bring about desired behavior. Operant conditioning relies on two basic assumptions about human experience and psychology: (1) a particular act results in an experience that is a consequence of that act, and (2) the perceived quality of an act's consequence affects future behavior. In addition, a central idea of operant conditioning holds that the main influences on behavior are external— that is, it is in a person's external environment that his or her behavior is programmed.

The Harvard psychologist B.F. Skinner pioneered the field of behaviorism in the late 1930s and continued to contribute to it through the mid-1970s. Operant conditioning is one of the key concepts of this school of psychology. Skinner called his brand of conditioning "operant conditioning" to distinguish it from the conditioning theory developed by the Russian physiologist Ivan Pavlov, now referred to as "classical conditioning." Classical conditioning primarily concerned itself with reflexive or unlearned behavior, such as the jerking of a knee upon being tapped with a hammer. In a famous experiment, Pavlov training dogs to salivate in expectation of food at the sound of a bell. Operant conditioning, however, deals with learned, not reflexive behavior; it works by reinforcing (rewarding) and punishing behavior based on the consequences it produces. Reinforcement is used to increase the probability that behavior will occur in the future, whereas punishment aims to decrease that probability. In addition, the process of removing reinforcement from an act is called *extinction*.

Organizational management literature often refers to operant conditioning as part of reinforcement theory and work behavior modification. Unlike other theories of management and motivation, operant conditioning does not rely on attitudes, beliefs, intentions, and motivation for predicting and influencing behavior, although Skinner

and other behaviorists do not suggest that these factors do not exist. Instead, they posit that these notions find their genesis in external conditions and reinforcement. Hence, organizational management theorists who adopt this approach look to external factors—the environment—to explain and influence behavior within the work place. For example, this approach to management views motivation as a product of workers' environments, not as an internal quality of each individual worker's psychological makeup. Therefore, employees are highly motivated whenever quality is reinforced with pay raises, promotions, and other conditions that employees find desirable.

Since most of the behavior taking place in a business is learned rather than reflexive, operant conditioning can be applied to organizational management. Workers learn various kinds of behavior before and after joining a company, and they encounter a host of stimuli in a company setting that can cause them to behave in certain ways with certain consequences. These kinds of behaviors are rewarded and punished depending on their value to a company. The stimuli in the workplace include schedules, corporate structures, company policies, telephone calls, managers, and so on. The consequences of workplace behavior include approval or disapproval from managers and coworkers, promotions, demotions, pay increases, and so forth. When consequences are directly linked to certain kinds of behavior, they are contingent on these kinds of behavior. The classic example is touching a hot stove and experiencing the immediate consequence of being burned.

However, most consequences in a company are only partially contingent on the behavior (performance) of employees, and thus there are often entire networks of relationships between employee behavior and its consequences. These relationships are called *schedules of reinforcement*, and applying operant conditioning to the work place means controlling these schedules.

Reinforcement schedules are either continuous or intermittent (partial). Continuous reinforcement schedules are those situations in which every occurrence of an act is reinforced. In contrast, intermittent schedules are those situations in which only some instances of an act are reinforced. Continuous reinforcement schedules generally facilitate new learning or the acquisition of new skills at the fastest rate. New employees learning how to process customer orders, for example, will learn the proper procedure the fastest if they are reinforced every time they take an order correctly. However, if a continuous schedule is suspended outright after being implemented for any substantial period, the behavior being reinforced might stop altogether. In addition, after a certain kind of behavior has been learned, it will occur more often if reinforced intermittently. Hence, employees who have learned the proper procedure for taking customer orders have the greatest likelihood of continuing to do so correctly if

managers adopt an intermittent schedule after the behavior has been learned.

Moreover, reinforcement can be positive (adding something new, such as a raise or a promotion) or negative (the removal of something from the work environment, such as constant supervision) after new employees demonstrate they have sufficiently learned their jobs. Negative reinforcement, however, should not be confused with punishment, which involves undesirable or aversive consequences and decreases the probability of an act being repeated. Negative reinforcement, rather, is a kind of a reward that removes constraints or other elements from the work environment to encourage employee behavior.

As Nelson and Quick reckon reward systems should have corresponding strategic significance to the organization. Strategically designed reward systems enable organizations to achieve the objectives of motivating behavior and encouraging further accomplishments among employees while advancing the core objectives of the organization at the same time. Managers who adopt a strategic approach in their positive reinforcement actions present employees with rewards that have long–term implications (such as training, educational programs, and awards that demonstrate recognition of achievements made by employees). For example, Marriott International annually honors its best twenty employees with the J. Willard Marriot Award of Excellence.

Organizational behavior modification (OBM) is the most common mode of operant conditioning that is practiced by many organizations because of its relevance to organizational management and wide ranging options for implementation. Social, nonfinancial, and financial reinforcements are the key pillars of the OBM concept. According to Nelson and Quick, a comprehensive review of past research on the impact of OBM in organizations revealed that the concept registered improved performance in organizations in the service and manufacturing sectors that adopted OBM. The review also revealed that monetary-based reinforcement impacted positively on performance more than other forms of rewards and recognition.

Because some behavior is so complex that it does not occur all at once, managers must reinforce progressive approximations of the desired behavior. This process begins with the reinforcement of behavior that may barely resemble the desired behavior, using a continuous reinforcement schedule with a progressive standard. Consequently, behavior must show improvement or greater approximation of the desired behavior to receive reinforcement as time goes on.

When managers wish to discourage certain kinds of behavior or decrease the probability of their occurrence, they can implement a schedule of punishment along the lines of a schedule of reinforcement. Punishment involves

the application of undesirable consequences or the removal of positive consequences following undesired behavior. However, negative consequences must be meted out with consideration of how it will affect individual workers, because what constitutes punishment for one worker may not for another. Ultimately, these consequences or stimuli must be linked to the undesired behavior and decrease the probability of it reoccurring in order for them to constitute punishment in the technical sense of the operant conditioning approach. Moreover, effective punishment usually embodies the following qualities: it is consistent, immediate, impersonal, and contingent on specific behavior. Finally, punishment should be informative— letting employees know why they are being punished— and employees should recognize that future punishment can be avoided by refraining from the undesired behavior.

Operant conditioning has been successfully applied in many settings: clinical, for individual behavior modification, teaching, for classroom management, instructional development, for programmed instruction, and management, for organizational behavior modification.

SEE ALSO *Motivation and Motivation Theory; Organizational Behavior*

BIBLIOGRAPHY

Elfenbein, H.A. "Emotion in Organizations: A Review and Theoretical Integration." *Academy of Management Annals* Vol. 1, December 2007, 316–331.

Geiser, Robert L. *Behavior Mod and the Managed Society.* Boston: Beacon Press, 1976.

Hinkin, T.R., and C.A. Schriesheim. "If You Don't Hear From Me You Know You Are Doing Fine: The Effects of Management Nonresponse to Employee Performance." *Cornell Hotel & Restaurant Administration Quarterly,* November 2004, 362–372.

Lutz, J. *Learning and Memory.* 2nd ed. Long Grove, IL: Waveland Press, 2004.

Malott, R.W., and E.A. Trojan. *Principles of Behavior.* 5th ed. Upper Saddle River, NJ: Pearson/Prentice Hall, 2004.

Nadler, Leonard, and Zeace Nadler. *The Handbook of Human Resource Development.* 2nd ed. New York, NY: John Wiley & Sons, 1990.

Nelson, D.L., and J.C. Quick. *Organizational Behavior.* Thomson: South-Western, 2006.

Pinder, Craig C. *Work Motivation: Theory, Issues, and Applications.* Glenview, IL: Scott, Foresman and Company, 1984.

Skinner, B.F. *About Behaviorism.* New York, NY: Alfred A. Knopf, 1974.

Smith, P., and A. Dyson. "Get with the Programme." *The Safety and Health Practitioner,* December 2004, 38–40.

OPERATING SYSTEMS

A computer's operating system is one of the most important "parts" of the computer. Almost every type of computer— including mobile telephones, video game systems, E-book readers, and DVRs—needs an operating system in order to operate properly. When one turns on a computer, the operating system tells the computer what to do by controlling the system resources such as the processor, memory, disk space, etc. The operating system allows the user to work on the computer without having to know all the details about how the hardware works.

When choosing an operating system for a business, the primary considerations should be the hardware platform used, the number of users and attendant system security requirements, the ease of administration, the adaptability toward different uses, and the different applications that will be employed.

WHAT OPERATING SYSTEMS DO

One of the operating system's main tasks is to control the computer's resources—both the hardware and the software. The operating system allocates resources as necessary to ensure that each application receives the appropriate amount. In addition to resource allocation, operating systems provide a consistent application interface so that all applications use the hardware in the same way. This is particularly important if more than one type of computer uses the operating system or if the computer's hardware is likely to change. By having a consistent application program interface (API), software written on one computer can run on other types of computers. Developers face the challenge of keeping the operating system flexible enough to control hardware from the thousands of different computer manufacturers.

Operating systems must accomplish the following tasks:

1. Processor management. The operating system needs to allocate enough of the processor's time to each process and application so that they can run as efficiently as possible. This is particularly important for multitasking. When the user has multiple applications and processes running, it is up to the operating system to ensure that they have enough resources to run properly.

2. Memory storage and management. The operating system needs to ensure that each process has enough memory to execute the process, while also ensuring that one process does not use the memory allocated to another process. This must also be done in the most efficient manner. A computer has four general types of memory. In order of speed, they are: high-speed cache, main memory, secondary memory, and disk storage. The operating system must balance the needs of each process with the different types of memory available.

3. Device management. Most computers have additional hardware, such as printers and scanners, connected to them. These devices require drivers, or special programs that translate the electrical signals sent from the operating system or application program to the hardware device. The operating system manages the input to and output from the computer. It often assigns high-priority blocks to drivers so that the hardware can be released and available for the next use as soon as possible.

4. Application interface. Programmers use application program interfaces (APIs) to control the computer and operating system. As software developers write applications, they can insert these API functions in their programs. As the operating system encounters these API functions, it takes the desired action, so the programmer does not need to know the details of controlling the hardware.

5. User interface. The user interface sits as a layer above the operating system. It is the part of the application through which the user interacts with the application. Some operating systems, such as Microsoft Windows and Apple Macintosh, use graphical user interfaces. Other operating systems, such as Unix, use shells.

TYPES OF OPERATING SYSTEMS

Most simple, single-function computers (such as in microwave ovens with digital keypads) do not require an operating system. In fact, trying to implement an operating system in these computers would be overkill. On the other hand, all personal desktop and laptop computers and servers do require an operating system. While there are hundreds of operating systems available, the most popular by far are the Microsoft Windows family of operating systems, the Macintosh operating system, and the Unix family of operating systems.

There are four general types of operating systems. Their use depends on the type of computer and the type of applications that will be run on those computers.

1. Real-time operating systems (RTOS) are used to control machinery, scientific instruments, and industrial systems. In general, the user does not have much control over the functions performed by RTOS.

2. Single-user, single-task operating systems allow one user to do one thing at a time. An example of a single-user, single-task operating system is the operating system used by personal digital assistants (PDAs), also known as handheld computers.

3. Single-user, multi-tasking operating systems allow a single user to simultaneously run multiple applica-

tions on their computer. This is the type of operating system found on most personal desktop and laptop computers. Microsoft Windows, Mac OS, and Linux are three well-known examples of this type of system.

4. Multi-user operating systems allow multiple users to simultaneously use the resources on a single computer. Unix is an example of a multi-user operating system.

AVAILABLE OPERATING SYSTEMS

The most popular and widely-known operating system is Windows, a family of operating systems introduced by the Microsoft Corporation in 1985. Windows employs a graphical user interface (GUI), which eliminates the need for the user to learn complex commands. With a GUI, the user instructs the operating system by using a mouse to point and click icons that are displayed on the screen. The first version of Windows, released in November 1985, was designed as a GUI add-on for MS-DOS (short for Microsoft Disk Operating System), Microsoft's original command-line operating system. In order to communicate with the computer, DOS users had to type commands or instructions at a command prompt, and then the command-line interpreter executed those commands. DOS has limited use with modern computer systems and applications because it does not support multiple users or multitasking. It is also not as "user friendly" as a GUI operating system. By the late-1990s, most command-line operating systems had been replaced by user-friendly systems using a GUI.

By the time Windows 3.1 was released in 1991, Windows had gained significantly in market share, and from the mid-1990s on, Microsoft dominated the operating-system market. Microsoft released Windows 95 in August 1995. It was so well marketed and in such high demand that people bought the operating system even if they did not own a home computer. With each new release, from Windows 98 to Windows 2000 to Windows XP to Windows Vista, Microsoft gained popularity. By 2004, Microsoft commanded around 90 percent of the operating-system market. The latest Windows release, Windows Vista, was introduced worldwide in January 2007, five years after the introduction of its predecessor, Windows XP—the longest time between releases of Windows. Vista is only slowly gaining in popularity, while Windows XP remains the world's dominant operating system, commanding 79 percent market share in September 2007 (compared to only 7 percent for Vista).

The second-most popular family of operating systems is the Mac OS. Macintosh is often credited with introducing the GUI-style operating system; Mac OS was not the first graphical user interface, but it was the

first successful one, largely because competitors were so expensive—the Xerox Alto, the first true GUI system, cost $32,000 to build while the Macintosh retailed for $2,500. Because of its relative affordability, it immediately became much more popular than other GUI computers. The first Mac OS, unnamed at the time but now known as "System 1," was introduced in 1984. It had a desktop, windows, icons, a mouse, menus, and scrollbars.

Early versions of the Mac OS could only be used on Apple computers. In 1991, Apple introduced computers with PowerPC hardware; these computers could run either Windows or Mac OS. The latest version of the Mac OS, OS X, was first introduced in 2000. It can be used in computers with both PowerPC and Intel processors, giving it wider applicability and use. However, the Mac OS lags far behind Microsoft Windows. In 2007, it was the world's third-most popular operating system—after Windows XP and Windows Vista—but it commanded only slightly over 3 percent of the operating-system market.

UNIX is a multi-user, multitasking operating system, and was designed to be a small, flexible system used by computer programmers. UNIX is not considered to be very user-friendly for the average person due to its design. However, graphical user interfaces have been developed for UNIX to help alleviate the ease-of-use issue.

Linux is a UNIX variant that runs on several different hardware platforms. Linus Torvalds, a student at the University of Helsinki in Finland, initially created it as a hobby. The kernel, at the heart of all Linux systems, is developed and released under the General Public License (GNU), and its source code is freely available to everyone. There are now hundreds of companies, organizations, and individuals that have released their own versions of operating systems based on the Linux kernel.

Because of its functionality, adaptability, and robustness, Linux is able to compete against the Unix and Microsoft operating systems. IBM, Hewlett-Packard, and other computer giants have embraced Linux and support its ongoing development. More than a decade after its initial release, Linux is being adopted worldwide mainly as a server platform. More and more people are starting to use Linux as a home and office desktop operating system. The operating system can also be incorporated directly into microchips in a process called "embedding." Many appliances and devices are now starting to use operating systems in this way.

SEE ALSO *Computer-Integrated Manufacturing; Computer Networks; Computer Security; Data Processing and Data Management; Management Information Systems*

BIBLIOGRAPHY

Anderson, Laurence. "History of Mac OS." *Amacgenius.com* 1 November 2005. Available from: http://amacgenius.com/archive/125/.

Coustan, Dave, and Curt Franklin. *How Operating Systems Work.* How Stuff Works, Inc., 2005. Available from: http://computer.howstuffworks.com/operating-system.htm.

"IT Facts for OS." Available from: http://www.itfacts.biz/category/os.

What is Linux? Linux Online. Available from: http://www.linux.org.

OPERATIONS MANAGEMENT

Operations management is the planning, scheduling, and control of the activities that transform inputs (raw materials and labor) into outputs (finished goods and services). Along with marketing and finance, it is one of the three main areas of any business. Operations management is also an academic field of study that focuses on the effective planning, scheduling, use, and control of a manufacturing or service firm and their operations. Operations management is concerned with the efficiency and effectiveness of a firm's operation in support and development of the firm's strategic goals. Other areas of concern to operations management include the design and operations of systems to provide goods and services.

Operations management is a broad framework that includes a set of recognized and well-developed concepts, tools, and techniques. While the term operations management conjures up views of manufacturing environments, many of these concepts have been applied in service settings, with some of them actually developed specifically for service organizations. The field is a synthesis of concepts derived from design and industrial engineering, management information systems, quality, production, and inventory management, accounting, and other functions.

HISTORY OF OPERATIONS MANAGEMENT

During the early Industrial Revolution, manufacturing was often more of an art than a science. This changed with the development of Frederick W. Taylor's method of scientific management and Henry Ford's moving assembly line. These innovations brought the world into an age where management was predominantly centered on the production of goods. In the late 1950s and early 1960s scholars moved from writing about industrial engineering and operations research into writing about production management. Production management had itself become a professional field as well as an academic discipline. As the U.S. economy evolved into a service economy and operations techniques began to be incorporated into

services, the term *production/operations management* came into use. Today, services are such a pervasive part of our life that the term *operations management* is used almost exclusively.

The field of operations management has been gaining increased recognition over the last two decades. One major reason for this is public awareness of the success of Japanese manufacturers and the perception that the quality of many Japanese products is superior to that of American manufacturers. As a result, many businesses have come to realize that the operations function is just as important to their firm as finance and marketing. In concert with this, firms now realize that in order to compete effectively in the global market, they must have an operations strategy to support the mission of the firm and its overall corporate strategy.

Another reason for greater awareness of operations management is the increased application of operations management concepts and techniques to service operations. Finally, operations management concepts are being applied to other functional areas such as marketing and human resources. The term *marketing/operations interface* is often used in twenty-first century management discussions.

WHAT OPERATIONS MANAGERS DO

While operations management may sound like it focuses solely on the mechanics of production, operations managers must actually answer questions on three different levels: the strategic level, the tactical level, and the operational level.

Strategic Level. At the strategic level (long term), operations managers are responsible for or associated with making decisions in four key areas:

- Product development—what shall we make?

- Process and layout decisions—how shall we make it?

- Site location—where will we make it?

- Capacity—how much do we need?

Tactical Level. At the tactical level (intermediate term), operations management addresses the issues relevant to efficiently scheduling material and labor within the constraints of the firm's strategy and making aggregate planning decisions. Operations managers have a hand in deciding employee levels (How many workers do we need and when do we need them?), inventory levels (When should we have materials delivered and should we use a chase strategy or a level strategy?), and capacity (How many shifts do we need and do we need to work overtime or subcontract some work?).

Operational Level. At the operational level, operations management is concerned with lower-level (daily/weekly/monthly) planning and control. Operations managers and their subordinates must make decisions regarding scheduling (What should we process and when should we process it?), sequencing (In what sequence should we process the orders?), loading (What order do we put an item on what machine?), and work assignments (To whom do we assign individual machines or processes?).

A MULTI-FACETED FIELD

Originally, operations managers required only knowledge about productive processes. Today's operations managers must not only have knowledge of advanced operations technology and technical knowledge relevant to their industry, they must also possess interpersonal skills as well as know about other functional areas within the firm. Operations managers must have the ability to manage projects, work on multidisciplinary teams, communicate effectively, and motivate other people. The authors of *Managing Business Process Flows* (2008) describe the scope of operations management as encompassing these multidisciplinary areas:

- Supply Chains—management of all aspects of providing goods to a consumer from extraction of raw materials to end-of-life disposal.

- Operations Management/Marketing Interface—determining what customers value prior to product development.

- Operations Management/Finance Interface—capital equipment and inventories comprise a sizable portion of many firms' assets.

- Service Operations—coping with inherent service characteristics such as simultaneous delivery/consumption, performance measurements, etc.

- Operations Strategy—consistent and aligned with firm's other functional strategies.

- Process Design and Improvements—managing the innovation process.

The authors of *Fundamentals of Operations Management* suggested that the following issues are the major issues for operations management today:

- Reducing the development and manufacturing time for new goods and services

- Achieving and sustaining high quality while controlling cost

- Integrating new technologies and control systems into existing processes

- Obtaining, training, and keeping qualified workers and managers

- Working effectively with other functions of the business to accomplish the goals of the firm

- Integrating production and service activities at multiple sites in decentralized organizations

- Working effectively with suppliers at being user-friendly for customers

- Working effectively with new partners formed by strategic alliances

All of the areas encompassed by operations management are critical to any firm no matter the industry or sector. No longer is operations management considered subservient to marketing and finance; rather, it is a legitimate functional area within most organizations. Also, operations management can no longer focus on isolated tasks and processes but must be one of the architects of the firm's overall business model. The importance of these concerns can be seen in the rise and popularity of various operations doctrines, from Six Sigma and lean manufacturing to total quality management.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Management Functions; Operations Strategy; Product Design; Production Planning and Scheduling; Product-Process Matrix; Service Operations; Supply Chain Management*

BIBLIOGRAPHY

Anupindi, Ravi, Sunil Chopra, Sudhakar D. Deshmukh, Jan A. Van Mieghem, and Eitan Zemel. *Managing Business Process Flows: Principles of Operations Management.* 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2008.

Davis, Mark M., Nicholas J. Aquilano, and Richard B. Chase. *Fundamentals of Operations Management.* 4th ed. Boston: Irwin McGraw-Hill, 2003.

Finch, Byron. *Operations Now.* 2nd ed., Boston: McGraw-Hill Irwin, 2006.

Heizer, Jay, and Barry Render. *Principles of Operations Management.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Rainbird, Mark. "A Framework for Operations Management: The Value Chain." *International Journal of Operations and Production Management* 34, no. 3/4 (2004): 337–345.

Raturi, Amitabh, and James R. Evans. *Principles of Operations Management.* Mason, OH: Thomson Southwestern, 2005.

OPERATIONS SCHEDULING

Scheduling pertains to establishing both the timing and use of resources within an organization. Under the operations function (both manufacturing and services), sched-

uling relates to use of equipment and facilities, the scheduling of human activities, and receipt of materials.

While issues relating to facility location and plant and equipment acquisition are considered long-term and aggregate planning is considered intermediate term, operations scheduling is considered to be a short-term issue. As such, in the decision-making hierarchy, scheduling is usually the final step in the transformation process before the actual output (e.g., finished goods) is produced. Consequently, scheduling decisions are made within the constraints established by these longer-term decisions. Generally, scheduling objectives deals with tradeoffs among conflicting goals for efficient utilization of labor and equipment, lead time, inventory levels, and processing times.

There are two general approaches to scheduling: forward scheduling and backward scheduling. As long as the concepts are applied properly, the choice of methods is not significant. In fact, if process lead times (move, queue, and setup times) add to the job lead time and process time is assumed to occur at the end of process time, then forward scheduling and backward scheduling yield the same result. With forward scheduling, the scheduler selects a planned order release date and schedules all activities from this point forward in time.

With backward scheduling, the scheduler begins with a planned receipt date or due date and moves backward in time, according to the required processing times, until he or she reaches the point where the order will be released.

Of course there are variables to consider other than due dates or shipping dates. Other factors that directly impact the scheduling process include: the types of jobs to be processed and the different resources that can process each, process routings, processing times, setup times, changeover times, resource availability, number of shifts, downtime, and planned maintenance.

LOADING

Loading involves assigning jobs to work centers and to various machines in the work centers. If a job can be processed on only one machine, no difficulty is presented. However, if a job can be loaded on multiple work centers or machines, and there are multiple jobs to process, the assignment process becomes more complicated. The scheduler needs some way to assign jobs to the centers in such a way that processing and setups are minimized along with idle time and throughput time.

Two approaches are used for loading work centers: infinite loading and finite loading. With infinite loading, jobs are assigned to work centers without regard for capacity of the work center. Priority rules are appropriate for use under the infinite loading approach. Jobs are

loaded at work centers according to the chosen priority rule. This is known as vertical loading.

Finite loading projects the actual start and stop times of each job at each work center. Finite loading considers the capacity of each work center and compares the processing time so that process time does not exceed capacity. With finite loading, the scheduler loads the job that has the highest priority on all work centers it will require. Then the job with the next highest priority is loaded on all required work centers, and so on. This process is referred to as horizontal loading. The scheduler using finite loading can then project the number of hours each work center will operate. A drawback of horizontal loading is that jobs may be kept waiting at a work center, even though the work center is idle. This happens when a higher priority job is expected to arrive shortly. The work center is kept idle so that it will be ready to process the higher priority job as soon as it arrives. With vertical loading the work center would be fully loaded. Of course, this would mean that a higher priority job would then have to wait to be processed since the work center was already busy. The scheduler will have to weigh the relative costs of keeping higher priority jobs waiting, the cost of idle work centers, the number of jobs and work centers, and the potential for disruptions, new jobs, and cancellations.

If the firm has limited capacity (e.g., already running three shifts), finite loading would be appropriate since it reflects an upper limit on capacity. If infinite loading is used, capacity may have to be increased through overtime, subcontracting, or expansion or work may have to be shifted to other periods or machines.

SEQUENCING

Sequencing is concerned with determining the order in which jobs are processed. Not only must the order be determined for processing jobs at work centers, but also for work processed at individual work stations. When work centers are heavily loaded and lengthy jobs are involved, the situation can become complicated. The order of processing can be crucial when it comes to the cost of waiting to be processed and the cost of idle time at work centers.

There are a number of priority rules or heuristics that can be used to select the order of jobs waiting for processing. Some well-known ones are presented in a list adapted from Vollmann, Berry, Whybark, and Jacobs:

- Random (R). Pick any job in the queue with equal probability. This rule is often used as a benchmark for other rules.

- First come/first served (FC/FS). This rule is sometimes deemed to be fair since jobs are processed in the order in which they arrive.

- Shortest processing time (SPT). The job with the shortest processing time requirement goes first. This rule tends to reduce work-in-process inventory, average throughput time, and average job lateness.

- Earliest due date (EDD). The job with the earliest due date goes first. This seems to work well if the firm performance is judged by job lateness.

- Critical ratio (CR). To use this rule, one must calculate a priority index using the formula (due date − now)/(lead time remaining). This rule is widely used in practice.

- Least work remaining (LWR). An extension of SPT, this rule dictates that work be scheduled according to the processing time remaining before the job is considered to be complete. The less work remaining in a job, the earlier it is in the production schedule.

- Fewest operations remaining (FOR). This rule is another variant of SPT; it sequences jobs based on the number of successive operations remaining until the job is considered complete. The fewer operations that remain, the earlier the job is scheduled.

- Slack time (ST). This rule is a variant of EDD; it utilizes a variable known as slack. Slack is computed by subtracting the sum of setup and processing times from the time remaining until the job's due date. Jobs are run in order of the smallest amount of slack.

- Slack time per operation (ST/O). This is a variant of ST. The slack time is divided by the number of operations remaining until the job is complete with the smallest values being scheduled first.

- Next queue (NQ). NQ is based on machine utilization. The idea is to consider queues (waiting lines) at each of the succeeding work centers at which the jobs will go. One then selects the job for processing that is going to the smallest queue, measured either in hours or jobs.

- Least setup (LSU). This rule maximizes utilization. The process calls for scheduling first the job that minimizes changeover time on a given machine.

These rules assume that setup time and setup cost is independent of the processing sequence. However, this is not always the case. Jobs that require similar setups can reduce setup times if sequenced back to back. In addition to this assumption, the priority rules also assume that setup time and processing times are deterministic and not variable, there will be no interruptions in processing, the set of jobs is known, no new jobs arrive after processing begins, and no jobs are canceled. While little of this is true in practice, it does make the scheduling problem manageable.

GANTT CHARTS

Gantt charts are named for Henry Gantt, a management pioneer of the early twentieth century. He proposed the use of a visual aid for loading and scheduling. Appropriately, this visual aid is known as a Gantt chart. This Gantt chart is used to organize and clarify actual or intended use of resources within a time framework. Generally, time is represented horizontally with scheduled resources listed vertically. Managers are able to use the Gantt chart to make trial-and-error schedules to get some sense of the impact of different arrangements.

There are a number of different types of Gantt charts, but the most common ones, and the ones most appropriate to our discussion, are the load chart and schedule chart. A load chart displays the loading and idle times for machines or departments; this shows when certain jobs are scheduled to start and finish and where idle time can be expected. This can help the scheduler redo loading assignments for better utilization of the work centers. A schedule chart is used to monitor job progress. On this type of Gantt chart, the vertical axis shows the orders or jobs in progress while the horizontal axis represents time. A quick glance at the chart reveals which jobs are on schedule and which jobs are on time.

Gantt charts are the most widely used scheduling tools. However, they do have some limitations. The chart must be repeatedly updated to keep it current. Also, the chart does not directly reveal costs of alternate loadings nor does it consider that processing times may vary among work centers.

SCHEDULING SERVICE OPERATIONS

The scheduling of services often encounters problems not seen in manufacturing. Much of this is due to the nature of service (i.e., the intangibility of services and the inability to inventory or store services and the fact that demands for services are usually random.) Random demand makes the scheduling of labor extremely difficult as seen in restaurants, movie theaters, and amusement parks. Since customers do not like to wait, labor must be scheduled so that customer wait is minimized. This sometimes requires the use of queuing theory or waiting-line theory. Queuing theory uses estimate arrival rates and service rates to calculate an optimum staffing plan. In addition, flexibility can often be built into the service operation through the use of casual labor, on-call employees, and cross-training.

Scheduling of services can also be complicated when it is necessary to coordinate and schedule more than one resource. For example, when hospitals schedule surgery, not only is the scheduling of surgeons involved but also the scheduling of operating room facilities, support staff, and special equipment. Along with the scheduling of classes, universities must also schedule faculty, classrooms, labs, audiovisual and computer equipment, and students. To further complicate matters, cancellations are also common and can add further disruption and confusion to the scheduling process.

Instead of scheduling labor, service firms frequently try to facilitate their service operations by scheduling demand. This is done through the use of appointment systems and reservations. This trend is particularly evident in service companies such as airlines and hotels which have adopted the increased use of electronic reservations systems to register demand, track cancellations and determine the supply of services. Advance reservations systems enable companies to significantly reduce random demand, customer wait times, and difficulties in scheduling of labor.

The increased use of electronic reservation systems by businesses has prompted governments and regional bodies around the world to respond by reviewing regulations that govern computerized reservations. In 2008 the Transport Committee of the European Union Parliament offered its full support to proposals by the European Union Commission to replace the old rules that govern Computerized Reservations Systems with new ones. This move was geared towards modernizing regulations and optimizing opportunities for air travel companies and agencies operating within European Union member countries.

Therefore, it is important for managers to pursue technological options when seeking remedies for different problems and difficulties that characterize operations scheduling. In fact, the use of technological alternatives—including software applications and electronic scheduling of services—reduce the levels of labor intensity of operations to the advantage of the company.

Robert Bylett suggests that the use of operations checklist is an effective system for ensuring that all the activities of a business organization are run according to planned sequence and set limits. For example, an operations checklist in a restaurant business facilitates the identification of daily activities, general activities, and special events of the restaurant. Subsequently, it enables employees to execute assigned duties according to the set guidelines, thereby eliminating probabilities of customer delays or wastage of resources.

BIBLIOGRAPHY

Bylett, Robert. "Why You Need a Restaurant Operations Checklist." *Best Management Articles* 11 November 2007. Available from: http://operations-management.bestmanagementarticles.com/Article.aspx?id.

Finch, Byron. *Operations Now: Profitability, Processes, Performance.* Boston: McGraw-Hill Irwin, 2006.

Hurtubise, Stephanie, Claude Olivier, and Ali Gharbi. "Planning Tools for Managing the Supply Chain." *Computers & Industrial Engineering* 46 (2004): 763–779.

Kreipl, Stephan, and Michael Pinedo. "Planning and Scheduling in Supply Chains: An Overview of Issues in Practice." *Production and Operations Management* 13, no. 1 (2004): 77–92.

"MEPs Back Review of Air Ticket Reservations Rules." *EurActiv.com* 30 May 2008. Available from: http://www.euractiv.com/en/transport/meps-back-review-air-ticket-reservation-rules/article-172866

Raturi, Amitabh S., and James R. Evans. *Principles of Operations Management.* Mason, OH: Thomson South-Western, 2005.

Stevenson, William J. *Production and Operations Management.* 8th ed. Boston: Irwin/McGraw-Hill, 2005.

Vollmann, Thomas E., William L. Berry, D. Clay Whybark, and F. Robert Jacobs. *Manufacturing Planning and Control for Supply Chain Management.* 5th ed. Boston: McGraw-Hill Irwin, 2005.

OPERATIONS STRATEGY

After collectively considering the products and services demanded by customers, strengths and weaknesses of competitors, the environment, and the firm's own strengths, weaknesses, cultures, and resources, proficient firms can formulate their vision as expressed through the mission statement. This statement expresses the organization's values and aspirations; basically its reason or purpose for existence. Based on this mission statement the firm will formulate its business strategy. This business strategy is a long-term plan for accomplishing the mission set forth in the mission statement. Each function within the business can then derive its own strategy in support of the firm's overall business strategy (financial strategy, marketing strategy, and operations strategy).

Operations strategy is the collective concrete actions chosen, mandated, or stimulated by corporate strategy. It is, of course, implemented within the operations function. This operations strategy binds the various operations decisions and actions into a cohesive consistent response to competitive forces by linking firm policies, programs, systems, and actions into a systematic response to the competitive priorities chosen and communicated by the corporate or business strategy. In simpler terms, the operations strategy specifies how the firm will employ its operations capabilities to support the business strategy.

Operations strategy has a long-term concern for how to best determine and develop the firm's major operations resources so that there is a high degree of compatibility between these resources and the business strategy. Very broad questions are addressed regarding how major resources should be configured in order to achieve the firm's corporate objectives. Some of the issues of relevance include long-term decisions regarding capacity, location, processes, technology, and timing.

The achievement of world-class status through operations requires that operations be integrated with the other functions at the corporate level. In broad terms, an operation has two important roles it can play in strengthening the firm's overall strategy. One option is to provide processes that give the firm a distinct advantage in the marketplace. Operations will provide a marketing edge through distinct, unique technology developments in processes that competitors cannot match.

The second role that operations can play is to provide coordinated support for the essential ways in which the firm's products win orders over their competitors, also known as distinctive competencies. The firm's operations strategy must be conducive to developing a set of policies in both process choice and infrastructure design (controls, procedures, systems, etc.) that are consistent with the firm's distinctive competency. Most firms share access to the same processes and technology, so they usually differ little in these areas. What is different is the degree to which operations matches its processes and infrastructure to its distinctive competencies.

KEY SUCCESS FACTORS

Industries have characteristics or strategic elements that affect their ability to prosper in the marketplace (i.e., attributes, resources, competencies, or capabilities). The ones that most affect a firm's competitive abilities are called key success factors (KSFs). These KSFs are actually what the firm must be competent at doing or concentrating on achieving in order to be competitively and financially successful; they could be called prerequisites for success. In order to determine their own KSFs, a firm must determine a basis for customer choice. In other words, how do customers differentiate between competitors offering the same or similar products or services and how will the firm distinguish itself from these competitors? Once this is determined, the firm has to decide what resources and competitive capabilities it needs in order to compete successfully, and what will it take to achieve a sustainable competitive advantage. These KSFs can be related to technology, operations, distribution, marketing, or to certain skills or organizational capability. For example, the firm may derive advantages from superior ability to transform material or information (technology or operations), to quickly master new technologies and bring processes online (technology or organizational capability), or to quickly design and introduce new products, service a broad range of products, customize products or services on demand, or provide short lead times (skills).

The set of KSFs that are delegated totally or substantially to the operations function has been termed the *manufacturing mission.* It represents what top management expects from operations in terms of its strategic contribution.

All decisions made relative to system design, planning, control and supervision must aim at accomplishing the manufacturing mission. As such, the manufacturing mission is the principal driver of the operations function and gives it its reason for existence. All world-class manufacturers have an explicit, formal manufacturing mission.

From the manufacturing mission the operations function derives its distinctive competencies (also called competitive priorities or competitive weapons). Distinctive competence is defined as the characteristic of a given product/service or its producing firm that causes the buyer to purchase it rather than the similar product/service of a competitor. It is generally accepted that the distinctive competencies are cost/price, quality, flexibility, and service/time. Various experts include other competencies, such as location, but these can usually be categorized within one of the generally accepted four. Some experts also feel that innovation is quickly becoming a fifth distinctive competency, if it hasn't already. It should be noted that a firm's position on the product-process matrix is a controlling factor for the manufacturing mission and the firm's competitive priority or priorities.

DISTINCTIVE COMPETENCIES

Details relative to each distinctive competency are provided, along with the implications of each and some examples.

Price/Cost. A firm competing on a price/cost basis is able to provide consumers with an in-demand product at a price that is competitively lower than that offered by firms producing the same or similar good/service. In order to compete on a price basis, the firm must be able to produce the product at a lesser cost or be willing to accept a smaller profit margin. Firms with this competency are generally in a position to mass produce the product or service, thereby giving the firm economies of scale that drive the production cost per unit down considerably. Commodity items are mass-produced at such volume that they utilize a continuous process, thus deriving tremendous economies of scale and very low prices Consumers purchasing commodity-type products are usually not greatly aware of brand difference, and will buy strictly on the basis of price; e.g., as long as it is a major brand of gasoline and location is not a factor, consumers will opt for the lowest price. Wal-Mart is able to offer low prices by accepting a lower profit margin per unit sold. Their tremendous volume more than makes up for the lower profit margin.

Quality. David Garvin lists eight dimensions of quality as follows:

- Performance. Performance refers to a product's primary operating characteristics. For an automobile this could mean fast acceleration, easy handling, a smooth ride, or good gas mileage. For a television it could mean bright color, clarity, sound quality, or the number of channels it can receive. For a service this could merely mean attention to details or prompt service.

- Conformance. Conformance is the degree to which a product's design and operating characteristics meet predetermined standards. When a manufacturer utilizing coils of steel receives a shipment from the mill, it checks the width of the coil, the gauge (thickness) of the steel, and the weight of the coil, and puts a sample on a Rockwell hardness tester to check that the specified hardness has been provided. The receiving inspector will also check to see if specified characteristics are met (e.g., hot-rolled, pickled, and oiled). Services may have conformance requirements when it comes to repair, processing, accuracy, timeliness, and errors.

- Features. Features are the bells and whistles of a product or service. In other words, they are the characteristics that supplement the basic function of the product or service. Desirable, but not absolutely necessary, features on a VCR include four heads, slow-motion capability, stereo or surround sound, split screens or inset screens, and 365-day programming ability. Service examples include free drinks on an airline flight or free delivery of flowers.

- Durability. Durability is defined as mean time until replacement. In other words, how long does the product last before it is worn out or has to be replaced because repair is impossible? For some items, such as light bulbs, repair is impossible and replacement is the only available option. Durability may be had by use of longer life materials or improved technology processes in manufacturing. One would expect home appliances such as refrigerators, washer and dryers, and vacuum cleaners to last for many years. One would also hope that a product that represents a significant investment, such as an automobile, would have durability as a primary characteristic of quality.

- Reliability. Reliability refers to a product's mean time until failure or between failures. In other words, the time until a product breaks down and has to be repaired, but not replaced. This is an important feature for products that have expensive downtime and maintenance. Businesses depend on this characteristic for items such as delivery trucks and vans, farm equipment and copy machines since their failure could conceivably shut down the business altogether.

- Serviceability. Serviceability is defined by speed, courtesy, competence and ease of repair. This can be an extremely important characteristic as witnessed by the proliferation of toll-free hot lines for customer service. A number of years ago, a major television manufacturer advertised that its product had its "works in a box." This meant that the television set was assembled out of modular units. Whenever there were problems with the set, a repairman making a house call simply had to replace the problem module, making the product easily and quickly serviceable.

- Aesthetics. A product's looks, feel, smell, sound, or taste are its aesthetic qualities. Since these characteristics are strictly subjective and captive to preference, it is virtually impossible to please everyone on this dimension.

- Perceived Quality. Perceived quality is usually inferred from various tangible and intangible aspects of the product. Many consumers assume products made in Japan are inherently of high quality due to the reputation of Japanese manufacturers, whereas 50 years ago, the perception was the complete opposite. Other characteristics such as high price or pleasing aesthetics may imply quality.

Firms competing on this basis offer products or services that are superior to the competition on one or more of the eight dimensions. Obviously, it would be undesirable if not impossible for firms to compete on all eight dimensions of quality at once. This would be prohibitively expensive, and there are some limitations imposed by trade-offs that must be made due to the nature of the product. For example, a firm may sacrifice reliability in order to achieve maximum speed.

Service. Service can be defined in a number of ways. Superior service can be characterized by the term "customer service" or it could mean rapid delivery, on-time delivery, or convenient location.

Flexibility. Firms may compete on their ability to provide either flexibility of the product or volume. Firms that can easily accept engineering changes (changes in the product) offer a strategic advantage to their customers. Also, some firms are able to absorb wide fluctuations in volume allowing customers with erratic demand the luxury of not holding excessive inventories in anticipation of change in demand.

Tradeoffs. Firms usually focus on one distinctive competency (rarely more than two). For some competencies there are tradeoffs involved. An automobile manufacturer producing a product that is considered to be of high quality (leather seats, real wood trim, and an outstanding service package) will not be able to compete on a cost/price basis as the cost of manufacture prohibits it. An automotive parts house would like to keep their customers happy by offering the lowest prices possible. However, if the automotive parts house also wants to be able to fill almost every single order from walk-in customers, it must maintain an extensive inventory. The expense of this inventory could preclude the parts house from offering prices competitive with other similar firms not choosing to provide this level of service. Therefore, one parts house is competing on the basis of service (but not cost/price) while the other is competing on the basis of cost/price (but not service). The customer may have to wait a few days to get the desired part; if the customer cannot wait, he or she can pay more and purchase the part immediately from the competitor.

THE NEED FOR AN OPERATIONS STRATEGY

In too many instances, a firm's operations function is not geared to the business's corporate objectives. While the system itself may be good, it is not designed to meet the firm's needs. Rather, operations is seen as a neutral force, concerned solely with efficiency, and has little place within the corporate consciousness. Steven C. Wheelwright and Robert H. Hayes described four generic roles that manufacturing can play within a company, from a strategic perspective. While they specifically discuss the manufacturing function, the term operations can be substituted with no loss in relevance. These generic roles are labeled stages 1 to 4, as explained below.

Stage 1 firms are said to be internally neutral, meaning that the operations function is regarded as being incapable of influencing competitive success. Management, thereby, seeks only to minimize any negative impact that operations may have on the firm. One might say that operations maintain a reactive mode. When strategic issues involving operations arise, the firm usually calls in outside experts.

Stage 2 firms are said to be externally neutral, meaning they seek parity with competitors (neutrality) by following standard industry practices. Capital investments in new equipment and facilities are seen as the most effective means of gaining competitive advantage.

Stage 3 firms are labeled internally supportive, that is, operations' contribution to the firm is dictated by the overall business strategy but operations has no input into the overall strategy. Stage 3 firms do, however, formulate and pursue a formal operations strategy.

Stage 4 firms are at the most progressive stage of operations development. These firms are said to be externally supportive. Stage 4 firms expect operations to make an important contribution to the competitive success of the organization. An operation is actually involved in

major marketing and engineering decisions. They give sufficient credibility and influence to operations so that its full potential is realized. Firms within Stage 4 are known for their overall manufacturing capability.

Since the bulk of many, if not all, firms have the bulk of their labor force and assets tied to the operations function, it makes sense for most firms to strive for a position in Stage 3 or Stage 4. Firms can, of course, evolve from one stage to the next with few, if any, skipping a stage. In fact, most outstanding firms are in Stage 3, as Stage 4 is extremely difficult to reach.

The need for an operations strategy that reflects and supports the corporate strategy is not only crucial for the success of the corporate strategy but also because many decisions are structural in nature. In other words, the results are not easily changed. The firm could be locked into a number of operations decisions, which could take years to change if the need arose. These could range from process investment decisions to human resource management practices. For example, Dell runs a complete chain of operations that links all the key stakeholders right from the customers to the suppliers. In effect, Dell records huge volumes of profits as a result of high levels of responsiveness and product success.

Firms that fail to fully exploit the strategic power of operations will be hampered in their competitive abilities and vulnerable to attack from those competitors who do exploit their operations strategy. To do this effectively, operations must be involved throughout the whole of the corporate strategy.

Bell Helicopter has demonstrated success in incorporating its operations strategy into the overall corporate strategy of the organization. In 2008, the global leader in aircraft manufacturing announced the rationalization of the company's product line through concentrating on the production of the popular models that are in high demand. The management of Bell Helicopters projects to yield significant increase in the production capacity of the company and subsequent increase in its capacity to meet customer demands from this pragmatic strategy.

Corporate executives have tended to assume that strategy has only to do with marketing initiatives. They erroneously make the assumption that operation's role is strictly to respond to marketing changes rather than make inputs into them. Secondly, corporate executives assume that operations have the flexibility to respond positively to changing demands. These assumptions place unrealistic demands upon the operations function. Moreover, some target markets lack the fundamentals of capitalism such as free flow of information. It is therefore incumbent upon corporate executives to pursue operational strategies that create competitive advantage through innovation and increased research and development. For example, Apple

iTunes draws the majority of its market share through strategic and persistent pursuit of competitive advantage.

Operations management's attention must increasingly be toward strategy. The balance and direction of its activity should reflect its impact on the firm's performance toward achieving its goals through its strategy, and on the performance of operations itself, recognizing that both need to be done well. Linda Nielsen-Englyst recommends a four-phase process for formulating and updating operations strategy: learning, reviewing, aligning, and redirecting. Phase one is a learning stage where alternatives to the intended strategy are evaluated in practice. Phase two involves reviewing alternatives over time, allowing ideas to grow and mature. Phase three, the alignment stage, is an analytical process where the firm attempts to identify and document financial rationale for changing the intended strategy. Finally, in the redirecting phase, the firm tests its ideas in practice through local initiatives.

In an article titled *Operational Strategy: Bold Moves, Break out Performance*, Tom Godward and Mark Deck suggest that successful management of operations strategy requires facilitation and integration of key organizational factors that include management systems, organizational culture, information and technology systems, and process innovation. The availability and proper utilization of the key organizational dynamics go a long way in determining the probabilities of success of the operational strategies and the entire corporate strategies of the organization.

BIBLIOGRAPHY

Alptekinoglu, Aydin, and Charles J. Corbett. "Mass Customization vs. Mass Production: Variety and Price Competition." *Manufacturing and Service Operations Management.* 10, no. 2, (2008): 204—279.Available from: http://msom.journal. informs.org/cgi/content/abstract/10/2/204.

"Bell Helicopter Continues to See Large Demand for Products." 29 May 2008. Available from: http://www.bellhelicopter.com/ en/company/pressReleases/PR_08_0529_BellSeesContinued Demand.cfm.

Garvin, David A. "Competing on the Eight Dimensions of Quality." *Harvard Business Review*, November-December 1987, 101—109.

Godward, Tom, and Mark Deck. "Operational Strategy: Bold Moves, Breakout Performance." 2008. Available from: http:// www.prtm.com/strategiccategory.aspx?id=77&langtype=1033.

Lewis, Michael A. "Analysing Organisational Competence: Implications for the Management of Operations," *International Journal of Operations and Production Management.* 23, no. 7, (2003): 731—756.

———.*Manufacturing Strategy: Text and Cases,* 3rd ed. Homewood, IL: Irwin, 2000.

Neilslen-Englyst, Linda. "Operations Strategy Formation—A Continuous Process," *Integrated Manufacturing Systems*, 14, no. 8, (2003) 677—685.

Wheelwright, Steven C., and Robert H. Hayes. "Competing Through Manufacturing." *Harvard Business Review*, January-February 1985, 99—109.

OPPORTUNITY COST

An opportunity cost is defined as the value of a forgone activity or alternative when another item or activity is chosen. Opportunity cost comes into play in any decision that involves a tradeoff between two or more options. It is expressed as the relative cost of one alternative in terms of the next-best alternative. Opportunity cost is an important economic concept that finds application in a wide range of business decisions.

Opportunity costs are often overlooked in decision making. For example, to define the costs of a college education, a student would probably include such costs as tuition, housing, and books. These expenses are examples of accounting or monetary costs of college, but they by no means provide an all-inclusive list of costs. There are many opportunity costs that have been ignored: (1) wages that could have been earned during the time spent attending class, (2) the value of four years' job experience given up to go to school, (3) the value of any activities missed in order to allocate time to studying, and (4) the value of items that could have been purchased with tuition money or the interest the money could have earned over four years.

These opportunity costs may have significant value even though they may not have a specific monetary value. The decision maker must often subjectively estimate opportunity costs. If all options were purely financial, the value of all costs would be concrete, such as in the example of a mutual fund investment. If a person invests $10,000 in Mutual Fund ABC for one year, then he forgoes the returns that could have been made on that same $10,000 if it was placed in stock XYZ. If returns were expected to be 17 percent on the stock, then the investor has an opportunity cost of $1,700. The mutual fund may only expect returns of 10 percent ($1,000), so the difference between the two is $700.

This seems easy to evaluate, but what is actually the opportunity cost of placing the money into stock XYZ? The opportunity cost may also include the peace of mind for the investor in having his money invested in a professionally managed fund, compared to the sleep lost after watching his stock fall 15 percent in the first market correction while the mutual fund's losses were minimal. The values of these aspects of opportunity cost are not so easy to quantify. It should also be noted that an alternative is only an opportunity cost if it is a realistic option at that time. If it is not a feasible option, it is not an opportunity cost.

Opportunity-cost evaluation has many practical business applications, because opportunity costs will exist as long as resource scarcity exists. The value of the next-best alternative should be considered when choosing among production possibilities, calculating the cost of capital, analyzing comparative advantages, and even choosing which product to buy or how to spend time. According to Kroll, there are numerous real-world lessons about opportunity costs that managers should learn:

1. Even though they do not appear on a balance sheet or income statement, opportunity costs are real. By choosing between two courses of action, you assume the cost of the option not taken.

2. Since opportunity costs frequently relate to future events, they are often difficult to quantify.

3. Most people will overlook opportunity costs.

As most finance managers operate on a set budget with predetermined targets, many businesses easily pass over opportunities for growth. Most financial decisions are made without the consultation of operational managers. As a result, operational managers are often convinced by finance departments to avoid pursuing value-maximizing opportunities, assuming that the budget simply will not allow it. Instead, workers slave to achieve target production goals and avoid any changes that might hurt their short-term performance, for which they may be continually evaluated.

During the opening years of the twenty-first century, opportunity costs associated with more environmentally sensitive business practices and economic activity—such as combating carbon dioxide emissions through sequestration—came to the fore. Carbon sequestration (capture) is intended to reduce greenhouse gases in the atmosphere and can be achieved several different ways. One U.S. government study of different carbon capture strategies noted some of the opportunity costs. For example, one method of carbon sequestration involves afforestation, or planting trees in an area where there had been none before. Some opportunity costs associated with this type of carbon sequestration might include other profitable activities that could be conducted on that land. For example, the Congressional Budget Office noted that other measures to stop greenhouse gases might make growing crops for biofuels profitable. In this instance, there would be less incentive to devote land to trees for carbon sequestration because of the opportunity costs.

SEE ALSO *Balance Sheets; Economics; Strategic Planning Failure*

BIBLIOGRAPHY

Gamal, Atallah. "Opportunity Costs, Competition, and Firm Selection." *International Economic Journal* 20, no. 4 (2006).

Gitz, Vincent, Jean-Charles Hourcade, and Philippe Ciais. "The timing of biological carbon sequestration and carbon abatement in the energy sector under optimal strategies against climate risks." *The Energy Journal* 27, no.3 (2006): 113—133.

Internet Center for Management and Business Administration. "Opportunity Cost." NetMBA.com. Available from: http://www.netmba.com/econ/micro/cost/opportunity.

Kroll, Karen. "Costly Omission." *Industry Week,* 6 July 1998.

———"Opportunities Lost Because 'There Isn't the Budget'?" *Management Accounting,* June 1998.

Sikora, Martin. "Trying to Recoup the Cost of Lost Opportunities." *Mergers and Acquisitions Journal,* March 2000.

The U.S. Congressional Budget Office. "The Potential for Carbon Sequestration in the United States." A CBO Paper. Washington, 2007. Available from: http://www.cbo.gov/.

ORDER-QUALIFYING CRITERIA

SEE *Order-Winning and Order-Qualifying Criteria*

ORDER-WINNING AND ORDER-QUALIFYING CRITERIA

The terms "order winners" and "order qualifiers" were coined by Terry Hill, professor at the London Business School, and refer to the process of how internal operational capabilities are converted to criteria that may lead to competitive advantage and market success. In his writings, Hill emphasized the interactions and cooperation between operations and marketing. The operations people are responsible for providing the order-winning and order-qualifying criteria—identified by marketing—that enable products to win orders in the marketplace. This process starts with the corporate strategy and ends with the criteria that either keeps the company in the running (i.e., order qualifiers) or wins the customer's business.

COMPETITIVE ADVANTAGE AND COMPETITIVE PRIORITIES

Many factors shape and form the operations strategy of a corporation. For example, these factors include: the ever increasing need for globalizing products and operations, thus reducing the unit cost; creating a technology leadership position; introducing new inventions; taking advantage of mass customization; using supplier partnering; and looking for strategic sourcing solutions. All of these factors require an external or market-based orientation—these are the changes that take place in the external environment of the company.

Traditionally, strategic decisions were thought of as "big decisions" made by general managers. However, big strategic decisions may not be the only source of competitive advantage for the firm. Jay Barney wrote, "Recent

work on lean manufacturing suggests that it is the simultaneous combination of several factors that enables a manufacturing facility to be both very high quality and very low cost. This complicated system of numerous interrelated, mutually supporting small decisions is difficult to describe, and even more difficult to imitate, and thus a source of sustained competitive advantage." Barney contrasted big and small decisions further, "Recognizing that small decisions may be more important for understanding competitive advantages than big decisions suggests that the study of strategy implementation—the process by which big decisions are translated into operational reality—may be more important for understanding competitive advantage than the study of strategy formulation."

The strategy expressed as a combination of a few big and hundreds of small decisions leads to setting up competitive priorities for improving operational practices through investments in various programs. These competitive priorities place different and diverse demands on manufacturing. These demands, sometimes called manufacturing tasks, can be organized into three distinctly different groups: product-related demands, delivery-related demands, and cost demands.

The emphasis given to these priorities and the state of the organization determine the nature and level of investments deemed necessary to implement the operations strategy. These investments in operational practices are expected to lead to better operational performance, as measured and evaluated internally using indicators like reject rates in the manufacturing process, production schedule fulfillment, and others. Through investments firms create and acquire resources that can isolate them from negative market influences and can serve as a source of competitive advantage for them. These investments can be made in tangible assets (e.g., machinery and capital equipment) and intangible assets (e.g., brand names and the skills of individual employees).

A distinction has to be made between investments aimed at creating resources and those aimed at creating capabilities. Few resources by themselves are productive. Productive activity requires the cooperation and coordination of teams of resources. An operational capability is the capacity for a team of resources to perform some task or activity.

While resources are the source of a firm's capabilities, capabilities are the main source of its competitive advantage. Capabilities are not evaluated in themselves, and they cannot be thought of as absolute values. They have to be evaluated relative to the capabilities of competitors. This is the reason for distinguishing between competitiveness dimensions (like the three Ps from the marketing mix: price, place, and product) and capability-based dimensions (like cost-time-quality measures). They show

the two sides of the same coin: the internal capabilities and their evaluation in the market.

ORDER QUALIFIERS AND ORDER WINNERS

Terry Hill argues that the criteria required in the marketplace (and identified by marketing) can be divided into two groups: order qualifiers and order winners. An order qualifier is a characteristic of a product or service that is required in order for the product/service to even be considered by a customer. An order winner is a characteristic that will win the bid or customer's purchase. Therefore, firms must provide the qualifiers in order to get into or stay in a market. To provide qualifiers, they need only to be as good as their competitors. Failure to do so may result in lost sales. However, to provide order winners, firms must be better than their competitors. It is important to note that order qualifiers are not less important than order winners; they are just different.

Firms must also exercise some caution when making decisions based on order winners and qualifiers. Take, for example, a firm producing a high quality product (where high quality is the order-winning criteria). If the cost of producing at such a high level of quality forces the cost of the product to exceed a certain price level (which is an order-qualifying criteria), the end result may be lost sales, thereby making "quality" an order-losing attribute.

Order winners and qualifiers are both market-specific and time-specific. They work in different combinations in different ways on different markets and with different customers. While, some general trends exist across markets, these may not be stable over time. For example, in the late 1990s delivery speed and product customization were frequent order winners, while product quality and price, which previously were frequent order winners, tended to be order qualifiers. Hence, firms need to develop different strategies to support different marketing needs, and these strategies will change over time. Also, since customers' stated needs do not always reflect their buying habits, Hill recommends that firms study how customers behave, not what they say.

When a firm's perception of order winners and qualifiers matches the customer's perception of the same, there exists a "fit" between the two perspectives. When a fit exists one would expect a positive sales performance. Unfortunately, research by Sven Horte and Hakan Ylinenpaa, published in the *International Journal of Operations and Production Management,* found that for many firms a substantial gap existed between managers' and customers' opinions on why they did business together. The researchers found that favorable sales performance came about when there was a good fit between a firm's perception of the strengths of a product and customer perception of the product. Conversely, when firms with high opinions about their competitive strengths had customers who did not share this opinion, sales performance was negative.

PRODUCT LIFE CYCLE

Over time, product sales follow a pattern called the product life cycle. The different stages of the product life cycle also influence a product's set of order winners and order qualifiers. The length of and the sales at each stage of the cycle, as well as the overall length of the life cycle, vary from product to product and depend on such factors as the rate of technological change, the amount of competition in the industry, and customer preferences.

In the early portion of a product's life, product design is critical. A product's early users are almost always more interested in product performance than in price. This stage is characterized by a large number of product innovations. A considerable amount of product design is undertaken to make the product more useful and desirable for its users. Abernathy referred to this early phase of product technology as the search for dominant design. Dominant designs are those that "make a market," such as Ford's Model T car, the DC-3 airplane, and the IBM PC. At this stage, the production process is most likely to be a job shop or close to a job shop.

As the dominant design gets more accepted, cost reduction becomes increasingly important. Thus, process innovation—geared primarily toward lowering costs, increasing yield, and improving throughput time—becomes more important. Changes become less radical as the product, the process, and the organization become more standardized. The production process moves closer to the continuous flow end of the process spectrum. When this happens, both the product and the process become increasingly vulnerable to the introduction of new offerings of similar function (i.e., substitute products) by other producers. Then, the company has to decide when and how to abandon the product and process that they perfected and in which they invested so much.

As the product moves through its life cycle, the requirements for the product and for the production process change. During the early part of the life cycle a production facility with high flexibility (i.e., a job shop) can generate order winners such as customization. For a mature product a dedicated facility (i.e., a flow shop) can produce high quality and low cost, which are the order winners for many, but not all, mature products.

Terry Hill noted that different product characteristics require different production processes, and without communication between marketing, which identifies the order winners and qualifiers, and operations, which develops the operational capabilities to deliver these characteristics,

market success cannot be achieved. Hill developed a tool—product profiling—to ascertain a certain level of fit between process choices and the order-winning criteria of the products. The purpose of profiling is to provide comparison between product characteristics required in the market and the process characteristics used to manufacture the products and make the necessary adjustments.

Social and cultural changes can also affect order winning and qualifying criteria. For example, midway through the first decade of the twenty-first century, environmental issues became a public concern. This development had vast implications for companies and managers. Medhi Shahbazpour and Rainer Seidel argued that sustainable and environmentally sensitive practices needed to become an integral part of the manufacturing process. Sustainability can be either an order winner or order qualifier. As Shahbazpour and Seidel note, "Whether sustainability is categorized as order or order qualifier depends on the specific market, industry, and society the firm operates in."

SEE ALSO *Competitive Advantage; Operations Strategy; Product Life Cycle and Industry Life Cycle*

BIBLIOGRAPHY
Barney, Jay. "Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?" *Academy of Management Review* 11 (1986): 656–65.
da Silveira, Giovani J.C. "Market priorities, manufacturing configuration, and business performance: an empirical analysis of the order-winners framework." *Journal of Operations Management* 23, no. 6 (2005): 662–675
———. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17 (1991): 99–120.
Hill, Terry. *Manufacturing Strategy: Text and Cases.* 3rd ed. Boston: Irwin McGraw-Hill, 2000.
Horte, Sven Ake, and Hakan Ylinenpaa. "The Firm's and Its Customers' Views on Order-Winning Criteria." *International Journal of Operations and Production Management* 17, no. 10 (1997): 1006–1019.
Shahbazpour, Mehdi, and Rainer H. Seidel. "Using Sustainability for Competitive Advantage." *Proceedings of LCE* 2006. Available from: http://www.mech.kuleuven.be/lce2006/166.pdf
Vastag, Gyula, and Ram Narasimhan. "An Investigation of Causal Relationships Among Manufacturing Strategic Intent, Practices and Performance." In *Performance Measurement.* eds. A.D. Neely and D.B. Waggoner. Cambridge, UK: Centre for Business Performance, 1998: 679–86.

ORGANIC ORGANIZATIONS

The term "organic" suggests that, like living things, organizations change their structures, roles, and processes to respond and adapt to their environments. Burns and Stalker noted in *The Management of Innovation* that organic struc-

tures are appropriate in unstable, turbulent, unpredictable environments and for nonroutine tasks and technologies. For organizations coping with such uncertainty, finding appropriate, effective, and timely responses to environmental challenges is of critical importance. Organic organizations are characterized by:

- Decentralization
- Flexible, broadly defined jobs
- Interdependence among employees and units
- Multi-directional communication
- Employee initiative
- Relatively few and broadly defined rules, regulations, procedures, and processes
- Employee participation in problem solving and decision making, often interactively and in groups

In organic organizations, the emphasis is on effectiveness, problem solving, responsiveness, flexibility, adaptability, creativity, and innovation. Such an organization is able to respond in a timely manner to environmental change because employees are empowered to be creative, to experiment, and to suggest new ideas. The process of innovation is triggered by employees throughout the organization in a "bottom-up" manner. The following four sections explain how these characteristics fit together in a cohesive organizational structure that allows for flexibility and ongoing change.

MEETING CHALLENGES

An unstable external environment increases the uncertainty and complexity with which an organization must contend. An organization is continually confronted with a variety of new and unexpected problems and opportunities, of which the nature and relevant factors are initially unclear and for which appropriate responses are not immediately obvious. Further, since the environment changes rapidly, responses to today's problems and opportunities may need to be modified or may even be inappropriate or irrelevant to tomorrow's challenges. In short, the organization cannot keep doing the same old things in the same old ways. Under conditions of uncertainty and complexity, the organization must design its structures and processes to be flexible and responsive to changes in customer desires, technology, governmental regulations, and economic conditions.

FLEXIBILITY AND SHARED AUTHORITY

The need for flexibility and responsiveness leads to the decentralization of decision-making authority in organic organizations. As a result, rules, regulations, procedures,

and policies tend to be few, are defined broadly rather than precisely, loosely rather than rigidly, and are often informal rather than written. Employees are allowed to exercise a great deal of discretion. The authority to identify problems and opportunities and to devise responses is delegated to those best able to respond, regardless of their position, unit, or level in the organization. Emphasis is placed more on individual and group control than on managerial, hierarchical control. Top-level managers in organic organizations are more concerned with coordination and integration as opposed to passing directives down a vertical hierarchy, which is a common task of top-level managers in mechanistic organizations.

The need for flexibility and responsiveness also affects how work is designed and performed in organic organizations. Jobs are not clearly or precisely defined in these organizations. Positions, roles, job descriptions, and standard operating procedures are broad and generalized rather than specific and specialized. Employees accept general responsibility for getting things done, but the manner in which they accomplish their tasks is dictated more by autonomous or semi-autonomous teams than by standard operating procedures. Because the work of organic organizations is often interdependent, specific tasks and responsibilities vary from one situation to another and are refined through direct interaction and mutual adjustment among employees and work units. Too much direction from top-level management may hinder rather than assist the accomplishment of tasks.

A key issue in organic organizations is determining who has the knowledge, perspective, experience, expertise, or skills required to identify opportunities or find solutions to problems. Rather than assuming that top management is the fountainhead of all knowledge and wisdom, organic organizations assume that various people in the organization may have crucial insights or capabilities. Thus, communication is multidirectional, decentralized, and informal rather than hierarchical and formalized. To facilitate the sharing of information and ideas, employees are frequently empowered to communicate across traditional organizational boundaries regardless of position or level or unit.

Going one step further, pharmaceutical firms, for example, may collaborate across corporations and with academic researchers to conduct basic research leading to new drug development. Jack Welch, former CEO of General Electric, referred to this type of company as a "boundaryless organization." Coordination and integration with multiple constituencies beyond traditional organizational boundaries is a necessary component for success, especially in multinational organizations.

Diversity of information and perspectives is often the key to the development of creative responses to vague, complex problems and opportunities. Thus, in organic organizations, much work is done in groups composed of employees with different backgrounds and from different levels, units, or functional areas. Such teams are among the main coordination mechanisms in organic organizations.

THE HUMAN ELEMENT

Human needs and dynamics play an important role in organic organizations. The empowerment and participation of employees is motivational because it meets the human need for autonomy, responsibility, challenge, esteem, social interaction, and personal development. Furthermore, this empowerment and participation helps the organization develop and capitalize on its intellectual capital, which is becoming increasingly valued by many organizations. By emphasizing initiative, direct interaction, open communication, and the creation of teams composed of various members of the organization, organic organizations are able to utilize their internal diversity to foster innovative responses to environmental challenges and changes.

MIXING STYLES

The organic organization is not entirely without hierarchy or formalized rules, regulations, procedures, and processes. Indeed, structural parameters, even if loosely or broadly defined, are necessary to prevent the chaos that would result from absolute decentralization (i.e., where everyone in the organization is completely free to decide what they want to do or not do). As an example of such structural parameters, while employees of Minnesota Mining and Manufacturing (3M) are encouraged to take the initiative in suggesting new products and seeking support from others in the organization, new product teams must still meet specific financial measures at each stage of product development. Nonetheless, the real control is found in constant interaction among peers and the normative rules that develop informally among them.

It is not always necessary for an entire organization to be organic. Some units, such as research and development departments, may benefit from an organic structure because they face an unstable environment. Units that have a more stable environment, such as routine, administrative departments, may favor a mechanistic structure. Some units may borrow from both models. Customer service departments, for example, can build flexibility into responding to exceptional circumstances while maintaining standardized protocols for more typical situations.

The structures of organic organizations are informal, fluid, and constantly changing to identify and develop responses to new problems and opportunities. Authority and responsibility shifts from one situation to another. Groups are established, complete their work, and disband, and a single employee may belong to several temporary

teams at the same time. In organic organizations there is diminished emphasis on superior-subordinate roles in favor of dispersed initiative. Roles, tasks, and responsibilities are not limited by rigid, vertical boundaries of hierarchy for decision-making, communication, coordination, and control. Relations and interactions between personnel and units continually change, and managers and other employees must figure out which relations and interactions will be most effective for each particular problem or opportunity.

In a move that is directly related to organic organizational structure, some companies have adopted a strategy known as a "Results-Only Work Environment" or ROWE. This type of organizational structure emphasizes productivity instead of hours spent at work. The company Best Buy has been a pioneer of this management style. Personnel at its corporate headquarters do not have fixed hours, and they are not required to work from the office. Instead, employees have control over how they manage their time. This policy has much in common with the characteristics of an organic organizational structure, such as a greater degree of individual autonomy and empowerment for employees. A "Results-Only Work Environment" also resembles an organic organization in that it deemphasizes a hierarchical structure.

SEE ALSO *Effectiveness and Efficiency; Mechanistic Organizations; Organization Theory*

BIBLIOGRAPHY
Belkin, Lisa. "Time Wasted? Perhaps It's Well Spent." *The New York Times*, 31 May 2007.

Berry, Leonard L. "The Collaborative Organization: Leadership Lessons from Mayo Clinic." *Organizational Dynamics* 33, no. 3 (2004): 228–42.

Burns, Tom, and G.M. Stalker. *The Management of Innovation.* London: Tavistock, 1961.

Cardinal, Laura B., Sim B. Sitkin, and Chris P. Long. "Balancing and Rebalancing in the Creation and Evolution of Organizational Control." *Organization Science* 15, no. 4 (2004): 411–32.

Conlin, Michelle. "Smashing The Clock: No fixed schedules. No mandatory meetings. Inside Best Buy's radical reshaping of the workplace." *Business Week*, 11 December 2006, 60.

Dickson, Marcus W., Christian J. Resick, and Paul J. Hanges. "Systematic variation in organizationally-shared cognitive prototypes of effective leadership based on organizational form." *The Leadership Quarterly* 17, no. 5, (2006).

Geraldi, Joana G. "The balance between order and chaos in multi-project firms: A conceptual model." *International Journal of Project Management* 26, no. 4, (2008).

Gooderham, Paul N., and Odd Nordhaug. *International Management: Cross-Boundary Challenges.* Malden, MA: Blackwell Publishing, 2004.

Hansen, Morten T., and Nitin Nohria. "How to Build Collaborative Advantage." *MIT Sloan Management Review* 46, no. 1 (2004): 22–31.

Kiger, Patrick J. "Flexibility to the Fullest: Throwing out the rules of work—part 1 of 2; Best Buy frees corporate employees to work wherever they want, whenever they want—as long as they reel in results." *Workforce Management*, 25 September 2006.

Pearce, C.L. "The Future of Leadership: Combining Vertical and Shared Leadership to Transform Knowledge Work." *Academy of Management Executive* 18, no. 1 (2004): 47—58.

ORGANIZATION THEORY

Organization theory is a broad field with roots in sociology. Anthropologists, philosophists, and political scientists have contributed greatly to the field. Organization theory as a topic for managers, as opposed to scholars, has come about fairly recently. For example, political scientists trace many ideas back to Ancient Rome or even before. Philosophers reach even farther back in time, and anthropologists have been interested in organization in terms of how groups arrange social systems and status systems as long as there has been a field of anthropology.

Although it is difficult to pinpoint when managers became interested in theories of organization, some suggest it was around the 1940s, when the writings of the German sociologist and engineer, Max Weber, were translated into English. Although Weber's lifework was spent trying to understand why capitalism arose first in Western Europe rather than in Asia, American managers lifted Weber's notion of bureaucracy out of these studies to explain then-modern forms of organizations that coincided with what Weber had described among Western European organizations. These organizations had reduced the influence of patriarchal styles of management to systems in which job positions, rather than the people in those positions, provided the source of authority.

Phillip Selznick became well known for studying goal conflict and power struggles during the U.S. government's subsidy of the Tennessee Valley Authority, which was an effort to put unemployed Americans to work producing electricity for the Tennessee Valley area. In the 1950s Herbert Simon studied how managers make decisions when information is complex but incomplete. The 1960s brought about research elaborating why the closed-system mentality of organizations—the idea that organizations have little reciprocal interaction with their environments—was not accurate. The result was a shift to viewing organizations as open systems that are intertwined with their environments in such a way that reciprocal interdependence is created. Managers began to realize that society has a profound effect on organizations, as organizations also have a profound effect on society.

Taken in total, then, organization theory as a management topic of interest was born out of non-management research. Bureaucracy, authority, goal conflict, power, managerial decision-making, and interaction between organizations and their environments are all topics of concern among today's organization theorists, but none of these ideas arose from management research.

Management research has borrowed from these various fields to attempt to answer two questions that are of specific interest to managers: Why do organizations exist and how do they function? With respect to the first question, it seems reasonable to argue that organizations exist to provide society with a level of goods and services that would otherwise be unattainable. With respect to the second, how organizations function, organizations combine human skills, knowledge, technology, and material resources to produce goods and services.

The broadest variant of organization theory looks at the relationship between organizations and their social and natural environments, as originated by open-system theorists. One branch of Western moral philosophy conceives of organizations as having a social contract with society, whereby they are granted legitimacy for the purpose of serving the social good. This constructive purpose includes the production of goods and services and their fair allocation. Yet organizations can also cause negative social outcomes. Negative externalities include the social problems associated with monopolies, unsafe products, and the unfair treatment of employees, as well as the ecological problems posed by industrial accidents and industry-related pollution of the natural environment.

Because of the existence of negative externalities, organization theory is influenced by the concept of social control that can be found in political science, economics, and sociology. Social control refers to the laws, regulations, and social customs that are meant to minimize the negative impacts of organizational activities. Because organization theorists address social control, they also examine the nature of the relationship between organizations and their regulatory agencies.

The anthropological view derives from the knowledge that standards of social control reflect the underlying assumptions, values, and beliefs of cultures. The restraints or expectations placed on organizations, therefore, can vary across societies. The stakeholder model of organizations is useful for demonstrating this form of cultural relativism. The stakeholder model depicts an organization as surrounded by a variety of constituent groups, such as customers, social activists, regulators, the media, stockholders, and regulatory agencies.

Stakeholder expectations, in turn, can depend upon cultural affiliations. For example, employees in the United States tend to expect more active participation in the work contract than do employees in Japan. Thus, a Japanese firm with operations in the United States may face employment laws and employee views of justice and fairness that differ from those of the home country. When the scope of organization theory is widened to include international issues such as the activities of multinational corporations in host environments, the impact of cultural relativism must be acknowledged.

Although organization theory never loses sight of the importance of the organizational-societal interface (and this is one distinguishing feature between organization theory and organization behavior), it also deals with what goes on inside organizations. Weber's classical theory of bureaucracy, for example, was followed by research on the more informal aspects of organizational life. This line of inquiry is strongly influenced by the insight that organizational activity can involve less-than-rational processes that yield unexpected consequences, including the negative externalities mentioned above. Hence, although organizations ideally exist as tools for constructive social purposes, these purposes can be subverted by the constraints on rational decision processes within organizations.

Contemporary theorists use many metaphors to guide their investigations into the suboptimal and even non-rational decisions enacted in organizations. These metaphors include those that suggest organizations are systems of power and political intrigue, miniature cultures, chaos, temples, theaters, machines, families, and jungles. These metaphors arise through shared meaning that has been socially constructed and generally agreed upon, thus subconsciously institutionalizing the specific, agreed-upon metaphor for certain organizations.

Organization theorists are interested in why organizations exist and how these social systems function. This interest has yielded a body of research on the organizational-societal relationship and the formal and informal aspects of organizational life, yet there is no single answer to either of these root issues.

Since 2001 some management theories have come under criticism for the role they may have played in corporate scandals at firms such as Enron and Tyco. The late London Business School scholar, Sumanatra Ghoshal, argued that business schools and MBA programs taught amoral management ideas that drastically deemphasized responsibility and ethics. Likewise, Malcolm Salter warned that another scandal like Enron could only be avoided if companies created, "organizational processes and structures that promote effective management and ethical behavior." However, these business scandals also yielded new avenues of research. Enron emails that became public after the scandal and subsequent investigations have provided insight into how communication and informal networks function inside an organization.

BIBLIOGRAPHY

Brown-Johnson, N., and S.B. Droege. "Reflections on the Generalization of Agency Theory: Cross-cultural Considerations." *Human Resource Management Review* 14, no. 3 (2004): 325–35.

Diesner, Jana, Terrill L. Frantz, and Kathleen M. Carley. "Communication Networks from the Enron Email Corpus 'It's Always About the People. Enron Is No Different.'"*Compuational* & *Mathematical Organization Theory.* 11, no. 3 (2005).

Ghoshal, Sumantra. "Bad Management Theories Are Destroying Good Management Practices." *Academy of Management Learning and Education* 4, no. 1 (2005).

Salter, Malcolm. *Innovation Corrupted: The Origins and Legacy of Enron's Collapse.* Cambridge: Harvard University Press, 2008.

Vázquez, Xosé H. "Allocating Decision Rights on the Shop Floor: A Perspective from Transaction Cost Economics and Organization Theory." *Organization Science* 15, no. 4 (2004): 463–81.

Zajac, Edward J., and James D. Westphal. "The Social Construction of Market Value: Institutionalization and Learning Perspectives on Stock Market Reactions." *American Sociological Review* 69, no. 3 (2004): 433–58.

ORGANIZATIONAL ANALYSIS AND PLANNING

Organizational analysis and planning focuses on cultivating and maintaining an efficient workforce through design and structure of an organization, including the relationship and behavior of individuals within organizations. Specifically, organizational analysis is concerned with developing models and theories that accurately capture the functioning and development of organizations and that account for the ways in which organizations respond to and bring about changes. Organizational planning, on the other hand, involves designing an organization's structure and dividing up the responsibilities of an organization. The goals of organizational analysis and planning typically have been to determine the best way to view and organize a company in order to manage it successfully and to bring about greater efficiency.

MODELS OF OGANIZATIONAL ANALYSIS

One of the basic techniques of organizational analysis is modeling—developing models of organizations that delineate the way they function and evolve in order to identify the best way of managing each one. Modeling enables managers to determine the crucial variables in particular circumstances so they can experiment with different combinations of variables to achieve their desired results. For example, managers can determine the best combination of technology and organizational structure for their company by using organizational models.

Organizational models typically focus on behavior, structure, or technology. In consideration of these variables, four general models of organizational analysis exist: the rational (also called the classical model), the natural system (also called the participative model), the socio-technical, and the cognitive model.

Rational Model. A pioneer of the rational model of organization was Frederick Taylor, who was influential near the start of the twentieth century. Taylor's background in engineering prompted his organizational analysis on efficiency. In Taylor's view, there was one best way—the most efficient way—to perform a task. Scientific management sprang from his work, with resultant time and motion studies in which tasks were timed and employee motions were gauged for efficiency. The best way to perform a task, in Taylor's view, was the way that accomplished the task in the least amount of time. He extended this view from employees to management, suggesting that nearly all organizational tasks could become more efficient if scientific principles were applied.

This was at the dawn of the introduction of the automobile to America. Although many Western European nations began manufacturing automobiles before the early twentieth century, production efficiencies still had a long way to go. Applying scientific management principles helped Ford Motor Company develop the first American, mass-produced automobile. Frederick Taylor, then, was correct. Scientific management did work, but it was not without problems. The main problem was that it ignored the boredom that repetitive tasks created for workers. Workers became simply replaceable parts in the organizational machine.

In addition, the rational model of organization presupposes that decisions about an organization's structure are reached because of the rational assessment of an organization's needs, goals, and external influences. And like Taylor's scientific management, this is true in some situations, but is not comprehensive enough to tell the whole story of how needs, goals and external influences affect organizational analysis and planning.

The rational model assumes that deviations from rationality result from errors in judgment and calculation as well as from ignorance. This model treats organizations as mechanical groups because it conceives of the organization as having a structure of different parts, and that all of these parts can be modified and manipulated in order to improve the efficiency of the entire

organization. Furthermore, individual parts of the organization are viewed as modifiable through deliberate effort. Finally, this model sees the long-term development of the organization as modifiable and controllable through planned modification in order to accomplish definite goals.

The rational model is still pervasive among managers and corresponds to the pyramidal organizational structure, in which top managers are at the apex and employees are at the bottom. Managers possess the authority in this model, defining and assigning tasks to the employees, who are charged with completing the tasks. They must begin by giving employees clear and detailed instructions. After that, managers must evaluate employee performance and distribute rewards and punishments based on the way employees performed their tasks.

Managers assume that worker motivation is directly correlated with economic rewards and punishments meted out by the managers. Motivation, from a rational perspective, simply involves increasing pay or threatening workers with various punishments. Hence, according to this model, managers rely on pay and related forms of compensation to motivate workers to complete their tasks efficiently in order to achieve company goals.

The problem with this assumption is that there are many motivators other than money, there can be many ways to perform a given task, and there are many organizational goals that are not rational. The rational model is thus a starting point for thinking about organizational analysis, but certainly not encompassing enough to provide a complete picture.

Natural System Model. In contrast to the rational model, the natural system model views organizations holistically, that is, as systems. The natural system model sees an organization as not only striving to accomplish its own goals, but also other important goals. An organizational structure is regarded as an institution in its own right that has needs of its own. Hence, according to this model, an organization seeks to maintain a balance of its various needs and goals, which may restrict the way it pursues other goals.

Unlike the rational model of organization, the natural system model sees the modification of an organization as unplanned and adaptive reactions to unstable conditions that threaten the balance of the organization as an entire system. The way an organization responds to problems is characterized as a defense mechanism and as being influenced by the common values ensconced in the members of the organization. This model concentrates on threats to an organization's equilibrium, that is, on events and activities with the potential of disrupting an organization's balance.

When deviations from organizational plans and goals occur, they are seen not as the product of error or ignorance, but as the result of limitations brought about by an organization's social structure. This model generally is based on the concept of organizations as organisms in which all the parts are interconnected and interdependent. Consequently, changes in one part of an organization are thought to have an impact on other parts of the organization, and so planned modification of the organization is difficult.

In practical terms, the natural system model strives to balance the needs of all the members of the organization as well as other stakeholders, such as customers, shareholders, and suppliers. This model holds that organizations function best when members belong to at least one effective work group (department, committee, or staff group), thereby contributing to the goals of organizations. Members who belong to more than one work group help link the different units of the organization together and facilitate communication and the exchange of information throughout the organization.

The natural system model views change as affecting the entire organization, not just individuals or individual units. Consequently, managers cannot change just one small part of an organization; rather, they must change the whole organization. As a result, planning for change must be comprehensive and systematic. Theoretically, the natural system model helps prevent conflicts, in that changes take place only with the involvement of each member of the organization. Therefore, commitment to change is greatly increased and conflict over change is limited.

Sociotechnical Model. Due to the limitations of the previous models of organization, theorists developed other models to capture the essence and functioning of modern organizations. The sociotechnical model does not rely on the mechanical and biological analogies of the rational and natural system models. Instead, the sociotechnical model views organizations as having a greater ability to modify their form and structure. Nevertheless, like the natural system model, the sociotechnical model sees organizations as evolving. An organization changes when the expectations of its members change as a result of their collaboration with other members and the exchange of information.

This model views organizations as systems that interact with their environments. Through the course of this interaction, organizational behavior is affected by human, social, technological, and organizational inputs. These inputs are all interdependent, thus a change in one causes a change in the others. The basic tenets of the sociotechnical model include the belief that behavior in

organizations can have a number of causes, that organizations are systems, and that informal social systems are different from formal social systems.

An organization's main task is accomplished through the process of inputs being converted into outputs. The organization is designed around these tasks. Similarly each unit of the organization is designed around its specific subtask. The sociotechnical model assumes that an organization's effectiveness is determined by its design to perform its main task. Organizations have differentiated, yet integrated, units based on three primary factors: technology (including techniques, skills, and materials), geographic location, and time (work shifts). According to this model, if an organization is effectively designed around its main task and if its units are differentiated and integrated effectively, then the number of conflicts will be reduced.

Cognitive Model. The cognitive model of organization consists of three primary components: cognition, the decision-making or problem-solving process, and an organizational setting. Cognition refers to the information-processing units of an organization and its organizational units. The decision-making or problem-solving component is a series of steps, operations, and procedures that an organizational unit uses to make decisions or solve problems. The organizational setting component is the arrangement of the organization, that is, the way tasks are distributed and the way processes are coordinated.

Although the rational model of organization focuses on clarifying and assigning tasks, it does not address the other aspects of organizations. In particular, it provides little in terms of the ways organizations solve problems once tasks are clarified and assigned. The cognitive model moves beyond this level of organizational analysis by focusing on the processes through which organizations assign specific activities and times for the activities to be performed.

The cognitive model focuses on the decision-making process of an organization. An organization makes decisions in accordance with its objectives and based on available information. Since this model views individuals as having the capacity to do only a few things at a time, the organization functions as the combination of these limited capacities and facilitates the overall completion of a number of complex tasks, which are broken down into a series of subtasks so that individuals can perform them. These subtasks are the areas of specialization within an organization. Specialization, in turn, brings about the flow of specific information to and from specialized units.

This model provides several key insights into the workings of organizations. It conceives of an organization as a process that develops from the interaction of human cognition, organizational structure, and the types of decisions that need to be made. Because of these characteristics, the cognitive model focuses on the development and adaptation of organizations in different circumstances. Furthermore, this model accounts for the way in which specialization affects organizational behavior and coordination.

In conclusion, because each different organization model has its advantages and disadvantages, managers must decide which one (or ones) best captures the workings of their company by evaluating the assumptions and key processes of each, as well as by determining which one can solve the kinds of problems they need to solve.

TYPES OF ORGANIZATIONAL PLANNING STRUCTURES

Organizational planning involves designing an organization's structure to maximize efficiency. This includes dividing a company up into different units, departments, and teams. Prior to this division, managers must consider a company's goals and business obstacles as well as alternative company structures. Business goals may include, for example, increasing the flow of information, promoting teamwork, and reducing redundancy. Next, managers must consider the different organizational structures and select the one that holds the greatest potential for eliminating problems with the current corporate structure or for bringing about the desired structural environment. The selection may be made by taking different organizational models into consideration, as well.

Managers and executives generally divide an organization into different units based on one of the following six criteria:

Function. A manufacturing firm typically includes functional units such as engineering, production, finance, sales, and personnel. These different functions are controlled by managers who head each function. In this organizational structure, each function primarily focuses on its core tasks (e.g., production or finance).

Product. Large, diversified companies may find it advantageous to divide their tasks based on product groups, such as foodstuffs, farm chemicals, and pharmaceuticals. This organizational structure has the benefit of enabling each business unit to produce desired results. However, it can lead to high administrative costs and redundancy.

Customers. Companies may be divided into different units based on target customers. For example, a book publisher may be organized by retail bookstores, mail-order book stores, online book stores, and school system

tier, such as elementary, middle school, high school, and higher education.

Geographic Location. Many sales and service companies use geographic location as the basis for creating departments within the organization. This organizational structure calls for members of each group to concentrate on particular locations for which they are responsible.

Process. Some companies are organized by process. Process organization is common in manufacturing and clerical companies. For example, natural gas companies have different units for exploration, production, and distribution. This type of organizational structure enables each unit to have its own specialists.

Matrix. Matrix organizational structures include not only general functional units like production, sales, and finance, but also product or geographic units. Company executives frequently oversee the product units directly. The product units, in turn, collaborate with and coordinate the functional units. By adopting the matrix arrangement, companies attempt to reap the benefits of the functional and the product or geographic structures, while bypassing the inefficient and redundant aspects of the product structure. A company with a matrix organizational structure has functional units such as development, production, and sales matched in a matrix by product or geographic location.

Since the globalization of companies and businesses, matrix structure has been viewed as a popular option for organizations. As Margaret Oertig and Thomas Buergi note, "Many international companies have projects spanning a variety of nationalities, involving great geographical distance and a range of time zones." However, not all companies consider matrix structure an ideal method of organization. For example, Hewlett Packard CEO, Mark Hurd and former CEO of General Electric Jack Welch have both offered criticisms of matrix organizational structure, arguing that it can create complex reporting and accountability issues for workers within a company.

A *McKinsey Quarterly* article from 2007 notes that matrix organizations seem ideal for a global company while echoing these criticisms of matrix organization. Instead, the article's authors advocate the use of what they term "formal networks" as an organizational structure. While "formal networks" resemble a matrix structure in that they attempt to collect team members from all areas of an organization, the authors point out that "formal networks" are less hierarchical than matrix organizations.

Ultimately, company executives and managers must strive to select the organizational structure that best suits their fields of business; that offers the optimal amount of control, specialization, and cooperation; and that facilitates key business activities while also taking into consideration concerns for efficiency and effectiveness.

SEE ALSO *Organizational Chart; Organizational Development; Organizational Structure*

BIBLIOGRAPHY
Bryan, Lowell L., Eric Matson, and Leigh M. Weiss. "Harnessing the Power of Informal Employee Networks." *The McKinsey Quarterly.* November 2007, 44–55.

French, Wendell, Cecil H. Bell, and Robert A. Zawacki. *Organization Development and Transformation: Managing Effective Change,* 6th ed. McGraw-Hill, 2005.

Goodman, Paul S., and Denise M. Rousseau. "Organizational Change that Produces Results: The Linkage Approach." *Academy of Management Executive* 18, no. 3 (2004): 7–20.

Oertig, Margaret and Thomas Buergi. "The Challenges of Managing Cross-cultural Virtual Project Teams." *Team Performance Management* 12, no. 1/2 (2006): 23–30.

Roberts, John. *The Modern Firm: Organizational Design for Performance and Growth.* Oxford University Press, 2004.

Wall, Stephen J. "The Protean Organization: Learning to Love Change." *Organizational Dynamics* 34, no. 1 (2004): 37–46.

Welch, Jack, and Suzy Welch. "Call It Work-Life Choices", *Business Week*, November 27, 2006, Issue 4011

"The Word from Hurd." *Business Week Online*, September 1, 2005. Available from: http://www.businessweek.com/technology/content/sep2005/tc2005091_4317_tc121.htm?chan=search.

ORGANIZATIONAL BEHAVIOR

Organizational behavior is the study of individual behavior in an organizational setting. This includes the study of how individuals behave alone, as well as how individuals behave in groups. Organizational behavior is an interdisciplinary field dedicated to understanding individual and group behavior, interpersonal processes, and organizational dynamics. The purpose of organizational behavior is to gain a greater understanding of those factors that influence individual and group dynamics in an organizational setting so that individuals and the groups and organizations to which they belong may become more efficient and effective.

Organizational behavior is a relatively new field of study that draws most heavily from the psychological and sociological sciences. It also looks to scientific fields such as ergonomics, statistics, and psychometrics. Other topics of interest in the field of organizational behavior include the extent to which theories of behavior are culturally

bound, unethical decision-making, self-management and self-leadership, and work/family conflict.

MULTIPLE LEVELS OF ANALYSIS

One of the main reasons for this interdisciplinary approach is because the field of organizational behavior involves multiple levels of analysis. These different levels of analysis are necessary for understanding individual behavior within organizations because people always act within the context of their environment, which includes both objects and other people. Workers influence their environment and are also influenced by their environment, making the study of organizational behavior a multi-level endeavor. The different levels of analysis used in the field of organizational behavior are: the individual level, the group level, and the organizational level.

Individual Level of Analysis. At the individual level of analysis, organizational behavior involves the study of learning, perception, creativity, motivation, personality, turnover, task performance, cooperative behavior, deviant behavior, ethics, and cognition. At this level of analysis, organizational behavior draws heavily upon psychology, engineering, and medicine. For example, a study of organizational behavior at the individual level of analysis might focus on the impact of different types of overhead lighting on such factors as productivity and absenteeism.

Group Level of Analysis. At the group level of analysis, organizational behavior involves the study of group dynamics, intra- and intergroup conflict and cohesion, leadership, power, norms, interpersonal communication, networks, and roles. At this level of analysis, organizational behavior draws upon the sociological and socio-psychological sciences. For example, a study of how different personality types correspond to different leadership styles and levels of results operates at the group level of analysis.

Organization Level of Analysis. At the organization level of analysis, organizational behavior involves the study of topics such as organizational culture, organizational structure, cultural diversity, inter-organizational cooperation and conflict, change, technology, and external environmental forces. At this level of analysis, organizational behavior draws upon anthropology and political science. The various studies on organizational cultures, from William Ouchi's classic *Theory Z: How American Business Can Meet the Japanese Challenge* (1981) to the more recent *Organizational Culture and Leadership* (2004) are examples of organizational behavior conducted at the organization level of analysis.

ORGANIZATIONAL BEHAVIOR MANAGEMENT

Much of organizational behavior research is ultimately aimed at providing human resource management professionals with the information and tools they need to select, train, and retain employees in a fashion that yields maximum benefit for the individual employee as well as for the organization. As one author has written, "People are an organization's most important assets!" The study of organizational behavior is an attempt to maximize the effectiveness of this asset.

Organizational behavior management utilizes studies of organizational behavior as a tool to improve productivity and profit. There is an attempt to develop scientific principles that improve employee performance. This goes beyond simply understanding the general principles of human behavior in the organizational context and focuses on such specific issues as:

- Employee safety, stress, and health

- Evaluation of employee satisfaction and feedback systems

- Use of monetary and nonmonetary incentives

- Development of self-management procedures

- Programmed instruction, behavioral modeling, and computer-aided instruction

- Positive and negative side effects of management interventions

- Systems analysis of the way in which work gets done, measured, and evaluated

TRENDS

A number of important trends in the study of organizational behavior are the focus of research efforts. First, a variety of research studies have examined topics at the group level of analysis rather than exclusively at the individual level of analysis. For example, while empowerment has largely been investigated as an individual-level motivation construct, researchers have begun to study team empowerment as a means of understanding differences in group performance. Similar research has focused on elevating the level of analysis for personality characteristics and cooperative behavior from the individual level to the group level.

Another research trend is an increasing focus on personality as a factor in individual- and group-level performance. This stems from the movement toward more organic organization designs, increased supervisory span of control, and more autonomous work designs. All of these factors serve to increase the role that personality

plays as a determinant of outcomes such as stress, cooperative or deviant behavior, and performance.

Personality traits that are related to flexibility, stress hardiness, and personal initiative are also the subject of research. Examples of these personality traits include a tendency toward individualism or collectivism, self-monitoring, openness to experience, and a proactive personality. Forms of behavior that are constructive and change-oriented in nature are also studied. These forms of behavior are proactive in nature and act to improve situations for the individual, group, or organization. Examples of these behaviors include issue selling, taking initiative, constructive change-oriented communication, innovation, and proactive socialization.

Organizational behavior is a central concern of human resource managers. Research at all levels of organizational behavior continues to be an active field in both academia and management. A wide variety of issues and concerns are the focus of on-going studies and management techniques.

SEE ALSO *Human Resource Management; Motivation and Motivation Theory; Organic Organizations; Organizational Culture; Organizational Development*

BIBLIOGRAPHY
Bowditch, James L., and Anthony F. Buono. *A Primer on Organizational Behavior.* 7th ed. New York: Wiley, 2007.
DeCenzo, David A., and Stephen P. Robbins. *Fundamentals of Human Resource Management.* 9th ed. New York: Wiley, 2006.
Hersey, Paul H., Kenneth H. Blanchard, and Dewey E. Johnson. *Management of Organizational Behavior.* 9th ed. Upper Saddle River, NJ: Prentice Hall, 2007.
Hitt, Michael A., C. Chet Miller, and Adrienne Colella. *Organizational Behavior: A Strategic Approach.* New York: Wiley, 2005.
Hofstede, Geert, and Gert Jan Hofstede. *Cultures and Organizations: Software of the Mind.* 2nd ed. New York: McGraw-Hill, 2004.
Schein, Edgar H. *Organizational Culture and Leadership.* San Francisco, CA: Jossey-Bass, 2004.
Schermerhorn, John, James G. Hunt, and Richard N. Osborn. *Organizational Behavior.* 10th ed. New York: Wiley, 2008.
Staw, Barry, ed. *Research in Organizational Behavior*, vol. 28. London: JAI Press, 2008.

ORGANIZATIONAL CHART

An organizational chart is a pictorial representation of a company's structure and reporting relationships. This chart can provide a great deal of information and may help organizational members understand the overall structure of the organization and its strategy. This entry describes how organizational charts are constructed, including the software and other applications that can be used to create them; what information the organizational chart provides; the benefits of making the chart available publicly; and the circumstances under which a chart is likely to change.

CONSTRUCTING AN ORGANIZATIONAL CHART

All organizational charts have similar elements that allow them to be easily interpreted and understood by people inside and outside of the organization. Charts consist of shapes and lines that represent work units and their hierarchy. See Figure 1 for an example of an organizational chart.

The basic building block of an organizational chart is the rectangle, which can represent a person or a work unit (e.g., a department). For example, as shown in Figure 1, the CEO position has a separate rectangle that denotes one person, but the entire Public and Community Relations Department is also represented by one rectangle. If the outline of the rectangle is dashed, this means that a position is open and must be filled, as with one of the manager positions. If a rectangle is divided, and two or more names are in it, this may indicate job sharing or that multiple people are responsible for the outcomes associated with this position. In the figure, W. Allen and P. Lloyd are comanagers in one area of the Production and Services Marketing Department, where they have a job-sharing arrangement and each works part-time hours.

The boxes may contain as much or as little information as the organization prefers. They may include a job title, an employee's name, an employee's department, or even information such as job tenure, education, or salary. Alternatively, a chart may be created without rectangles, with names or titles standing alone. The three employees in the Public and Community Relations Department are listed with their names not in rectangles. This often is done to save space on the chart.

Rectangles on an organizational chart are linked with solid or dashed lines. A solid line indicates a formal, direct relationship, and a dashed line indicates that one employee or department advises another or has some other sort of indirect relationship. Note that all but one of the reporting relationships in Figure 1 is formal. L. Jiminez has a dashed line to the Product and Services Marketing Department, which means that she sometimes will work for that department or will report to that department's manager. When lines represent a tree structure—when two or more rectangles are linked to another with multiple lines—this indicates that several individuals or departments report to one supervisor. For instance, the tree structure represents the relationship between the CEO and the three top

Figure 1

Sample Organizational Chart
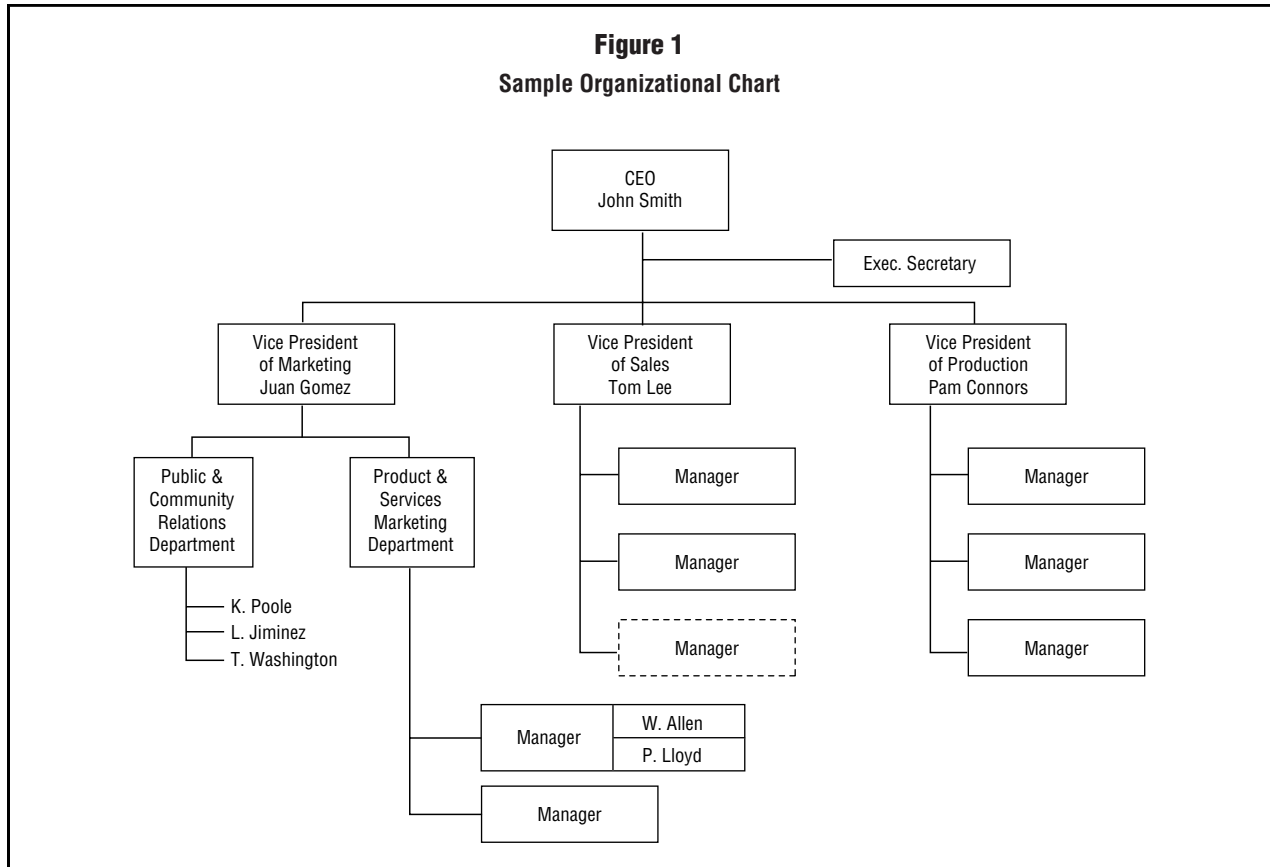
managers who report to the CEO. Finally, a rectangle that is attached horizontally outside of the vertical hierarchy typically indicates an assistant or staff person. In the example, this is represented by the executive secretary to the CEO.

Computer software is the most common and user-friendly method for creating organizational charts. Organizational charts can be created using drawing tools in a word processing program, but diagramming programs offer more options and ease of use. For example, Microsoft's Visio 2007 presentation software allows for the creation of organizational charts, can be shared with colleagues in various formats, and is compatible with all other Microsoft applications. For creating larger, more complex charts, there are many different programs available for purchase. Some examples are OrgPlus7, Concept-Draw 7.6, SmartDraw 2008.3, and Abra OrgChart. These software programs allow quick, easy chart creation with point-and-click menus, automatic resizing and alignment. Diagramming software programs also allow charts to be easily downloaded into word processing documents, presentations, or Web sites for optimal visibility. Other features include the ability to insert photographs and

information from other human resources programs directly into charts.

Other diagramming software for creating organization charts can be used live on the Internet to allow user interface from business to business. The Google Apps Suite offers Google Docs, a program that allows for the creation and integration of organizational charts directly into documents that are accessible to multiple online users. Users are able to make changes to charts and documents based on a level of access determined by the account's administrator.

INFORMATION IN THE ORGANIZATIONAL CHART

Organizational charts provide a great deal of information about the organization as a whole and the interaction of its parts. From a chart, one can see the organization's structure, its hierarchy, the degree to which it is centralized or decentralized, and its chain of command.

Organizational Structure. First, organizational charts detail an organization's structure. It may be functional, in which work units are divided based on what they do and named after those functions (e.g., research and

development, marketing, sales, etc.). The structure may be divisional, based on product, customers served, or geographic location. Finally, an organizational chart may represent a matrix structure, in which work units are organized by function and division.

Organizational Hierarchy and Centralization. In addition to outlining the type of organizational structure, the organizational chart also indicates the number of management levels, whether the organizational structure is tall or flat, and the span of control at each level. Tall organizations have many levels of middle management and small spans of control. Each manager supervises and directs few employees, and the chain of command has many managers. Conversely, a flat organization has fewer management levels and larger spans of control. Because managers supervise more employees, employees tend to have more autonomy and discretion in their jobs.

Organizational hierarchy and the number of management levels often indicate the degree of centralization within an organization. Centralized organizations are those in which most of the decision making occurs by a few people at the top of the hierarchy. This typically creates a top-down management structure, in which top-level managers strongly control the direction of the workplace through their decisions and supervision. Conversely, an organization with a decentralized structure allows greater decision-making and authority at lower organizational levels. Highly decentralized companies may have units that operate nearly independently of one another. The degree of hierarchy on an organization's chart will help to determine the degree of centralization or decentralization within its structure. Typically, the taller the organization, the more centralized it is. Flatter organizations generally require more decentralization because managers each have broader spans of control and cannot direct and closely supervise so many people. Additionally, as previously described, the organization's structure may indicate the degree of centralization. Functional structures tend to be more centralized than divisional structures.

Chain of Command. The vertical and horizontal lines connecting the rectangles on an organizational chart indicate reporting relationships and chain of command. That is, they indicate which employees are directly responsible for the supervision of others and who has ultimate accountability for a group of employees.

AVAILABILITY OF THE ORGANIZATIONAL CHART

Many companies make their organizational chart available to their employees and to the public either online or in corporate literature. The members of the public who may

have an interest in a company's organizational chart include company shareholders, investors, distributors and suppliers, customers, potential job applicants, and even community members. The chain of command of a publicly traded company can often be found in a company's profile on Yahoo! Finance or Google Finance and are updated regularly. By providing this information, these external stakeholders and other interested parties may gain a better understanding of the organization. The chart may give them a sense of the organization's operations, workforce, or even its strategy.

Employees typically have access to the organizational chart through the employee handbook or a company Web site, generally in the "About Us" or "Investor Relations" sections. Providing the organizational chart to employees allows them to see the structure of the organization and to better understand how their positions fit into the bigger picture. Additionally, observing the chain of command helps an employee to understand to whom they are accountable, making diagnosing organizational problems easier.

CHANGES TO THE ORGANIZATIONAL CHART

The organizational chart must reflect any alterations to the organizational structure. The structure may change due to a company's growth, decline, or restructuring.

Growth or Decline. All organizations have a life cycle of growth, maturity, and decline, and in each stage the organizational structure is likely to be different. In the growth stage, the company is expanding rapidly, gaining customers and market share. Growth takes place when a company is just beginning and products and services are gaining a foothold. It may also occur when an organization develops a new product or expands into new markets, perhaps in other countries. With growth, the organizational chart will change. Levels of management may be added, along with new departments.

In maturity, an organization is no longer growing at a rapid rate and is stable in its production and sales. The organization may introduce minor changes to a product or service, but major changes to its structure are unlikely.

In the decline stage, the organization is losing ground in the marketplace. It may be that its products or services are becoming obsolete or that its competitors are taking over the market. In decline, the organization may shed levels of management or positions in all divisions. Additionally, it may outsource work in some areas and thus remove those departments from its structure. Or, as certain products or services are dropped from the organization, the work units needed for these products and services also may be eliminated. Thus, in the decline stage

the organizational chart is likely to be streamlined or shrunken.

Restructuring. Restructuring occurs when an organization reduces its workforce by eliminating large numbers of management and line employees. Restructuring typically occurs when information technology can be used to achieve the same productivity outcomes with fewer people. With restructuring, management levels may be eliminated entirely, or entire departments may be removed. This is particularly true if outsourcing accompanies the restructuring.

SEE ALSO *Management Levels; Organizational Structure*

BIBLIOGRAPHY
Baker, Donna. *How to do Everything with Google Tools.*New York: McGraw Hill, 2008.
DuBrin, Andrew J. *Essentials of Management.* 7th ed. Cincinnati, OH: Thomson/South-Western, 2004.
Jones, Gareth R., and Jennifer M. George. *Contemporary Management.* 4th ed. New York: McGraw-Hill/Irwin, 2006.
Microsoft Office System Webcast: A First Look at Office Visio 2007 12 September 2006. Available from: http://msevents. microsoft.com/cui/WebCastEventDetails.aspx?EventID= 1032305755& EventCategory=4&culture=en-US&Country Code=US.
Rue, Leslie W., and Lloyd L. Byars. *Management: Skills and Application.* 10th ed. New York: McGraw-Hill/Irwin, 2003.
Williams, Chuck. *Management.* 3rd ed. Mason, OH: Thomson/ South-Western, 2005.

ORGANIZATIONAL CULTURE

An organizational culture is defined as the shared assumptions, values, and beliefs that guide the actions of its members. Large organizations usually have a dominant culture (shared by the majority of the organization) and subcultures (represented by groups of individuals with unique values or beliefs that may or may not be consistent with the dominant culture). Subcultures that reject the dominant culture are called *countercultures*. Organizational culture tends to be shaped by the founders' values, the industry and business environment, the national culture, and the senior leaders' vision and behavior.

THE IMPORTANCE OF ORGANIZATIONAL CULTURE

As people work together to accomplish goals, groups develop into organizations. As goals become more specific and longer-term, and work more specialized, organizations become both more formal and institutionalized. Organizations tend to take on a life of their own and widely held beliefs, values, and practices develop, differentiating one organization from another and often affecting the organization's success or failure. As one commentator has noted, "Most organizational scholars and observers now recognize that organizational culture has a powerful effect on the performance and long-term effectiveness of organizations."

The importance of organizational culture is a relatively new phenomenon. While organizational psychologists began developing theories of organizational behavior during the 1950s and 1960s, it wasn't until the 1980s that the culture of the organization was recognized as a key determinant of behavior and effectiveness. The interest in organizational cultures was largely created by William Ouchi's 1981 best-seller, *Theory Z: How American Business Can Meet the Japanese Challenge.* Ouchi considered organizational culture to be a key factor in creating an effective organization. In 1982 two other best-sellers, Terrance Deal and Allan Kennedy's *Corporate Cultures: The Rites and Rituals of Corporate Life* and Thomas Peters and Robert Waterman's *In Search of Excellence*, supported the idea that excellent companies tended to have strong cultures.

Throughout the 1980s, management scholars began attempting to describe these belief systems, which they referred to as organizational or corporate cultures. Interest in organizational culture has remained strong in subsequent decades as managers and executives continue to recognize the impact an organization's culture can have on such key factors as morale, productivity, and profit.

A STRONG ORGANIZATIONAL CULTURE

Strong organizational cultures are those where the core values of the dominant culture are strongly believed by the great majority of organizational members. A strong culture tends to increase behavior consistency and reduce turnover.

There are many practices within an organization that tend to keep a culture alive and measure the cultural fit between the organization and its employees. Many of the human resource practices such as selection, performance appraisal, training, and career development reinforce the organization's culture. Organizational beliefs also tend to influence the work norms, communication practices, and philosophical stances of employees. Organizations use a process called socialization to adapt new employees to the organization's culture. If employees do not adapt well, they feel increasing pressure from supervisors and from coworkers who are better acculturated. They might stay and fight, stay and become isolated, or leave the organization, voluntarily or involuntarily, and look for a different organization whose culture they fit better.

In contrast, employees who understand and share the organization's values have a better basis for making choices that match the firm's goals. Many organizations compete through innovation. When most employees understand and support the organization's expectations, less time is spent explaining, instructing, and building consensus before trying something innovative. Moreover, the error level will be lower in most cases. Employees who are well acculturated also find their work more meaningful: They are part of, and contributing to, something larger than themselves. Thus, a good cultural fit between employees and the organization contributes to employee retention, organizational productivity, and profit. However, strong cultures may be less adaptive to change, may create barriers to diversity, and may create barriers to successful acquisitions and mergers.

MEANS OF CONVEYING CULTURE

Organizations often convey cultural values explicitly by means of mission statements or corporate credos, or to a lesser extent through slogans, logos, or advertising campaigns. Leaders and managers also show what the organization values by what they say and do, what they reward, who they make allies, and how they motivate compliance. Other elements of culture appear tacitly in symbols and symbolic behavior. For instance, meeting protocols, greeting behavior, allocation and use of space, and status symbols are a few areas where organizational norms often develop. Culture can regulate social norms as well as work or task norms.

The new-employee orientation typically offered by organizations conveys selected cultural elements of which management is both aware and proud. Some cultural elements might be initially unpalatable, however, and some others might be hard to put into words. For instance, an orientation would rarely say outright that the culture rewards neglect of one's personal life and demands a sixty-hour work week, although these expectations are not unknown in corporate life. Perceptive new employees learn about tacit cultural elements through observation and through questioning trusted employees or mentors. This is not one-time learning; employees must continue to watch for signs that the rules are changing.

These organizational rules include explicit policy statements, but also a much larger and less evident set of unwritten organizational expectations. Attentive employees figure them out sooner than others. They listen to the metaphors, images, and sayings that are common in the organization. They watch, for example, the consequences of others' mistakes to reach conclusions about appropriate behavior.

Organizations also communicate values and rules through displayed artifacts. For example, in some organizations, the CEO's office displays many symbols of wealth, such as expensive original art or antiques. In others, the CEO's workspace is very spartan and differs little from that of other executives and higher-level managers. In the former case, a manager with other sources of income might be able to afford similar status symbols but would be unwise to display them since this might be perceived as competing with the CEO. In the latter case, display of personal wealth by people in general would probably be counter to organizational values.

Even the way a physical plant is laid out communicates cultural messages: Is it an open area where everyone can see everyone? Are there cubicles? Are there private offices? Is it easy or difficult to move and communicate between functional areas? Have ergonomics and convenience been considered or ignored? Are there adequate neutral spaces for people to meet to make decisions and solve problems? Do the break rooms and lunch rooms invite or discourage use?

SOME COMPONENTS OF CULTURE

The idea that organizations have cultures came originally from ethnography, the study and description of human social cultures. Researchers in organizational culture have borrowed some of that language. Individuals in societies took on specific "roles," such as ruler, priest, historian, or teacher. In organizations, similar roles emerge. The historian or storyteller, for instance, is usually a longtime employee who narrates inspirational stories about the company's early years or its evolution. Embodied in the stories are many of the core values that permeate the organization. This "organizational folklore" includes oft-repeated stories about the founder, a long-term CEO, a dramatic firing, or an individual who rose through the ranks very quickly owing to some attribute highly valued by the firm. The stars of an organization are comparable to a social culture's heroes. An organization's success stories yield "role models" for the ambitious.

Organizations develop "rites and rituals" comparable to traditional activities within an ethnic culture. Whereas some organizations might emphasize award ceremonies, others might de-emphasize explicit recognition and affiliation behaviors. Still others might foster "management by walking around," whereby managers spend frequent one-on-one time away from their desks giving praise or criticism to individuals. As another example, lunch with the president might be a longstanding tradition, although the amount of actual communication will vary from organization to organization according to unwritten rules about who talks to whom.

Although all organizations have both formal and informal communication networks, organizational culture strongly affects the content, reliability, and influence of

the informal network or "grapevine." When information through formal channels is scarce, the grapevine carries heavier traffic. Leaders aware of culture's importance try to find ways to tap and monitor the grapevine and sometimes use the grapevine by adding information to it.

CULTURE CHANGE

An organization's culture is composed of relatively stable characteristics that are based on deeply held values that are reinforced by many organizational practices. However, an organizational culture can be changed, and increasingly, such changes are becoming more frequent. Because of the fast-paced and dynamic nature of the twenty-first century's global environment, changes in organizational structure are today seen as just as important as constancy and steadfastness were in the previous century. As Cameron and Quinn point out in their 2006 book *Diagnosing and Changing Organizational Culture,* "Stability is interpreted more often as stagnation than steadiness, and organizations that are not in the business of change and transition are generally viewed as recalcitrant."

Beginning in the early 2000s, a number of books were published to guide organizations in changing their cultures. Such works as *Managing Change and Transition, Strategic Organizational Change,* and *The Corporate Culture Handbook: How to Plan, Implement, And Measure a Successful Culture Change Programme* have come to define the discussion of organizational culture. One example of when organizations must adapt their culture is when organizations become multinational. With the increase in global organizations, it has become clear that national cultures impinge on organizational cultures. Besides language differences, employees bring to the job many radically different assumptions about such aspects as the dignity of work, the proper relationship between employee and supervisor, the value of initiative, the treatment of unwelcome information, and the voicing of complaints. Organizations with international customers, and even more, those with global operations, have needed to learn how to adapt to a multicultural environment. Failure to adapt jeopardizes an organization's chance of success abroad.

Despite their importance and even necessity, cultural changes are not necessarily easy to decide upon or implement. Cultural changes are most likely to occur when there is a dramatic setback such as a financial crisis or when there is a turnover in top leadership. Also, younger and smaller organizations and organizations with a weak culture are more amenable to change.

Deliberate and major culture change occurs by executive fiat, by implementation of a plan, or a combination of these means. When leadership changes or when existing leadership commits to change, employees learn that the old assumptions which they were comfortable are no longer safe. After a merger or acquisition, for example, "how we do things here" will change, sometimes quickly and radically. A wise leadership team implements a planned culture-change process. The process usually consists of a series of two-way communications that elicit the prevailing assumptions, reassure employees that the changes can benefit them, introduce (sometimes gradually) the new vision, and work to gain employees' commitment and support. Leaders also must model the new culture for others and change the organization's structure and management practices to support the new culture. If the leaders skip the process or do an inadequate job, employees at all levels experience stress, confusion, and anger. When change is introduced so as not to arouse fear and resentment, however, transition may be relatively smooth.

To summarize, organizational culture is the shared assumptions, beliefs and values held by most members of an organization. Culture is conveyed in both explicit and implicit ways. Newcomers to an organization must quickly assimilate a great deal about the culture. Veteran employees must remain aware of cultural change too, especially when the leadership changes. A strong culture that is aligned with the organization's strategic context and is adaptive to environmental changes can enhance an organization's long-term financial performance.

SEE ALSO *Organizational Behavior; Organizational Development; Theory Z*

BIBLIOGRAPHY

Cameron, Kim S., and Robert E. Quinn. *Diagnosing and Changing Organizational Culture.* San Francisco, CA: Jossey-Bass, 2006.

Deal, Terrence E., and Allan A. Kennedy. *Corporate Cultures: The Rites and Rituals of Corporate Life.* Reading, MA: Addison-Wesley, 1982.

Graf, Alan B. "Building Corporate Cultures." *Chief Executive,* March 2005, 18.

Hofstede, Geert, and Gert Jan Hofstede. *Cultures and Organizations: Software of the Mind.* 2nd ed. New York: McGraw-Hill, 2004.

LaRue, Bruce, and Robert R. Ivany. "Transform Your Culture." *Executive Excellence,* December 2004, 14–15.

LeFranc, Fred. "A Dynamic Culture Can Make a Franchise System Successful." *Franchising World,* February 2005, 75–77.

Luecke, Richard. *Managing Change and Transition.* Boston, MA: Harvard Business School Publishing, 2003.

O'Donovan, Gabrielle. *The Corporate Culture Handbook: How to Plan, Implement, And Measure a Successful Culture Change Programme.* Dublin: Liffey Press, 2006.

Ouchi, William G. *Theory Z: How American Business Can Meet the Japanese Challenge.* Reading, MA: Addison-Wesley, 1981.

Panico, C. Richard. "Culture's Competitive Advantage." *Global Cosmetic Industry* 172, no. 12 (2004): 58–60.

Peters, Thomas J., and Robert H. Waterman, Jr. *In Search of Excellence: Lessons from America's Best Run Companies.* New York: Harper & Row, 1982.

Wright, Gordon. "Realigning the Culture." *Building Design* & *Construction* 46, no. 1 (2005): 26–34.

ORGANIZATIONAL DEVELOPMENT

Organizational development is an ongoing, systematic process to implement effective change in an organization. Organizational development is known as both a field of applied behavioral science focused on understanding and managing organizational change and as a field of scientific study and inquiry. It is interdisciplinary in nature and draws on sociology, psychology, and theories of motivation, learning, and personality.

HISTORY OF ORGANIZATIONAL DEVELOPMENT

In the late 1960s organizational development was implemented in organizations via consultants, but was relatively unknown as a theory of practice and had no common definition among its practitioners. In 1969 Richard Beckhard, an authority on organizational development and change management, defined organizational development as "an effort, planned, organization-wide, and managed from the top, to increase organization effectiveness and health through planned interventions in the organization's processes, using behavioral-science knowledge."

Throughout the 1970s and 1980s organizational development became a more established field with courses and programs being offered in business, education, and administration curricula. In the 1990s and 2000s, organizational development continued to grow and evolve and its influences could be seen in theories and strategies such as total quality management (TQM), team building, job enrichment, and reengineering. The global marketplace and working remotely with telecommuting teams are aspects of business today that are theorized in up-and-coming organizational development ideologies.

RATIONALE AND IMPLEMENTATION

Organizational development takes into consideration how the organization and its constituents or employees function together. Does the organization meet the needs of its employees? Do the employees work effectively to make the organization a success? How can the symbiotic relationship between employee satisfaction and organizational success be optimized? Organizational development places emphasis on the human factors and data inherent in the organization-employee relationship. Organizational development strategies can be used to help employees become

more committed and more adaptable, which ultimately improves the organization as a whole.

The organizational development process is initiated when there is a need, gap, or dissatisfaction within the organization, either at the upper management level or within the employee body. Ideally, the process involves the organization in its entirety, with evidenced support from upper management and engagement in the effort by all members from each level of the organization.

To launch the process, consultants with experience in organizational development and change management are often utilized. These consultants may be internal to the company or external, with the cautionary understanding that internal consultants might be too entrenched in the existing company environment to effectively coordinate and enforce the action plans and solutions required for successful change. Analysts contracted jointly with consultants can also be an effective problem-solving method, and this route is often employed when issues arise among executive leaders.

Data analysis through task forces, interviews, and questionnaires can illuminate likely causes for disconnects throughout an organization. These gaps can then be analyzed, an action plan formed, and solutions employed. This is by no means a linear process, nor is it a brief one. Feedback from all constituents should be elicited throughout the process and used to make adjustments to the action plan as necessary. Constant monitoring during the entire implementation effort is important for its success and acceptance.

THE FUTURE OF ORGANIZATIONAL DEVELOPMENT

There are contradictory opinions about the status and future prospects of organizational development. Is it a theory whose time has come and gone? Does its basis in behavioral science, a "soft" science, make it unappealing? What are the challenges for the future?

An article by Bunker, Alban, and Lewicki proposes six areas that could revitalize the field of organizational development in the future: virtual teams, conflict resolution, work group effectiveness, social network analysis, trust, and intractable conflict. These authors suggest that focusing on these areas will help bridge the gap between research theory (i.e., academics) and practice (i.e., consultants). Getting these two groups to communicate with each other will benefit both groups and promote organizational development efforts.

In a survey conducted by Church, Waclawski, and Berr, twenty individuals involved in the study and practice of organizational development were questioned about their perspectives and predictions on the future of the

field. The most in-demand services, according to those polled, are:

- Executive coaching and development
- Team building and team effectiveness
- Facilitating strategic organizational change
- Systemic integration
- Diversity and multiculturalism

They list the daily challenges in the field as the need for speed, resistance to change, interpersonal skills and awareness, and differentiating organizational development, which refers to the variety of definitions of organizational development among practitioners and how this impacts consultants, clients, and the clients' needs.

The future of organizational development includes an international focus and more thought and theory where multiple cultures collaborate in the world of business. An emphasis on the individual and how he should be counseled will include ideas about ethnicity, culture, and a broader worldview, rather than merely the Euro-American perspective.

The opinions on the future direction of the field vary among its practitioners. Nevertheless, the continuing interest in and value of optimizing an organization's needs and goals with the needs, wants, and personal satisfaction of its employees indicate that organizational development will continue to be relevant to and vital for organizational reform in the future, either in its present form or through evolution into other theories and practices.

SEE ALSO *Organization Theory; Organizational Learning; Quality and Total Quality Management; Teams and Teamwork*

BIBLIOGRAPHY
Beckhard, Richard. *Organization Development: Strategies and Models.* Reading, MA: Addison-Wesley, 1969.

Brown, D.R., and D.F. Harvey. *An Experiential Approach to Organization Development.* Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Bunker, Bargara B., Billie T. Alban, and Roy J. Lewicki. "Ideas in Currency and OD Practice: Has the Well Gone Dry?" *Journal of Applied Behavioral Science* 40, no. 4 (December 2004): 403–22.

Burke, W. Warner. "Internal Organization Development Practitioners: Where Do They Belong?" *Journal of Applied Behavioral Science* 40, no. 4 (December 2004): 423–31.

Cummings, Thomas G., and Christopher G. Worley. *Organization Development and Change.* 8th ed. Mason, OH: Thomson/South-Western, 2005.

French, Wendell L., Cecil Bell, and Robert A. Zawacki. *Organization Development and Transformation: Managing Effective Change.* 6th ed. New York: McGraw-Hill/Irwin, 2005.

Jones, Brenda B. and Michael Brazel. *The NTL Handbook of Organization and Change: Principles, Practices, and Perspectives.* San Francisco, CA: Pfeiffer, 2006.

Massarik, Fred, and Marissa Pei-Carpenter. *Organization Development and Consulting: Perspectives and Foundations.* San Francisco: Pfeiffer, 2002.

Schein, Edgar H. *Organization Development: A Jossey-Bass Reader.* San Francisco, CA: John Wiley & Sons, 2006.

Shifo, Ross. "OD in Ten Words or Less: Adding Lightness to the Definitions of Organizational Development." *Organizational Development Journal* 22, no. 3 (2004): 74–85.

Waclawski, Janine, and Allan H. Church. *Organization Development: A Data-Driven Approach to Organizational Change.* San Francisco: Jossey-Bass, 2002.

Wheatley, Margaret, Robert Tannenbaum, Paula Y. Griffin, and Kristine Quade. *Organization Development at Work: Conversations on the Values, Applications, and Future of OD.* San Francisco: Pfeiffer, 2003.

ORGANIZATIONAL LEARNING

The importance of learning in organizations has been recognized since the early twentieth century. Organizational learning was implicitly applied by Henry Ford in developing the Model T. This work demonstrated the existence of learning curves, whereby the time and cost needed to assemble products decreased by a constant percentage—usually 20 to 30 percent—for every doubling of output.

The phenomenon of learning curves, also called experience curves, progress curves, or learning by doing, became very popular in the 1960s and 1970s. At that time, many managers were held up to (and fired for not reaching) the 80 percent mark, meaning, with each doubling of output, costs were expected to decrease to 80 percent of the prior cost level. This overly simplistic view of learning curves resulted in disgruntlement with them in the 1980s.

Modern scholars realize that, although the learning curve is present in many organizations, there is great variation in the slope of those learning curves. The disparity in organizational learning rates clearly indicates that productivity rates are not guaranteed to improve as experience increases. Other factors are at play.

The goal of much research on organizational learning, is to determine which characteristics of an organization cause it to be able to continually learn and adapt to new circumstances. Those that are able to do so are called "learning organizations" because they are uniquely capable of improving themselves by learning from experience. Peter Senge popularized the concept of the learning organization in his 1993 book *The Fifth Discipline,* and he identified the following as its core ingredients:

1. Mental models—everyone sets aside old ways of thinking.

2. Personal mastery—everyone becomes self-aware and open to others.

3. Systems thinking—everyone learns how the whole organization works.

4. Shared vision—everyone understands and agrees to a plan of action.

5. Team learning—everyone works together to accomplish the plan.

Organizations that meet Senge's criteria offer work settings in which members develop their abilities to learn and are encouraged and helped to make that learning continuously available to everyone else. These organizations have value-driven organizational cultures that emphasize information sharing, teamwork, empowerment, participation, and learning. According to the 2006 Google Annual Report, the main benefit of the company's corporate culture has been the learning achieved through teamwork. Organized learning has been a natural offshoot of Google's dedication to the creativity and innovation of its collective, making it the most highly sought-after business model of the early twenty-first century.

Importantly, the leaders of learning organizations set an example for others by embracing change and communicating enthusiasm for solving problems and growing with new opportunities. Jack Welch, formerly the CEO of General Electric, communicated his enthusiasm for the learning organization when he once stated in an annual report that this was the company's only competitive advantage.

The imperative for improved learning derives from the emerging global, knowledge-based economy, which focuses on collective, entrepreneurial learning to create continual innovations in products, processes, and services. It is driven by the continuing growth of new technological knowledge. This, in turn, leads to newly definable markets for this knowledge and to changing organizational and network structures, thus enabling organizations to apply new technology in both old and new markets. The organizational learning and information sharing model used by Wikipedia is a good example of the global community organizing, synthesizing, and constantly editing information to the betterment of all who have access to it.

SEE ALSO *Knowledge Management; Organizational Culture; Trends in Organizational Change*

BIBLIOGRAPHY

Argote, Linda. *Organizational Learning: Creating, Retaining & Transferring Knowledge.* The Netherlands: Kluwer Academic Publishing, 1999.

Argyris, Chris, and David Schon. *Organizational Learning II.* London: Addison-Wesley, 1996.

Bray, David A. *Knowledge Management Research at the Organizational Level.* Atlanta, Georgia: Emory University, 2007.

Brin, Sergey, and Larry Page. *2006 Google Annual Report.* Delaware: United States Securities and Exchange Commission, 2006.

Garvin, David A. "Building a Learning Organization." *Harvard Business Review* 71 (1993).

Kline, Peter, and Bernard Saunders. *Ten Steps to a Learning Organization.* Green River Books, 1997.

Senge, Peter M. *The Fifth Discipline: The Art and Practice of the Learning Organization.* London: Century Business, 1993.

ORGANIZATIONAL STRUCTURE

Organizational structure refers to the way that an organization arranges people and jobs so that its work can be performed and its goals can be met. When a work group is very small, and face-to-face communication is frequent, formal structure may be unnecessary, but in a larger organization decisions have to be made about the delegation of various tasks. Thus, procedures are established that assign responsibilities for various functions. It is these decisions that determine the organizational structure.

In an organization of any size or complexity, employees' responsibilities typically are defined by what they do, who they report to, and for managers, who reports to them. Over time these definitions are assigned to positions in the organization rather than to specific individuals. The relationships among these positions are illustrated graphically in an organizational chart. The best organizational structure for any organization depends on many factors including the work it does; its size in terms of employees, revenue, and the geographic dispersion of its facilities; and the range of its businesses (the degree to which it is diversified across markets).

DEVELOPMENT OF THE TRADITIONAL ORGANIZATIONAL STRUCTURE

Understanding the historical context from which some of today's dominant organizational structures have developed helps to explain why some structures are the way they are. For instance, why are the old, but still operational steel mills such as U.S. Steel and Bethlehem Steel structured using vertical hierarchies? Why are newer steel mini-mills such as Chaparral Steel structured more horizontally, capitalizing on the innovativeness of their employees? Part of the reason, as this section discusses, is that organizational structure has a certain inertia—the idea borrowed from physics and chemistry that something in motion tends to continue on that same path. Changing

an organization's structure is a daunting managerial task, and the immensity of such a project is at least partly responsible for why organizational structures change infrequently.

At the beginning of the twentieth century the United States business sector was thriving. Industry was shifting from job-shop manufacturing to mass production, and thinkers like Frederick Taylor in the United States and Henri Fayol in France studied the new systems and developed principles to determine how to structure organizations for the greatest efficiency and productivity, which in their view was very much like a machine. Even before this, German sociologist and engineer Max Weber had concluded that when societies embrace capitalism, bureaucracy is the inevitable result. Yet, because his writings were not translated into English until 1949, Weber's work had little influence on American management practice until the middle of the twentieth century.

Management thought during this period did match Weber's ideas of bureaucracy, where power is ascribed to positions rather than to the individuals holding those positions. It also was influenced by Taylor's scientific management, or the "one best way" to accomplish a task using scientifically-determined studies of time and motion. Also influential were Fayol's ideas of invoking unity within the chain-of-command, authority, discipline, task specialization, and other aspects of organizational power and job separation. This created the context for vertically-structured organizations characterized by distinct job classifications and top-down authority structures, or what became known as the traditional or classical organizational structure.

Job specialization, a hierarchical reporting structure through a tightly-knit chain-of-command, and the subordination of individual interests to the superordinate goals of the organization combined to result in organizations arranged by functional departments with order and discipline maintained by rules, regulations, and standard operating procedures. This classical view, or bureaucratic structure, of organizations was the dominant pattern, as small organizations grew increasingly larger during the economic boom that occurred from the 1900s until the Great Depression of the 1930s. Henry Ford's plants were typical of this growth, as the emerging Ford Motor Company grew into the largest U.S. automaker by the 1920s.

The Great Depression temporarily stifled U.S. economic growth, but organizations that survived emerged with their vertically-oriented, bureaucratic structures intact as public attention shifted to World War II. Post-war rebuilding reignited economic growth, powering organizations that survived the Great Depression toward increasing size in terms of sales revenue, employees, and geographic dispersion. Along with increasing growth, however, came

increasing complexity. Problems in U.S. business structures became apparent and new ideas began to appear. Studies of employee motivation raised questions about the traditional model. The "one best way" to do a job gradually disappeared as the dominant logic. It was replaced by concerns that traditional organizational structures might prevent, rather than help, promote creativity and innovation—both of which were necessary as the century wore on and pressures to compete globally mounted.

DIFFERENT ORGANIZATIONAL STRUCTURES

There are multiple structural variations that organizations can take on, but there are a few basic principles that apply and a small number of common patterns. The structure of every organization is unique in some respect, but all organizational structures develop or are consciously designed to enable the organization to accomplish its work. Typically, the structure of an organization evolves as the organization grows and changes over time.

Researchers generally identify four basic decisions that managers have to make as they develop an organizational structure, although they may not be explicitly aware of these decisions.

1. Division of labor. The organization's work must be divided into specific jobs.

2. Departmentalization. Unless the organization is very small, the jobs must be grouped in some way.

3. Span of control. The number of people and jobs that are to be grouped together must be decided, which is related to the number of people that are to be managed by one person.

4. Authority. The way decision-making authority is to be distributed must be determined.

In making each of these design decisions, a range of choices are possible. At one end of the spectrum, jobs are highly specialized with employees performing a narrow range of activities; while at the other end of the spectrum employees perform a variety of tasks. In traditional bureaucratic structures, there is a tendency to increase task specialization as the organization grows larger. In grouping jobs into departments, the manager must decide the basis on which to group them. The most common basis, at least until the last few decades, was by function. For example, all accounting jobs in the organization can be grouped into an accounting department, all engineers can be grouped into an engineering department, and so on.

The size of the groupings also can range from small to large depending on the number of people the managers supervise. The degree to which authority is distributed throughout the organization can vary as well, but

traditionally structured organizations typically vest final decision-making authority by those highest in the vertically structured hierarchy. Even as pressures to include employees in decision-making increased during the 1950s and 1960s, top management usually made final decisions. The traditional model of organizational structure is thus characterized by high job specialization, functional departments, narrow spans of control, and centralized authority. Such a structure has been referred to as traditional, classical, bureaucratic, formal, mechanistic, or command and control. A structure formed by choices at the opposite end of the spectrum for each design decision is called unstructured, informal, or organic.

BASIS FOR DEPARTMENTALIZATION

Many organizations group jobs in various ways in different parts of the organization, but the basis that is used at the highest level plays a fundamental role in shaping the organization. There are four commonly used bases: functional, geographic, product, and customer/market.

Functional Departmentalization. Every organization of a given type must perform certain jobs in order to do its work. For example, key functions of a manufacturing company include production, purchasing, marketing, accounting, and personnel. The functions of a hospital include surgery, psychiatry, nursing, housekeeping, and billing. Using such functions as the basis for structuring the organization may, in some instances, have the advantage of efficiency. Grouping jobs that require the same knowledge, skills, and resources allows them to be done efficiently and promotes the development of greater expertise. A disadvantage of functional groupings is that people with the same skills and knowledge may develop a narrow departmental focus and have difficulty appreciating any other view of what is important to the organization; in this case, organizational goals may be sacrificed in favor of departmental goals. In addition, coordination of work across functional boundaries can become a difficult management challenge, especially as the organization grows in size and spreads to multiple geographical locations.

Geographic Departmentalization. Organizations that are spread over a wide area may find advantages in organizing along geographic lines so that all the activities performed in a region are managed together. In a large organization, simple physical separation makes centralized coordination more difficult. Also, important characteristics of a region may make it advantageous to promote a local focus. For example, marketing a product in Western Europe may have different requirements than marketing the same product in Southeast Asia. Companies that market products globally sometimes adopt a geographic structure. In addition, experience gained in a regional division is often excellent training for management at higher levels.

Product Departmentalization. Large, diversified companies are often organized according to product. All the activities necessary to produce and market a product or group of similar products are grouped together. In such an arrangement, the top manager of the product group typically has considerable autonomy over the operation. The advantage of this type of structure is that the personnel in the group can focus on the particular needs of their product line and become experts in its development, production, and distribution. A disadvantage, at least in terms of larger organizations, is the duplication of resources. Each product group requires most of the functional areas such as finance, marketing, production, and other functions. The top leadership of the organization must decide how much redundancy it can afford.

Customer/Market Departmentalization. An organization may find it advantageous to organize according to the types of customers it serves. For example, a distribution company that sells to consumers, government clients, large businesses, and small businesses may decide to base its primary divisions on these different markets. Its personnel can then become proficient in meeting the needs of these different customers. In the same way, an organization that provides services such as accounting or consulting may group its personnel according to these types of customers. Figure 1 depicts an organization grouped by customers and markets.

TRADITIONAL ORGANIZATIONAL STRUCTURE

The traditional approach is the vertically-arranged organizational structure that came to dominate in the first half of the twentieth century. This traditional model is easily represented in a graphical form by an organizational chart. It is a hierarchical or pyramidal structure with a president or other executive at the top, a small number of vice presidents or senior managers under the president, and several layers of management below this, with the majority of employees at the bottom of the pyramid. The number of management layers depends largely on the size of the organization. The jobs in the traditional organizational structure usually are grouped by function into departments such as accounting, sales, human resources, and so on. Figures 2a and 2b illustrate such an organization grouped by functional areas of operations, marketing, and finance.

Figure 1a
Organizational Structure
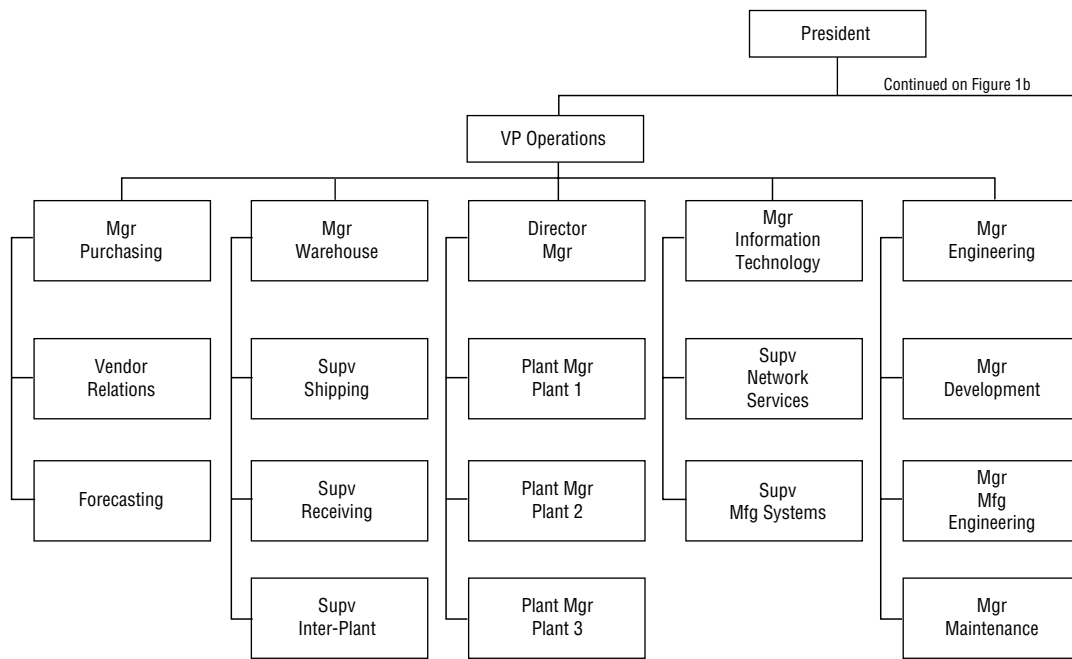
Figure 1b
Organizational Structure

Figure 2
Customer/Market Organization
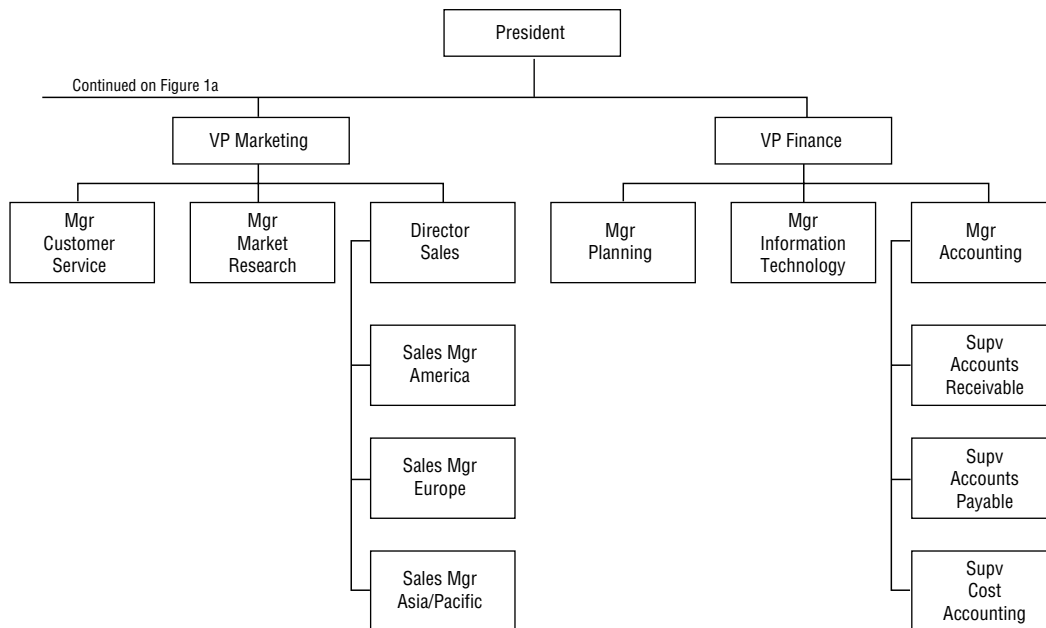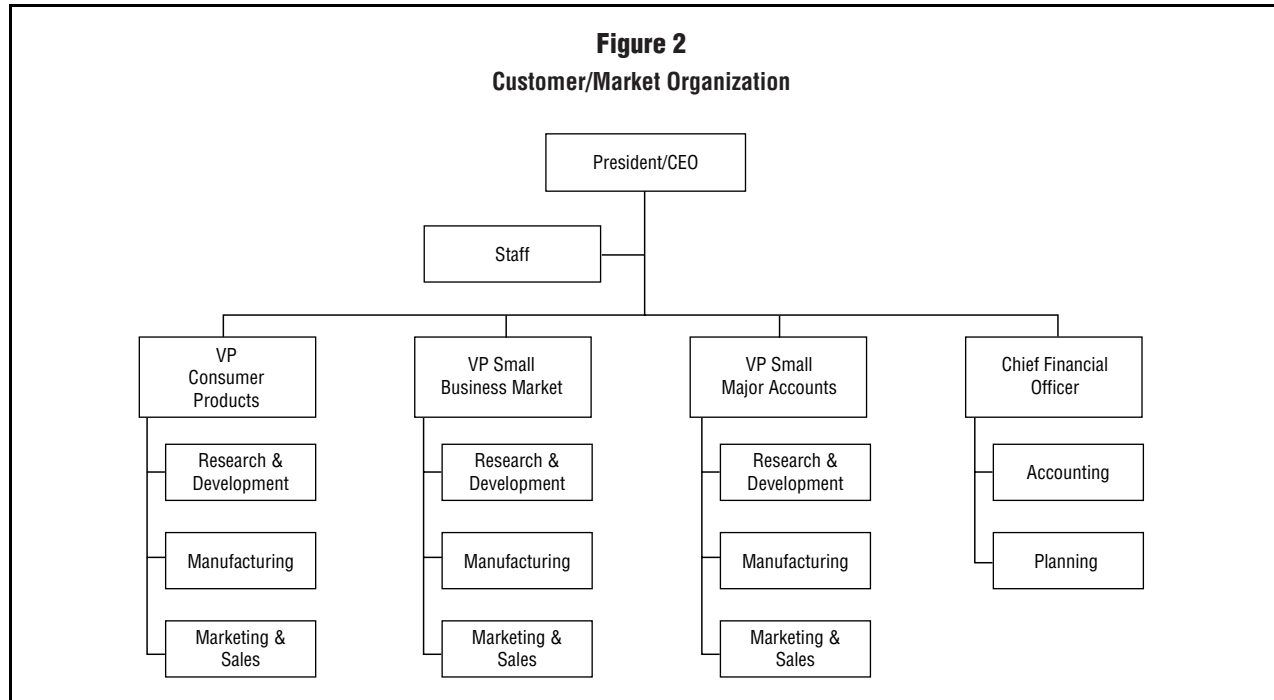
MATRIX ORGANIZATIONAL STRUCTURE

Some organizations find that none of the aforementioned structures meet their needs. One approach that attempts to overcome the inadequacies is the matrix structure, which is the combination of two or more different structures. Functional departmentalization commonly is combined with product groups on a project basis. For example, a product group wants to develop a new addition to its line; for this project, it obtains personnel from functional departments such as research, engineering, production, and marketing. These personnel then work under the manager of the product group for the duration of the project, which can vary greatly. These personnel are responsible to two managers (as shown in Figure 3).

One advantage of a matrix structure is that it facilitates the use of highly specialized staff and equipment. Rather than duplicating functions as would be done in a simple product department structure, resources are shared as needed. In some cases, highly specialized staff may divide their time among more than one project. In addition, maintaining functional departments promotes functional expertise, while at the same time working in project groups with experts from other functions fosters cross-fertilization of ideas.

The disadvantages of a matrix organization arise from the dual reporting structure. The organization's top management must take particular care to establish proper procedures for the development of projects and to keep communication channels clear so that potential conflicts do not arise and hinder organizational functioning. In theory at least, top management is responsible for arbitrating such conflicts, but in practice power struggles between the functional and product manager can prevent successful implementation of matrix structural arrangements. Besides the product/function matrix, other bases can be related in a matrix. Large multinational corporations that use a matrix structure most commonly combine product groups with geographic units. Product managers have global responsibility for the development, manufacturing, and distribution of their own product or service line, while managers of geographic regions have responsibility for the success of the business in their regions.

STRATEGIC BUSINESS UNITS

As corporations become very large they often restructure as a means of revitalizing the organization. Growth of a business often is accompanied by a growth in bureaucracy, as positions are created to facilitate developing needs or opportunities. Continued changes in the organization or in the external business environment may make this bureaucracy a hindrance rather than a help, not simply because of the size or complexity of the organization but due to a sluggish bureaucratic way of thinking. One approach to encourage new ways of thinking and acting

Figure 3
Matrix Structure
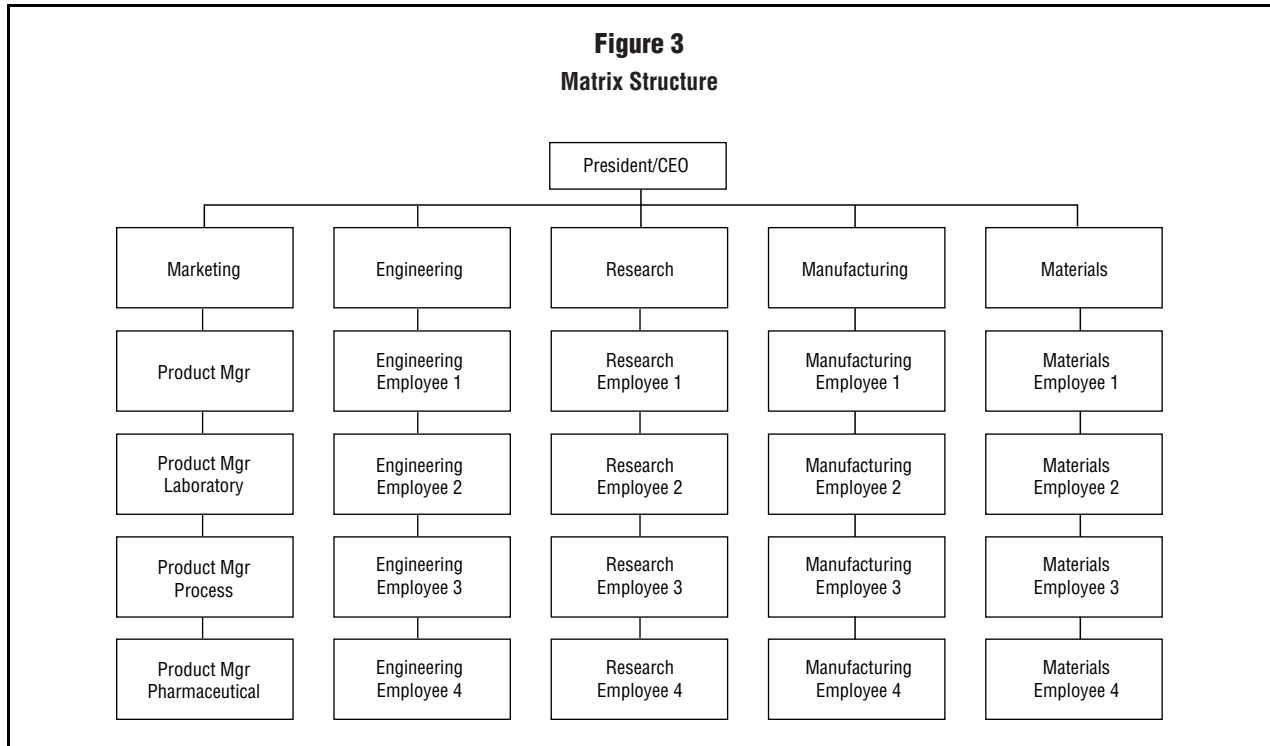
is to reorganize parts of the company into largely autonomous groups, called strategic business units (SBUs). Such units generally are set up like separate companies, with full profit and loss responsibility invested in the top management of the unit—often the president of the unit and/or a senior vice president of the larger corporation. This manager is responsible to the top management of the corporation. This arrangement can be seen as taking any of the aforementioned departmentalization schemes one step further. The SBUs might be based on product lines, geographic markets, or other differentiating factors. Figure 4 depicts SBUs organized by geographic area.

EMERGING TRENDS IN ORGANIZATIONAL STRUCTURE

Except for the matrix organization, all the structures described above focus on the vertical organization; that is, who reports to whom, who has responsibility and authority for what parts of the organization, and so on. Such vertical integration is sometimes necessary, but may be a hindrance in rapidly changing environments. A detailed organizational chart of a large corporation structured on the traditional model would show many layers of managers; decision-making flows vertically up and down the layers, but mostly downward. In general terms, this is an issue of interdependence.

In any organization, the different people and functions do not operate completely independently. To a greater or lesser degree, all parts of the organization need each other. Important developments in organizational design in the last few decades of the twentieth century and the early part of the twenty-first century have been attempts to understand the nature of interdependence and improve the functioning of organizations in respect to this factor. One approach is to flatten the organization, to develop the horizontal connections and de-emphasize vertical reporting relationships. At times, this involves simply eliminating layers of middle management. For example, some Japanese companies—even very large manufacturing firms—have only four levels of management: top management, plant management, department management, and section management. Some U.S. companies also have drastically reduced the number of managers as part of a downsizing strategy; not just to reduce salary expense, but also to streamline the organization in order to improve communication and decision-making.

In a virtual sense, technology is another means of flattening the organization. The use of computer networks and software designed to facilitate group work within an organization can speed communications and decision-making. Even more effective is the use of intranets to make company information readily accessible throughout the organization. The rapid rise of such technology has made virtual organizations and boundaryless organizations possible, where managers, technicians, suppliers, distributors, and customers connect digitally rather than physically.

Figure 4
SBU Structure
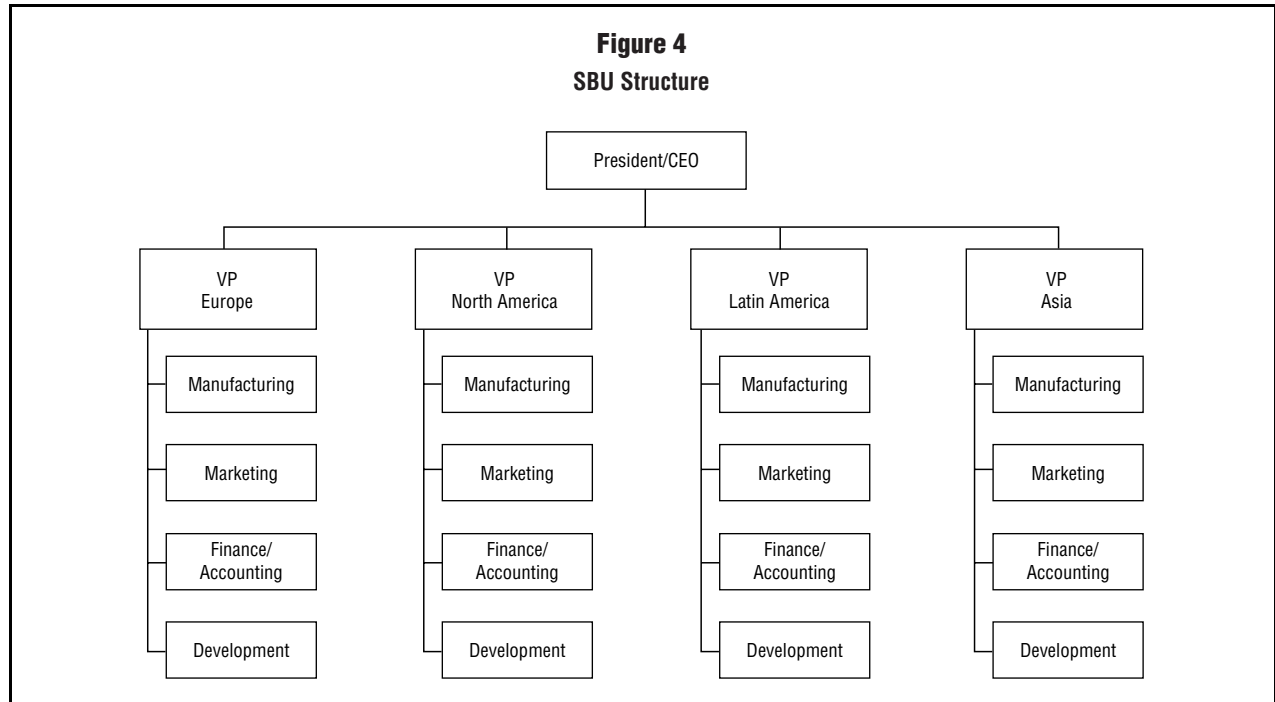
A different perspective on the issue of interdependence can be seen by comparing the organic model of organization with the mechanistic model. The traditional, mechanistic structure is characterized as highly complex because of its emphasis on job specialization, highly formalized emphasis on definite procedures and protocols, and centralized authority and accountability. Yet, despite the advantages of coordination that these structures present, they may hinder tasks that are interdependent. In contrast, the organic model of organization is relatively simple because it de-emphasizes job specialization, is relatively informal, and decentralizes authority. Decision-making and goal-setting processes are shared at all levels, and communication ideally flows more freely throughout the organization.

A common way that modern business organizations move toward the organic model is by the implementation of various kinds of teams. Some organizations establish self-directed work teams as the basic production group. Examples include production cells in a manufacturing firm or customer service teams in an insurance company. At other organizational levels, cross-functional teams may be established, either on an ad hoc basis (e.g., for problem solving) or on a permanent basis as the regular means of conducting the organization's work. Aid Association for Lutherans is a large insurance organization that has adopted the self-directed work team approach. Part of the impetus toward the organic model is the belief that this kind of structure is more effective for employee moti-vation. Various studies have suggested that steps such as expanding the scope of jobs, involving workers in problem solving and planning, and fostering open communications bring greater job satisfaction and better performance.

Saturn Corporation, a subsidiary of General Motors (GM), emphasizes horizontal organization. It was started in 1985 with the intention to learn and incorporate the best in business practices in order to be a successful U.S. auto manufacturer. The organizational structure that it adopted is described as a set of nested circles, rather than a pyramid. At the center is the self-directed production cell, called a Work Unit. These teams make most, if not all, decisions that affect only team members. Several such teams make up a wider circle called a Work Unit Module. Representatives from each team form the decision circle of the module, which makes decisions affecting more than one team or other modules. A number of modules form a Business Team, of which there are three in manufacturing. Leaders from the modules form the decision circle of the Business Team. Representatives of each Business Team form the Manufacturing Action Council, which oversees manufacturing. At all levels, decision-making is done on a consensus basis, at least in theory.

Saturn was originally established as an independently administered subsidiary of General Motors. Poor financial performance in the early twenty-first century led to a 2006 decision to reintegrate the company into the traditional GM divisional structure. GM executives hoped that the positive lessons learned from the Saturn experiment

would help improve the rest of GM's operation, making the company as a whole more competitive. In 2008, GM announced plans to sell Saturn. Despite these financial moves, GM has never repudiated the structural experiment, and many commentators continue to laud Saturn for its innovative approach to corporate organization.

RESTRUCTURING

Industry consolidation—creating huge global corporations through joint ventures, mergers, alliances, and other kinds of interorganizational cooperative efforts—has become increasingly important in the twenty-first century. Among organizations of all sizes, concepts such as agile manufacturing, just-in-time inventory management, and ambidextrous organizations are impacting managers' thinking about their organizational structure. Indeed, few leaders were likely to blindly implement the traditional hierarchical structure common in the first half of the twentieth century. The early twenty-first century has been dominated by the thinking that changing organizational structures, while still a monumental managerial challenge, can be a necessary condition for competitive success. As the authors of *Designing Organizations to Create Value* (2003) write, "a poor design can lead to lost profits and even result in the failure of the institution."

Indeed, corporate restructuring has become a popular response to financial difficulties in the twenty-first century. However, there are dangers to following the path of reorganization. Removing layers of bureaucracy to cut costs is tempting, but it can often be the case that removed layers of management creep back into the organization. It can also be difficult to reshape an organization with a strong organizational culture, as many well-established firms have. Further, reorganization may not be an appropriate response to trouble. According to a 2008 article in the *Harvard Business Review*, "in efforts to improve performance, most organizations go right to structural measures because moving lines around the org chart seems the most obvious solution and the changes are visible and concrete." However, the article notes, such changes are generally only short-term and "Several years later, companies usually end up in the same place they started."

Whatever the potential dangers, structural reorganization is likely to remain a popular corporate strategy in the fast-paced global environment of the twenty-first century. Properly handled, restructuring—particularly away from the traditional vertical model—can increase competitiveness and reorient the organizational culture and behaviors to enhance productivity and profits. Even with the attendant dangers, restructuring is a tempting path. As the authors of *Diagnosing and Changing Organizational Culture* (2006) note, "The failure rate of most planned organizational change initiatives is dramatic," but "organ-

izations that are not in the business of change and transition are generally viewed as recalcitrant."

SEE ALSO *Line-and-Staff Organizations; Organizational Chart; Organizational Culture; Organizational Development*

BIBLIOGRAPHY

Brews, Peter J., and Christopher L. Tucci. "Exploring the Structural Effects of Internetworking." *Strategic Management Journal* 25, no. 5 (2004): 429–452.

Birckley, Jim, et al. *Designing Organizations to Create Value: From Strategy to Structure.* New York: McGraw-Hill, 2003.

Cameron, Kim S. and Robert E. Quinn. *Diagnosing and Changing Organizational Culture.* San Francisco, CA: Jossey-Bass, 2006.

Galbraith, Jay R. *Designing Organizations.* San Francisco, CA: Jossey-Bass, 2002.

Hansen, Morten T., and Nitin Nohria. "How to Build Collaborative Advantage." *MIT Sloan Management Review* 46, no. 1 (2004): 22–31.

Lumpkin, G.T., and Gregory G. Dess. "E-Business Strategies and Internet Business Models: How the Internet Adds Value." *Organizational Dynamics* 33, no. 2 (2004): 161–173.

Miles, Raymond, and Charles Snow. *Organizational Strategy, Structure, and Process.* New York: McGraw-Hill, 2003.

Neilson, Gary L., Karla L. Martin, and Elizabeth Powers. "The Secrets to Successful Strategy Execution." *Harvard Business Review,* June 2008. Available from: http://www.orgdna.com/google/hbr2008_download.cfm.

O'Reilly, Charles A., III, and Michael L. Tushman. "The Ambidextrous Organization." *Harvard Business Review* 82, no. 4 (2004): 74–82.

"Organizational Structure Types and Design Strategy." *Organizational Structure.net.* Available from: http://www.organizationalstructure.net/.

Ticoll, David. "Get Self-Organized." *Harvard Business Review* 82, no. 9 (2004): 18–20.

ORGANIZING

Organizing is the managerial function of arranging people and resources to work toward a common goal. The purposes of organizing include, but are not limited to determining the tasks to be performed to achieve objectives, dividing tasks into specific jobs, grouping jobs into departments, specifying reporting and authority relationships, delegating the authority necessary for task accomplishment, and allocating and deploying resources in a coordinated fashion.

Henri Fayol first identified organizing as a function of management in his classic monograph *General and Industrial Administration.* This book was published in France in 1916 but was not translated into English until the 1920s, and it was not published in the United States until 1949. Fayol's monograph has had a profound effect on the teaching and practice of management in the years since. Early "principles of management" texts published

in the 1950s generally were organized around management functions, including organizing, as are most basic management texts from the late 1990s.

Organizing plays a central role in the management process. Once plans are created, the manager's task is to see that they are carried out. Given a clear mission, core values, objectives, and strategy, the role of organizing is to begin the process of implementation by clarifying jobs and working relationships. It identifies roles and how different parts of the organization relate to and work with one another. All of this, of course, can be done in many ways. The strategic leadership challenge is to choose the best organizational form to fit the strategy and other demands.

ORGANIZING DECISIONS

When organizing, managers must make decisions about the division of labor and work specialization, departmentalization, chain of command, span of management, centralization, and formalization. Collectively, these decisions are often called organizational design.

Division of Labor or Specialization. More than two centuries ago, Adam Smith concluded that division of labor contributes to increased productivity and efficiency by allowing workers to specialize and become proficient at a specific task. This principle, coupled with technological advances, made possible the tremendous productivity of industrial companies during most of the twentieth century.

By the 1940s most manufacturing jobs in developed nations were highly specialized, with workers performing specific, standardized, and repetitive tasks. This resulted in reduced staffing, training, and compensation costs, since highly skilled workers were often not necessary. In addition, since employees were doing the same task repetitively, they tended to become very good at it.

Despite the improvements in productivity made possible by the division of labor, managers must be aware of the negative aspects of specialization: fatigue, stress, boredom, low quality products, absenteeism, and turnover. Such problems have led to programs geared toward job enlargement and job enrichment. Many enterprises now cross-train specialized workers to avoid constant repetitive work and reduce the risk of layoffs should one skill become obsolete.

Departmentalization. After the work to be completed is organized into identifiable jobs through a process of dividing labor, jobs are then combined into logical sections or departments. Doing so allows for effective coordination of effort. There are many ways to departmentalize, each of which has important advantages and disadvantages. One of the most common forms is functional departmentalization, which involves grouping similar jobs into a common department, such as accounting, sales, human resources, and engineering. Another form

is product departmentalization, which involves organizing around an enterprise's various product lines. Other ways of departmentalizing include organizing by customer and by geographic territory. In practice, most large companies use a hybrid form of departmentalization, which means they combine one or more of the above methods to form their organizational structure.

Chain of Command. The chain of command is a line of authority extending from the top to the bottom of the organizational structure. Classic principles of organizing emphasize that one must be aware of the need to define the extent of managers' responsibility and authority by specifying their place in the chain of command. Another principle of organizing related to the chain of command is called the unity of command, which states that a person should have only one superior to whom he or she must report.

Span of Management. The span of management, often called the span of control, is the number of individuals who are directly responsible to a particular manager. A classic principle of organizing suggests that there are definite limits to the number of subordinates one manager can supervise effectively. When organizing, managers must keep these limits in mind. Wide spans of management lead to flatter organizational structures with fewer layers of management, and are thus considered more efficient. However, if spans become too wide managers may not be able to provide adequate direction to subordinates. Narrow spans of management lead to tall organizational structures with many layers of management. Although narrower spans of management allow for closer supervision of subordinates they have many drawbacks, including cost, communication problems, and difficulty in developing the initiative and autonomy of subordinates.

In general, the trend is toward wider spans of management, with an accompanying decrease in management hierarchy. Technological advances in information processing and communication have made wider spans of management more feasible.

Chief among these advances is methods of organization that make it possible for multiple users to co-manage projects away from a centralized office. Software (like PeopleReady and SharePoint) helps organize group efforts in communication, building a customer base, finding and sharing information, creating a proactive mobile workforce, and organizing the company's platform.

Degree of Centralization. Another organizing decision is the degree of centralization in the organizational structure. If decision-making authority in an organization is highly centralized, then most major decisions are made at the upper levels of the structure. Conversely, if decision-making

authority is decentralized, important decisions are often made at lower levels of the hierarchy. The degree of centralization that is appropriate for a given organization depends upon many factors, including the nature of the environmental conditions that face the enterprise, the characteristics and abilities of lower-level employees, and the size of the enterprise. Many organizations are favoring a greater degree of decentralization of their decision-making authority.

Formalization. The degree of formalization in an enterprise refers to the degree to which there are standardized rules and procedures governing the activities of employees. A company with a high degree of formalization is characterized by detailed job descriptions and clearly defined policies and procedures covering a wide variety of employee behaviors. Conversely, a company with a low level of formalization is characterized by non-structured jobs and fewer explicit policies and procedures.

As companies grow larger, a certain amount of formalization is inevitable. Employees require some direction in their job responsibilities and in the procedures required for consistency within the organization's production schema. When organizing, however, managers should be aware of the costs of excessive formalization, which may include stifling employee creativity and innovation as well as slowing the organization's responsiveness to critical issues and problems.

FACTORS AFFECTING ORGANIZING DECISIONS

There is no standard formula for the best way to organize an enterprise. Several factors have been shown to influence organizing decisions. Among the most important of these factors are strategy, size, environmental conditions, and technology.

Strategy. Managers organize in order to achieve the objectives of the enterprise for which they work. Thus, the strategy of the enterprise affects organizing decisions. Changes in strategy frequently necessitate changes in the way the enterprise is organized.

Size. Small enterprises tend to exhibit less formalization, centralization, and complexity in their organizational structure. Nevertheless, enterprises of the same size may be organized quite differently because of differences in strategy, environmental conditions, and technology.

Environmental Conditions. The key factor in the external environment that is relevant to organizing is uncertainty. Some enterprises face competitive environments that change rapidly and are quite complex, while others face relatively stable conditions. Generally, turbulent envi-ronments call for organizing decisions that lead to less formalization and centralization in the organizational structure. Companies that wish to be less formal and operate from a less upper-management driven schema will benefit from sharing as much of the information and responsibility as possible with employees at every level in the organization. Weekly newsletters including finance information, town hall-style meetings, an open door policy at all levels of the hierarchy, and an open forum company-wide instant messenger system will all serve to this end.

Technology. The processes by which an enterprise transforms inputs into outputs may also affect organizing decisions. Some research suggests that organizing decisions that lead to high degrees of formalization, centralization, and work specialization are more appropriate for routine technologies and that the converse is true for non-routine technologies. The trend in popular business models shifts constantly, but enterprises of all sizes should take their own needs—not what is popular—into consideration when deciding the degree of formalization and centralization they will implement.

SEE ALSO *Management Functions; Organizational Chart; Organizational Structure*

BIBLIOGRAPHY

Fayol, Henri. *General and Industrial Administration.* London: Sir Isaac Pitman & Sons, Ltd., 1949.

Hillier, Scot P. *Microsoft SharePoint: Building Office 2007 Solutions in VB 2005.* New York, NY: Springer-Verlag, 2007.

Robbins, Stephen P., and Mary Coulter. *Management.* 10th ed. Upper Saddle River, NJ: Prentice Hall, 2003.

Schermerhorn, John. *Management.* 8th ed. New York: John Wiley & Sons, 2004.

Sun, Guang-Zen. *Readings in the Economics of the Division of Labor: The Classical Tradition* Hackensack, NJ: World Scientific Publishing, 2005.

OUTSOURCING AND OFFSHORING

Outsourcing refers to a firm's practice of paying another firm to perform a function or produce a product that could be done or made in-house by the paying firm. It usually involves more information exchange, coordination, and trust than a mere vendor relationship, since a certain amount of management control is transferred to the supplier. Products and services can be outsourced domestically or to a foreign company. Outsourcing is increasingly associated with firms located overseas, where salaries are markedly lower.

Business process outsourcing, or BPO, is the most common type of outsourcing, occurring when businesses outsource a part of their process to another company, with the goal of cutting costs and improving efficiency. Payroll, accounting, and customer service outsourcing are all examples of BPO. There are two classifications of BPOs: front office and back office. Front office BPO refers to outsourcing parts of the process that include customers or visible parts of the company, such as tech support or customer service. Back office BPO refers to activities that are not as visible and that do not come in contact with the customer directly (such as billing supply purchasing and other accounting services).

Outsourcing and offshoring began in the 1960s and 1970s with the transfer of physical manufacturing processes to lower-cost areas. For example, some U.S. companies shifted production to factories in Mexico that were part of a *maquiladora* system. Offshoring of physical products then moved to other low-cost locations such as China, India, the Philippines, and Eastern Europe. Despite increased transportation, dock, duty, and broker costs and loss of supply-chain speed, firms found that a 30 to 50 percent reduction in labor costs more than compensated for these increases.

The information technology revolution has made location much less important since inputs and outputs can be transmitted digitally. This has facilitated the offshoring of many white-collar functions. For example, the computer manufacturer Dell has outsourced its technical support for residential customers. When customers dial the number for technical support they are connected with technicians in India. With the costs of establishing sufficient bandwidth, compatible software connections, and video hookups decreasing rapidly, more employers may embrace the opportunity to replace employees located in the United States with lower-cost workers overseas.

Some analysts foresee a new global division of labor emerging. They propose that the West will focus on the highest levels of product creation, the part that entails artistry, creativity, and empathy with the customer, and the jobs involving turning these concepts into actual products and services will be sent overseas. However, outsourcing is also used for the process of innovation. Some American firms feel that their current spending on research and development is not yielding a sufficient return, so they are turning to "original design manufacturers" (ODMs). These ODMs completely design products that are then sold to firms such as Dell, Motorola, and Philips, who tweak them to their own specifications and label them with their own brand names.

TYPES OF OUTSOURCING

Although all types of outsourcing share similar characteristics already discussed, there are many different types of outsourcing recognized in the business world. Marc

Schniederjans, in his 2008 book, *Outsourcing and Insourcing in an International Context*, gives an excellent list of the most common types of outsourcing, which include:

- *Offshore Outsourcing.* This refers to outsourcing to a firm located in another country. It does not mean that a company opens a branch in a different country—which is actually a form of insourcing, since the business is closer in proximity—but merely that another company enters the supply chain in an international relationship.

- *Nearshore Outsourcing.* This is a type of offshore outsourcing, but occurs when a company outsources to a nation that is nearby. For instance, America outsources many operations to Mexico, a neighboring country. Nearshore outsourcing reduces transportation and often communication costs.

- *Transitional Outsourcing.* This type of outsourcing allows a business to concentrate on a particular part of the business system, while outsourcing older or more traditional models. A company may outsource certain outdated technologies while working to develop a new replacement technology within the organization. Other companies may want to give up a business system entirely to free resources they can use to specialize.

- *Co-sourcing.* Co-sourcing involves paying the providing firm based on their performance, usually in reaching a goal. Companies collaborate on setting expectations and fulfilling them, and the provider is compensated when expectations are met.

- *Spin-Offs.* Spin-offs occur when a company splits and a separate organization is established. Tasks are switched to this new organization.

- *Backsourcing.* Also known as an insourcing activity, backsourcing occurs when a company is displeased with their outsourcing provider, and moves the outsourced tasks back to the original organization. This could involve breaches in the contract, ineptitude, or falling profits, but backsourcing usually means that negative aspects of the relationship caused the company to undo their outsourcing endeavor.

- *Business Process Outsourcing* (BPO). Already mentioned, this type of outsourcing is rising in popularity as companies move particular departments or systems to other firms who can carry them out more efficiently.

- *Business Transformation Outsourcing* (BTO). This process relegates business activities to another firm so that the company can focus on reinventing itself, create a new business model, or enter a different industry. An outside firm is hired to carry on the

necessary systems of the old business while the company explores a new field or another way of conducting business within its industry.

- *Value-added Outsourcing.* This is when a company gains competitive advantage by outsourcing tasks the providing firm can do better or with more efficiency.

- *Netsourcing.* This involves partnering with another company for online interactions, such as renting a Web site or collaborating to create a new program for the company. Some outsource the maintenance of their intranet to other firms.

- *Shared Outsourcing.* This occurs when a provider works on the same outsourced task for multiple companies, such as handling customer service for several similar companies, or working on the same piece of computer code for more than one tech firm.

- *Multisourcing.* This involves a company choosing multiple firms to outsource tasks to, usually to improve quality and gain more flexibility in their outsourcing arrangements. Some companies only begin to multisource to ensure competitive bidding for their outsourcing contract; eventually, they choose one firm at a lower cost.

OUTSOURCING AND MULTISOURCING

How should a company begin to outsource? Most experts agree that the current outsourcing trend involves backing away from large contracts that have high costs and put a hefty amount of the company's production process in other hands. Instead, businesses are backing down, choosing lesser contracts with a variety of other firms, some local and some overseas, in a network-type of relationship, also known as multisourcing. Multisourcing allows businesses more flexibility, letting them solve production problems with greater ease and implement new techniques with less hassle.

What other considerations should companies make when deciding to multisource? Business writer Ephraim Schwartz outlines several important issues to consider in his 2008 article, "Outsourcing: Breaking Up is Hard to Do":

1. The more complicated outsourcing becomes, the more vendors will be present and the more issues that will need to be resolved, especially if a certain part of the company's process is divided up among several different outsourced tasks. Primary concerns will be communication and coordination. It is best to develop a successful integration plan before multisourcing.

2. Bigger companies might be less willing to be multisourcing partners than outsourcing partners. Outsourcing with one sizable contract means that the company carrying out the tasks is guaranteed large payments for a fair amount of time. In multisourcing, companies must be willing to accept shorter contracts and less money. This means large outsourcing-ready firms will not be as likely to participate in the company's outsourcing efforts. Smaller firms may need to be found.

3. Multisourcing, even more than outsourcing, needs talented project managers. Having skilled people on both sides is necessary, especially because of the coordination difficulties in multisourcing. Managers with the ability to field complaints, solve problems, and handle multiple communication efforts are necessary.

4. Costs can come with multisourcing, Although savings is a primary objective when outsourcing, costs can creep up in other areas. The talented managers, large-scale communication efforts, multiple vendors, and multi-level training programs will all eat away at the savings outsourcing gives. Companies should carefully consider how much they will really save—and spend—on multisourcing.

BACKSOURCING AND CONTRACTS

When considering a move toward outsourcing business processes, a company should attempt to protect themselves against the possibility of backsourcing. Backsourcing occurs when a company, disappointed by the results from their provider firm, brings their processes back to the original organization and breaks off their partnership with the providing firm. A final act, backsourcing should be carried out only as a last resort, the end to a failed relationship. This is also known as insourcing, although insourcing typically refers to bringing processes closer to a company for a multitude of reasons, not only negative results.

Business author Addleshaw Goddard has devised a list of suggestions for companies who are considering backsourcing, whether before or after their original outsourcing decision. This comprehensive list includes many of the key backsourcing issues, which should be mentioned:

- Companies should do what they can with their existing contract with the provider when deciding to backsource. Backsourcing requires paying very careful attention to the original contract and often creating a new agreement to help the process.

- Companies should take care of their own employees. Often organizations will find it necessary to send their employees to be a part of the outsourcing

endeavor, for training and knowledge purposes. When backsourcing, companies should ensure they have provided for these employees prior to attempting the backsource. Will the employees still have jobs at their organization? Will they have the same jobs they had prior to outsourcing?

- In the time between outsourcing and backsourcing, the company may have lost the ability to perform the outsourced tasks, especially if they were complex. Companies should be sure they can still perform the necessary processes if they decide to backsource. Losing capability can severely cripple an organization's flexibility when dealing with negative outsourcing.

- When first creating the outsourcing contract, companies should be careful to include provisions in case of backsourcing. Flexibility is very important. Legally, companies need to have enough room to maneuver to a different provider or reassimilate processes in case of failure.

- Reviews help companies judge the performance of their outsourcing providers. Regular reviews should be conducted to ensure the provider is fulfilling the contract and producing satisfactory results. Many companies tie semi-annual reviews into the contract, so they can use the reviews as a basis for backsourcing if necessary.

- Companies may wish to hire third-party reviewers, to analyze the provider and their overall competence.

There are other types of measurement that companies can use to analyze their providers in an outsourcing relationship. Benchmarking measurements, which look at price and quality, can also judge the performance of outsource firms. Other company measurements can be applied to the outsourcing endeavor as well.

Outsourcing and offshoring have caused considerable controversy in the United States, as the country has lost jobs to foreign nations. Forrester Research predicts that 3.3 million white-collar jobs and $136 billion in wages will shift from the United States to lower-wage countries by the year 2015. Despite possible backlash, some feel that outsourcing and offshoring are beneficial to the United States. Nineteenth-century economist David Ricardo proposed that the nation losing jobs will eventually recover its economic loss by developing worldwide markets for its products and services. Outsourcing can also enable firms to spend more time and resources on their core competencies, leading to more innovative goods and services to be sold globally.

SEE ALSO *International Business; International Management; Technology Management; Technology Transfer*

BIBLIOGRAPHY
"40 Risks Purchasing Pros Must Address for Outsourcing Success." *Supplier Selection & Management Report,* March 2005, 406.

Blokdijk, Gerard. "Business Process Management: BPM, 100 Success Secrets." *Lulu.com,* 2008.

Economic Policy Institute. "EPI Issue Guide: Offshoring." Available from: http://www.epinet.org/.

Engardio, Pete, and Bruce Einhorn. "Outsourcing Innovation." *Business Week,*, 21 March 2005. Available from: http://www.businessweek.com/magazine/content/5_12/b39225601.htm.

Goddard, Addleshaw. "IT Outsourcing." *Silicon.com,* 2006. Available from: http://services.silicon.com/itoutsourcing/0,3800004871,39156077,00.htm?r=5.

LaLonde, Bud. "From Outsourcing to 'Offshoring'-Part 1." *Supply Chain Management Review* 8, no. 2 (2004): 6–7.

Michel, Roberto. "Sorting Out Offshoring Versus Outsourcing." *MSI* 22, no. 1 (2004): 2.

Schwartz, Ephraim. "Outsourcing: Breaking Up Is Hard to Do." *InfoWorld,* 2008. Available from: http://weblog.infoworld.com/realitycheck/archives/2008/05/outsourcing_bre.html.

Schniederjans, Marc J. *Outsourcing and Insourcing in an International Context.* M.E. Sharpe, 2005.

P

PARADIGM SHIFT

A paradigm is an overarching theory or viewpoint that a society operates by, accepting it as a basis for understanding. When a paradigm shift occurs, a new theory is proved and established, forcing all members under the old theory to change their perspective. There is often a strong movement against shifting paradigms, since many must restructure their businesses and lives to reflect the new understanding. However, a true paradigm shift will be inevitable, a step in natural progress as knowledge in a particular field increases.

One of the most often cited examples of a paradigm shift is Copernicus's theory that the Earth, along with other planets, revolved around the Sun. It took scientists centuries to fully accept this physical principle which eventually revolutionized many scientific fields. Another paradigm shift occurred at the beginning of the twentieth century, when Newtonian physics began to be replaced by Einstein's theories of relative space and time. As in science, many important paradigm shifts have occurred in the business world as economic principles have been more fully explored and organizational structures attempted. Some of the predicted paradigm shifts for the business world include new management paradigms and revolutionary marketing techniques.

PARADIGM CRISIS

A paradigm shift is often begun by a paradigm crisis, which occurs when the current understanding of a situation is not adequate to explain events. When this happens, people begin seeking other explanations to explain events more clearly and accurately. Changes in international policy or economic situations can begin business paradigm crises, while scientific crises are most often caused by data that cannot fit into the current model. The crisis is resolved when a new model is created that explains current events so well it becomes accepted by the majority in the field, thereby establishing the next paradigm.

BUSINESS PARADIGM SHIFTS

Many business analysts see the arrival of Internet-based collaboration, social networking, and Web 2.0 applications as the beginning of an important business management paradigm shift. For the past couple centuries, managers have produced their own goals and ideas for their companies to follow, creating a top-down system of governance in which employees follow orders from the executives who work on innovation and concepts. Invention was relegated to individual innovators and those with entrepreneurial talent.

While such innovative people are still expected to be necessary, the communication technology of the early twenty-first century is allowing organizations to form ideas in a more fluid, collaborative manner. Concepts are beginning to be formed as a result of employee discussion and customer understanding. Decision making is being spread further throughout the organization, leading to bottom-up strategies formed by the widespread creativity of many organizational members.

To deal with these new methods of creativity, managers must learn to judge incoming data. Widespread collaborative creativity results in a large amount of information, which must be used based on quality and authority. How will managers be able to trust data from so many different sources? What protocols will be established to deal with such employee-generated ideas? These are the

questions the decision-making paradigm shift may bring to the twenty-first century.

PARADIGMS AND IMAGE

Paradigm shifts also apply to marketing principles. This has become an important part of company branding and rebranding, as organizations seek to create a distinctive image for themselves. In this way companies can produce and manage their own paradigm among customers by creating important marketing and innovation strategies. Paradigm shifts can also occur within the organization as new views are accepted concerning branding and image. Sometimes all that is needed is a change in attitudes toward how a company can brand itself and what its brand is founded on.

Managers will encounter paradigm shifts, both large and small, in their organizations. Understanding what decisions are based upon paradigms—and how these decisions will change as the paradigms change—is a vital part of effective leadership.

BIBLIOGRAPHY

Hiebert, Murray, and Bruce Klatt. *The Encyclopedia of Leadership.* New York: McGraw-Hill Professional, 2000.

Knapp, Duane E. *The Brand Mindset.* New York: McGraw-Hill Professional, 1999.

Kotelnikov, Vadim. "Paradigms and Paradigm Shifts." *1000Ventures. com,* 2008. Available from: http://www.1000ventures.com/business_guide/crosscuttings/thinking_paradigms.

"New Management Thinking—Are You Ready for the Paradigm Shift?" *CBR,* 1 Nov 2007. Available from: http://www.cbronline.com/article_feature.asp?guid=2000C49D-30FC-4373-81DE-C5913B753C68.

PARTICIPATIVE MANAGEMENT

Participative (or participatory) management, otherwise known as employee involvement or participative decision making, encourages the involvement of stakeholders at all levels of an organization in the analysis of problems, development of strategies, and implementation of solutions. Employees are invited to share in the decision-making process of the firm by participating in activities such as setting goals, determining work schedules, and making suggestions. Other forms of participative management include increasing the responsibility of employees (job enrichment); forming self-managed teams, quality circles, or quality-of-work-life committees; and soliciting survey feedback.

Participative management, however, involves more than allowing employees to take part in making decisions. It also involves management treating the ideas and suggestions of employees with consideration and respect. The

most extensive form of participative management is direct employee ownership of a company.

Four processes influence participation. These processes create employee involvement as they are pushed down to the lowest levels in an organization. The farther down these processes move, the higher the level of involvement by employees. The four processes include:

1. Information sharing, which is concerned with keeping employees informed about the economic status of the company.

2. Training, which involves raising the skill levels of employees and offering development opportunities that allow them to apply new skills to make effective decisions regarding the organization as a whole.

3. Employee decision making, which can take many forms, from determining work schedules to deciding on budgets or processes.

4. Rewards, which should be tied to suggestions and ideas as well as performance.

BENEFITS OF PARTICIPATIVE MANAGEMENT

A participative management style offers various benefits at all levels of the organization. By creating a sense of ownership in the company, participative management instills a sense of pride and motivates employees to increase productivity to achieve their goals. Employees who participate in the decisions of the company feel like they are a part of a team with a common goal, and find their sense of self-esteem and creative fulfillment heightened. It is important to understand that participative management at one organization is not likely to look the same at the next. Subordinate involvement will vary, and the role of management will have different meanings within different international enterprises.

Managers who use a participative style find those employees are more receptive to change than in situations in which they have no voice. Changes are implemented more effectively when employees have input and make contributions to decisions. Participation keeps employees informed of upcoming events so they will be aware of potential changes. The organization can then place itself in a proactive mode instead of a reactive one, as managers are able to quickly identify areas of concern and turn to employees for solutions.

Participation helps employees gain a wider view of the organization. Through training, development opportunities, and information sharing, employees can acquire the conceptual skills needed to become effective managers or top executives. It also increases the commitment of employees to the organization and the decisions they make.

Creativity and innovation are two important benefits of participative management. By allowing a diverse group of employees to have input into decisions, the organization benefits from the synergy that comes from a wider choice of options. When all employees, instead of just managers or executives, are given the opportunity to participate, the chances are increased that a valid and unique idea will be suggested.

REQUIREMENTS OF PARTICIPATIVE MANAGEMENT

A common misconception by managers is that participative management involves simply asking employees to participate or make suggestions. Effective programs involve more than just a suggestion box. In order for participative management to work, several issues must be resolved and several requirements must be met. First, managers must be willing to relinquish some control to their workers; managers must feel secure in their position in order for participation to be successful. Often managers do not realize that employees' respect for them will increase instead of decrease when they implement a participative management style.

The success of participative management depends on careful planning and a slow, phased approach. Changing employees' ideas about management takes time, as does any successful attempt at a total cultural change from a democratic or autocratic style of management to a participative style. Long-term employees may resist changes, not believing they will last. For participation to be effective, managers must be genuine and honest in implementing the program. Many employees will need to consistently see proof that their ideas will be accepted or at least seriously considered. The employees must be able to trust their managers and feel they are respected.

Successful participation requires managers to approach employee involvement with an open mind. They must be open to new ideas and alternatives for participative management to work. It is important to remember that although the manager may not agree with every idea or suggestion an employee makes, how those ideas are received is critical to the success of participative management.

Employees must also be willing to participate and share their ideas. Participative management does not work with employees who are passive or simply do not care. Many times employees do not have the skills or information necessary to make good suggestions or decisions. In this case, it is important to provide them with information or training so they can make informed choices and offer valid input. Encouragement should be offered in order to accustom employees to the participative approach. One way to help employees engage in the decision-making process is by knowing their individual strengths and capitalizing on them. By guiding employees toward areas in which they

are knowledgeable and by encouraging them to acquaint themselves in areas they feel less knowledgeable, a manager can help to ensure their success.

Before expecting employees to make valuable contributions, managers should provide them with the criteria that their input must meet. This will aid in discarding ideas or suggestions that cannot be implemented, are not feasible, or are too expensive. Managers should also give employees time to think about ideas or alternative decisions. Employees often do not do their most creative thinking on the spot.

Another important element for implementing a successful participative management style is the visible integration of employees' suggestions into the final decision or implementation. Employees need to know that they have made a contribution. Offering employees a choice in the final decision is important because it increases their commitment, motivation, and job satisfaction. Sometimes even just presenting several alternatives and allowing employees to choose from them is as effective as if they thought of the alternatives themselves. If the employees' first choice is not feasible, management might ask for an alternative rather than rejecting the employee input. When an idea or decision is not acceptable, managers should provide an explanation. If management repeatedly strikes down employee ideas without implementing them, employees will begin to distrust management, thus halting participation. The key is to build employee confidence so their ideas and decisions become more creative and sound.

CONCERNS

Participative management is not a magic cure for all that ails an organization. Managers should carefully weigh the pros and the cons before implementing this style of management. Managers must realize that changes will not take effect overnight and will require consistency and patience before employees will begin to see that management is serious about employee involvement. Participative management is probably the most difficult and rewarding style of management to practice. It is challenging not only for managers but for employees as well.

While it is important that management allows employees to participate in decision making and encourages involvement in the organization's direction, managers must be cognizant of the potential for employees to spend more time formulating suggestions and less time completing their work. Upper-level management will not support a participative management program if they believe employees are not meeting their daily or weekly goals. Some suggestions for overcoming this potential problem are to set aside a particular time each week for workers to meet with management to share their ideas, or to allow them to work on their ideas during less busy times of the day or week. Another idea that works for some managers is to allow employees to set

up individual appointments to discuss ideas or suggestions. Generally, a roundtable approach to participative management works best so that all ideas from every party can be heard by management and employees alike.

Managers should remember that participative management is not always the appropriate way to handle a given situation. Employees often respect a manager that uses his or her authority and makes decisions when it is necessary. There are times when, as a manager, it is important to be in charge, make a decision, and accept the responsibility for choices made. For example, participative management is not appropriate when disciplinary action is needed.

When managers look upon their own jobs as a privilege instead of as a responsibility, they will fail at making participative management work. They will be less willing to turn over some of the decision-making responsibility to subordinates. Another reason that participative management fails is that managers do not realize it is not the same as delegating or simply shifting responsibility. Participation alone has no value; it is only an effective tool if it is used to solve problems and meet goals. Some managers believe that inviting employees to join in meetings and form committees will create a successful participative management program. However, these measures are only successful when employees' ideas are accepted by management and implemented.

The larger the organization, the more difficult it becomes to institute a participative management style. Large organizations have more layers and levels, which complicate effective communication and make it difficult to register the opinions and suggestions of a diverse group of employees and managers. The exception to this is when a large organization is set up in participative management style from the onset. Critics argue that unions are often more effective than participative management in responding to employee needs because union efforts can cut through bureaucratic organizations more quickly. However, in many cases, unions themselves can become very bureaucratic, and can often benefit from aspects of participatory management style on the most basic level.

Participative management programs can be threatened by office politics. Due to hidden agendas and peer pressure, employees may keep their opinions to themselves and refuse to tell a manager if they feel an idea will not work. Managers also play a part in politics when they implement participative management programs to impress their own bosses, but have no intention of seeing them through.

Many companies have experienced the positive effects of participative management. Employees are more committed and experience more job satisfaction when they are allowed to participate in decision making. Organizations have reported that productivity improved significantly when managers used a participative style. Participative management is not an easy management style to implement or be consistent with. It presents various challenges and does not succeed overnight. Managers will be more successful if they remember that it will take time and careful planning before they will see results. Starting with small projects that encourage and reward participation is one way to get employees to believe that management is sincere and trustworthy. The challenges are worthwhile when participatory management is seen through to the end, as everyone can be proud of the positive changes they have been a part of implementing.

SEE ALSO *Empowerment; Human Resource Management; Management Styles; Motivation and Motivation Theory; Synergy; Teams and Teamwork*

BIBLIOGRAPHY

Coleman, P.T. "Implicit Theories of Organizational Power and Priming Effects on Managerial Power-Sharing Decisions: An Experimental Study." *Journal of Applied Social Psychology* 34, no. 2 (2004): 297–321.

Coye, R.W., and J.A. Belohlav. "An Exploratory Analysis of Employee Participation." *Group and Organization Management* 20, no. 1 (1995): 4–17.

Greenfield, W.M. "Decision Making and Employee Engagement." *Employment Relations Today* 31, no. 2 (2004): 13–24.

Kaner, S., and L. Lind. *Facilitator's Guide to Participatory Decision-making.* Gabriola Island, BC, Canada: New Society Publishers, 1996.

Keef, L. "Generating Quality Interaction." *Occupational Health & Safety* 73, no. 5 (2004): 30–31.

McCoy, T.J. *Creating an Open Book Organization: Where Employees Think and Act Like Business Partners.* New York: Amacom, 1996.

Robbins, S.P. *Essentials of Organizational Behavior.* 8th ed. Upper Saddle River, NJ: Prentice Hall, 2005.

Sumukadas, N., and R. Sawhney. "Workforce Agility through Employee Involvement." *IIE Transactions* 36, no. 10 (2004): 1011–1021.

Szabo, Erna. *Participative Management and Culture: A Qualitative and Integrative Study in Five European Countries.* New York: Peter Lang Publishing, 2007.

Vanderburg, D. "The Story of Semco: The Company That Humanized Work." *Bulletin of Science, Technology & Society* 24, no. 5 (2004): 430–34.

Weiss, W.H. "Improving Employee Performance: Major Supervisory Responsibility." *Supervision,* October 1998, 6–8.

PATENTS AND TRADEMARKS

Trademarks and patents, along with copyrights, constitute the major forms of legal protection for what is commonly referred to as intellectual property. Although the rights in these three kinds of intellectual property protection are somewhat similar, trademarks, patents, and copyrights differ in what they protect. Patents protect inventions,

while trademarks protect words, phrases, symbols, and designs. Copyrights protect original artistic, musical, and literary works, including software.

PATENTS

A patent is a grant of a property right by the United States government, through the Patent and Trademark Office, to the inventor of an invention. The term of this property right is twenty years from the date the patent is granted, as long as the holder of the patent pays maintenance fees. A patent is not a grant of a right to make, manufacture, use, or sell the invention; rather it secures the right to exclude others from making, manufacturing, using, or selling the invention for the duration of the patent.

A patented invention is no guarantee of future commercial success. Statistically, although millions of patents have been granted, the number of successful inventions is minuscule. One avenue of commercialization open to a patentee is licensing his or her patent to a company, or a number of companies, provided he or she is able to locate a firm that is willing to risk investing in a wholly untried product or process. Upon licensing the patent, however, the patent holder cannot demand that royalties from the product continue beyond the stipulated 20-year patent period, nor can the patentee set the product's price or determine its use.

CREATION OF PATENT RIGHTS

The power to grant rights in patents arises from Article I, section 8 of the United States Constitution, which provides that "Congress shall have power…to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." The first patent law was passed in 1790, and the current law governing patents was enacted in 1952 and became effective January 1, 1953. Since the first statute, millions of patents have been granted. The current statute sets forth the subject matters for which patents may be granted and the conditions under which a patent will be issued. It also established the Patent and Trademark Office.

Under the law, anyone who "invents or discovers any new and useful process, machine, manufacture or composition of matter, or any new and useful improvements thereof, may obtain a patent." Courts have interpreted this language to include nearly anything that could be fabricated, although they have not allowed printed matter, such as books to be patented. An invention must meet the test of being new under the standards in the law before a patent will be granted. The subject matter of an invention must be sufficiently different from what has been described in a printed publication of some sort anywhere in the world, or sold in this country, before the date of the application for the patent. In addition, the invention must go beyond what would seem a common-sense or obvious advance-

ment, even to a practitioner or expert in the field. Finally, an invention must be determined "useful" before a patent will issue; this requirement, however, is interpreted very broadly.

Only the inventor may apply for a patent, with two exceptions: (1) if the inventor has died before applying for a patent, the inventor's estate may do so, and (2) if the inventor is insane, the inventor's guardian may apply for the patent.

An inventor applies for a patent by sending to the Commissioner of Patents and Trademarks, at the Patent and Trademark Office, a written specification, which is a description of the invention and of the process in which the invention is made and used. The specification must contain one or more claims about the subject matter that the applicant believes constitute an invention. The specification must be accompanied by a sworn oath or declaration by the inventor that he or she is the original and first inventor of the subject matter of the application. The application must also include drawings, where necessary, and the appropriate filing fee, which the patent statute and rules have established.

THE PATENT AND TRADEMARK OFFICE

The Patent and Trademark Office carries out the patent laws by examining the applications to determine if the inventor is entitled to a patent. The office publishes the specifications and drawings of all patents on the day they are issued. It records assignments of any patents to entities other than the inventors. It maintains a search room for the public to look at issued patents and the office's records.

TRADEMARKS

A trademark is a word, name, phrase, symbol, or design, or a combination of these elements, that identifies and distinguishes the source of goods or services. The term also encompasses service marks. Service marks are the same as trademarks except that they identify and distinguish the source of a service rather than a product. Trademark rights are used to prevent others from making, promoting, or selling goods or services which have a name, symbol, or design that is confusingly similar to that of the trademark. It does not, however, prevent others from making or selling the same goods or services, as long as it is under a different, nonconfusing mark.

CREATION OF TRADEMARK RIGHTS

There are two distinct types of rights in a trademark or service mark: the right to use the mark and the right to register the mark. These rights arise either from using the mark in actual commerce or from filing an application for registration of the mark with the Patent and Trademark Office.

The registration of marks is controlled under the Trademark Act of 1946; the Trademark Rules, 37 C.F.R. Part 2; and the *Trademark Manual of Examining Procedure.* The act covers not only trademarks and service marks, but also certification marks, collective trademarks, and collective membership marks.

The first party who either uses a mark in the course of commerce or business or files an application for registration with the Patent and Trademark Office usually has the right to register that mark. A party can use a mark, or establish rights in it, without filing an application for registration. The registration, however, creates a presumption that the party who has registered the mark is the owner of the mark for the goods and services set forth in the registration application, and therefore has the right to use the mark anywhere in the country. This presumption can become important when two parties unintentionally begin using similar marks and become involved in a lawsuit over who has the sole right to use the mark. The Patent and Trademark Office does not determine this, rather it is the decision of a court, which has the power to issue an injunction to stop a party from using a mark and to award damages for a party's improper use of another's mark.

Similarly, the owner of a mark may use the trademark (^{TM}) or service mark (^{SM}) designation with the mark to make it clear that the owner is claiming rights in the product or service so designated. The ^{TM} and ^{SM} designation may be used without the owner having registered the mark with the Patent and Trademark Office. If it is registered, however, the owner may use the registration symbol (®) with the mark.

Rights embodied in a trademark, unlike those of a copyright or a patent, can last for an indefinite period if the owner of the mark continuously uses the mark for its products or services. Federal registrations last for ten years, but between the fifth and sixth year after the date of the initial registration, the person who registered the mark must file an affidavit with information about the mark and ownership. If the registrant does not file this affidavit, the registration is cancelled. After the initial registration period, the mark can be renewed for successive ten-year terms. Registration of a mark with the Patent and Trademark Office provides protection from others using the mark in the United States and its territories, but does not extend to its use in other countries.

PATENTS AND TRADEMARKS IN THE INTERNET AGE

The growth of Internet technology has affected patent and trademark protection in a number of different ways. For instance, the Internet has made it significantly easier for individuals and companies to conduct searches of patent and trademark databases, whether they are looking to patent an invention or license someone else's invention. The global reach of the Internet has also spurred efforts to harmonize international patent and trademark protection, which may eventually offer firms greater protection in worldwide markets.

In other ways, however, the Internet has made it more difficult for owners to protect their intellectual property rights. The widespread availability of intellectual property in digital form has led to illegal copying of technology, software, music, and other protected materials. Nowhere has this been more prevalent than in the music and newspaper businesses, where the old business models have been turned upside down, and new questions concerning the "fair use" of intellectual property arise continually. Indeed, some of the Internet's most popular sites (such as YouTube) seem to thrive on offering copyrighted material.

In the early twenty-first century, a growing number of technology companies began launching intellectual property licensing programs to turn their accumulated patent bases into revenue. These firms conducted inventories of their patents and identified technologies that were outside the core business, yet still offered some potential for development. They then sought to license these technologies to other firms. IP licensing has proven quite lucrative for a number of large technology firms. IBM, for example, earns over one billion dollars per year from its IP licensing program.

In 2007 the U.S. Supreme Court made a number of decisions concerning patent rights. (These cases were: *MedImmune v. Genentech,* decided 8-1; *KSR International v. Teleflex, decided 9-0;* and *Microsoft v. AT&T,* decided 7-1.) To many observers the overall result of these cases, in the words of the *Washington Post,* "weakened the protection given to patent holders, making it more difficult to get a patent and easier to challenge existing ones."

In 2008 the Supreme Court voted 9-0 in *Quanta Computer, Inc. v. LG Electronics, Inc.* in deciding to limit the reach of patent law regarding the "postsale use" of a product—particularly component parts used in the manufacture of another end product. The Court wrote, "The longstanding doctrine of patent exhaustion provides that the initial authorized sale of a patented item terminates all patent rights in that item."

SEE ALSO *Entrepreneurship; Intellectual Property Rights; Licensing and Licensing Agreements*

BIBLIOGRAPHY

Ambrogi, Robert J. "The Top Internet Sites for Patents, Trademarks." *Palm Beach Daily Business Review,* 24 March 2004.

Barnes, Robert and Alan Sipress. "Rulings Weaken Patents' Power." *Washington Post,* 1 May 2007. Available from: http://www.washingtonpost.com/wp-dyn/content/article/2007/04/30/AR2007043001668_pf.html

Brown, Marc E. "New Kinds of Protection for Intellectual Property." *Electronic Business,* 1 April 2003.

Geffken, Carl. "Protecting Your Intellectual Property: Understanding Your Rights Regarding Patents, Copyrights, and Trademarks Is Vital in Protecting Your Company's Offerings across the Globe." *Global Cosmetic Industry* (January 2004).

McBride, Sarah, and Adam Thompson. "Google, Others Contest Copyright Warnings," *Wall Street Journal,* 1 August 2007. Available from: http://online.wsj.com/article/SB118593806790484425.html.

O'Haver, R. Russ. "Management Intangibles: Capitalizing on Your IP Assets." *Journal of Internet Law* (December 2003).

U.S. Patent and Trademark Office. "General Information Concerning Patents." January 2005. Available from: http://www.uspto.gov/web/offices/pac/doc/general/index.html.

U.S. Small Business Administration. "Protecting Your Ideas." Available from: http://www.sba.gov/starting_business/startup/ideas.html.

United States Supreme Court. *MedImmune v. Genentech.* January 2007. Available from: http://www.supremecourtus.gov/opinions/06pdf/05-608.pdf.

United States Supreme Court. *Microsoft v. AT&T.* April 2007. Available from: http://www.supremecourtus.gov/opinions/06pdf/05-1056.pdf.

United States Supreme Court. *KSR International v. Teleflex.* April 2007. Available from: http://www.supremecourtus.gov/opinions/06pdf/04-1350.pdf.

United States Supreme Court. *Quanta Computer, Inc. v. LG Electronics, Inc.* June 2008. Available from: http://www.supremecourtus.gov/opinions/07pdf/06-937.pdf.

PATERNALISM

The practice of paternalism has a long history in American business, and it has been both maligned and extolled. Many companies have taken the opportunity to highlight their "fatherly" actions, claiming to be family businesses that take care of their employees through extra benefits and care that their workers would not be able to afford otherwise. Others have complained that paternalistic methods used by businesses form unhealthy environments, creating company towns that are fully dependent on companies to provide too many aspects of their living conditions. Paternalism, according to skeptics, fosters a top-down style of management that hinders creative thought among employees and encourages harmful promises or inconsistent behavior. However, a new style of paternalism has become more common in recent years as companies have begun exploring ways in which to develop employee innovation and social resources by helping their workers live healthier, fuller lives.

In the late 2000s, paternalism often involves offering employees benefit plan advice (instead of only a limited number of available plans) and compensation packages that provide a number of personalized extras. These include fitness gym memberships and other healthy living options. By supporting employees in these socially conscious ways, companies are able to maximize employee retention and maintain favorable, efficient workplaces.

DEVELOPMENT OF PATERNALISM IN AMERICA

Ronald Sims, in his 2003 book *Ethics and Corporate Social Responsibility*, identifies three different stages of development that occurred in the progression of paternalism, as companies explored the meaning of social responsibility and employee welfare in the twentieth century of United States business.

The first stage was **profit maximizing management**, during which business executives decided that their primary goal, for both society and success, was to encourage profit and growth. The American economy was seen as dependent on the wealth of companies, and anything done to encourage that wealth was seen by managers as acceptable. This was before the era of legislation concerning child labor and gender inequality, so some of the accepted methods—while profitable for businesses—were harmful to society. Sims writes that this era ended at the time of the Great Depression (1930s) when the success of business and business practices was called into question.

The second stage was **trustee management**. After the Great Depression, wealth was more spread out, and fewer privately-owned companies existed. Instead, companies were under the control of stockholders and subject to many outside groups such as suppliers, creditors, and of course customers. Government involvement also increased, leading to legislation that established fair labor principles and welfare systems; such legislation also encouraged the protection of employees. Corporate wealth started to be distributed for the purposes of social responsibility, and corporate authority moved away from one or two top executives to corporate boards and trustees. Employee benefits became common in this stage. Unfortunately, several paternistic problems also arose as employees became dependent on their companies, while companies struggled to not misuse their paternistic authority.

The third stage is the **quality-of-life movement**, where corporate social responsibility became a popular topic. Companies began inspecting ways that they could profit by their relationships with employees and employees' relationships throughout society. Social capital, the collective ideas and connections of the society, became important to businesses. Focus moved from purely economic goals to wider initiatives involving care of the environment, employee physical health, employee mental health, and employee emotional security. This is the current state of business paternalism, which is growing into a more complex style of management as organizations realize the marketing and image benefits that can be earned through social responsibility, along with the rewards of employee energy and innovation.

PROBLEMS WITH PATERNALISM

The negative effects of paternalism developed largely in the second stage, as companies began to assume that employees did not have enough knowledge or available information to make wise decisions. Therefore, management took the burden of these decisions away from employees, locking some organizations into dangerous, dependent relationships that could be exploited. However, as electronic communication became more common, the excuse of employee ignorance no longer applied, and companies were able to offer their workers a number of choices, providing them with the necessary education to make wise decisions concerning health plans and benefit options.

One of the most popular current ideas under the heading of "New Paternalism" is the idea of "nudging," or giving employees—and others—small psychological nudges to make the right decisions, rather than forcing them to make certain choices in any direct way. These nudges are designed to help people realize the benefits to choosing health-conscious options without limiting their freedoms. Government nudges include "sin" and "fat taxes" to support beneficial lifestyles. A company interested in "nudging" their employees might offer gym memberships as a part of an attractive and flexible health benefit plan, encouraging workers to maintain physical well-being without requiring it.

BIBLIOGRAPHY

Aronoff, Craig E., and John L. Ward. "The High Cost of Paternalism." *Nation's Business.* May 1993.

Dowling, John Malcolm, and Yap Chin-Fang. *Modern Developments in Behavioral Economics.* Hackensack, NJ: World Scientific, 2007.

Goldstein, Evan R. "The New Paternalism." *The Chronicle Review,* 2008. Available from: http://chronicle.com/temp/reprint.php?id=pwq4w52rk7wg916xkfflm6r43x0h2d5s.

Sims, Ronald R. *Ethics and Corporate Social Resposibility.* Westport, CT: Greenwood Publishing Group, 2003.

Winning, Ethan A. "Pitfalls of Paternalism." *Ewin.com,* 2008. Available from: http://www.ewin.com/articles/paternal.htm.

PERFORMANCE APPRAISALS

SEE *Employee Evaluation and Performance Appraisals*

PERFORMANCE MEASUREMENT

Improvement in individual, group, or organizational performance cannot occur unless there is some way of getting performance feedback. Feedback is having the outcomes of work communicated to the employee, work group, or company. For an individual employee, performance measures create a link between their own behavior and the organization's goals. For the organization or its work units, performance measurement is the link between decisions and organizational goals.

It has been said that before you can improve something, you have to be able to measure it, which implies that what you want to improve can somehow be quantified. Additionally, it has also been said that improvement in performance can result just from measuring it. Whether or not this is true, measurement is the first step in improvement. But while measuring is the process of quantification, its effect is to stimulate positive action. Managers should be aware that almost all measures have negative consequences if they are used incorrectly or in the wrong situation. Managers have to study the environmental conditions and analyze these potential negative consequences before adopting performance measures.

TYPES OF PERFORMANCE MEASURES

Performance measures can be grouped into two basic types: those that relate to results (outputs or outcomes, such as competitiveness or financial performance) and those that focus on the determinants of the results (inputs such as quality, flexibility, resource utilization, and innovation). This suggests that performance measurement frameworks can be built around the concepts of results and determinants.

Measures of performance of a business usually embrace five fundamental, but interlinking areas:

1. Money, usually measured as profit

2. Output/input relationships or productivity

3. Customer emphasis such as quality

4. Innovation and adaptation to change

5. Human resources

Within the operations area, standard individual performance measures could be productivity measures, quality measures, inventory measures, lead-time measures, preventive maintenance, performance to schedule, and utilization. Specific measures could include:

1. Cost of quality: measured as budgeted versus actual

2. Variances: measured as standard absorbed cost versus actual expenses

3. Period expenses: measured as budgeted versus actual expenses

4. Safety: measured on some common scale, such as number of hours without an accident

5. Profit contribution: measured in dollars or some common scale

6. Inventory turnover: measured as actual versus budgeted turnover

While financial measures of performance are often used to gauge organizational performance, some firms have experienced negative consequences from relying solely on these measures. Traditional financial measures are better at measuring the consequences of yesterday's actions than at projecting tomorrow's performance. Therefore, it is better that managers not rely on one set of measures to provide a clear performance target. Many firms still rely on measures of cost and efficiency, when at times such indicators as time, quality, and service would be more appropriate measures.

To be effective, performance yardsticks should continuously evolve in order to properly assess performance and focus resources on continuous improvement and motivating personnel. To incorporate various types of performance measures some firm's developed performance measurement frameworks. These frameworks appear in the literature and vary from Kaplan and Norton's balanced scorecard to Fitzgerald's framework of results and determinants.

Kaplan and Norton's balanced scorecard approach operates from the perspective that more than financial data is needed to measure performance and that non-financial data should be included to adequately assess performance. They suggest that any performance measurement framework should allow managers to ask the following questions:

- How do we look to our shareholders? (financial perspective)

- What must we excel at? (internal business perspective)

- How do our customers see us? (customer perspective)

- How can we continue to improve and create value? (innovation and learning perspective)

However, the balanced scorecard is flawed as it does not allow for one of the most important questions of all:

- What are our competitors doing? (the competitor perspective)

Keegan proposed a similar, but lesser known, performance measurement framework titled the "performance matrix." The performance matrix is more flexible, as it is able to integrate different dimensions of performance and employs generic terms such as internal, external, cost, and noncost.

DESIGNING THE PERFORMANCE MEASUREMENT SYSTEM

A number of suggestions have been offered by various experts on the subject of designing performance measurement systems. Below is a list of suggestions derived from a number of these experts. Some of these apply to all measures and some apply to a limited number of a firm's measures. A firm's performance measures should:

- Be simple and easy to use.

- Have a clear purpose.

- Provide fast feedback.

- Cover all the appropriate elements (internal, external, financial and non-financial).

- Relate to performance improvement, not just monitoring.

- Reinforce the firm's strategy.

- Relate to both long-term and short-term objectives of the organization.

- Match the firm's organization culture.

- Avoid conflict with one another.

- Be integrated both horizontally and vertically in the corporate structure.

- Be consistent with the firm's existing recognition and reward system.

- Focus on what is important to customers.

- Focus on what the competition is doing.

- Lead to identification and elimination of waste.

- Help accelerate organizational learning.

- Help build a consensus for change when customer expectations shift or strategies and priorities call for the organization to behave differently.

- Evaluate groups, not individuals, for performance to schedule.

- Establish specific numeric standards for most goals.

- Be available for constant review.

Other recommendations for organizations that are developing performance measures include:

1. Data collection and methods of calculating the performance measure must be clearly defined.

2. Objective performance criteria are preferable to subjective ones.

3. Measures may vary between locations; avoid a "one size fits all" mentality.

Wisner and Fawcett provide a nine-step process for developing a performance measurement system:

1. Clearly define the firm's mission statement.

2. Identify the firm's strategic objectives using the mission statement as a guide (profitability, market share, quality, cost, flexibility, dependability, and innovation).

3. Develop an understanding of each functional area's role in achieving the various strategic objectives.

4. For each functional area, develop global performance measures capable of defining the firm's overall competitive position to top management.

5. Communicate strategic objectives and performance goals to lower levels in the organization. Establish more specific performance criteria at each level.

6. Assure consistency with strategic objectives among the performance criteria used at each level.

7. Assure the compatibility of performance measures used in all functional areas.

8. Use the performance measurement system to identify competition, locate problem areas, assist the firm in updating strategic objectives and making tactical decisions to achieve these objectives, and supply feedback after the decisions are implemented.

9. Periodically reevaluate the appropriateness of the established performance measurement system in view of the current competitive environment.

Finally, it is important that the performance measurement systems used by managers be continually reviewed and revised as the environment and economy changes. For example, newer measurements might include the measurement of the linkage between customer and employee satisfaction, or ways in which to measure the progress of new product innovations, or that of e-commerce, or perhaps the work performed by "knowledge workers." Obviously, failure to make the necessary modifications can inhibit the ability of the organization to be an effective and efficient global competitor in fast-changing marketplaces.

SEE ALSO *Balanced Scorecard; Employee Evaluation and Performance Appraisals; Human Resource Management; Quality and Total Quality Management*

BIBLIOGRAPHY
Boyd, Lynn H., and James F. Cox, III. "A Cause-and-Effect Approach to Analyzing Performance Measures." *Production and Inventory Management Journal* 38, no. 3 (1997): 25–32.

Denton, D. Keith. "Effective Measurement Involves Asking the Right Questions." *Production and Inventory Management Journal* (1995): 65–67.

Gunasekaran, A., H. James Williams, and Ronald E. McGaughey. "Performance Measurement and Costing System in New Enterprise." *Technovation* 25, no. 5 (May 2005): 523.

Hinton, Matthew, and David Barnes. "Towards a Framework for Evaluating the Business Process Performance of E-Business Investments." *International Journal of Business Performance Management* 7, no. 1 (2005): 87.

Kaplan, R.S., and D.P. Norton. "The Balanced Scorecard-Measures That Drive Performance." *Harvard Business Review,* January-February 1992, 71–79.

Keegan, D.P., R.G. Eiler, and C.R. Jones. "Are Your Performance Measures Obsolete?" *Management Accounting,* June 1989, 38–43.

Neely, Andy, ed. *Business Performance Measurement* 2003. Cambridge, UK. Cambridge University Press 2003.

Robson, Ian. "Implementing a Performance Measurement System Capable of Creating a Culture of High Performance." *International Journal of Productivity and Performance Management* 54, no. 1-2 (2005): 137–145.

Tangen, Stefan. "Performance Measurement: From Philosophy to Practice." *International Journal of Productivity and Performance Management* 53, no. 8 (2004): 726.

Vokurka, Robert, and Gene Fliedner. "Measuring Operating Performance: A Specific Case Study." *Production and Inventory Management Journal* 36, no. 1 (1995): 38–43.

Wisner, J.D., and S.E. Fawcett. "Link Firm Strategy to Operating Decisions through Performance Measurement." *Production and Inventory Management Journal* 32, no. 3 (1991): 5–11.

PERSONALITY AND PERSONALITY TESTS

Personality is a set of enduring traits and characteristics that relate to a person's emotions, motivations, interpersonal interactions, and attitudes. Personality testing is an attempt to determine the personality traits of an individual to better understand how that individual will behave in certain situations and how well suited a particular individual is for a specific job or task. Because of its usefulness in making these determinations, personality testing is of great interest to employers, particularly human resource managers.

THE NATURE OF PERSONALITY

Research into the human personality has been conducted for many decades, and much of this work has focused on defining personality and understanding how many dimensions of personality there are. One primary area of agreement about personality is that it is a trait. That is, personality is enduring and unlikely to change substantially in one's adult life. This does not mean that a person cannot or will not adapt to a change in circumstances (e.g., behavior at work versus behavior in social situations), but that, on average, a person demonstrates similar personality across all situations and may behave differently from those with dissimilar personality characteristics.

A major debate in the area of personality research is where personality originates, which is often described as the "nature vs. nurture" argument. Some researchers believe that individuals are born with a personality that is determined by genetics and remains unchanged regardless of environment; this group subscribes to the "nature" theory of the origin of personality. The "nurture" perspective is that personality is not determined by genetics, but rather by a host of environmental forces and personal experiences

(such as geography, socio-economic status, and parental upbringing). Most scholars now agree that personality is determined by a combination of both genetics and environment, and that neither is solely responsible for personality.

PERSONALITY TESTING

Despite the various debates about the nature and source of personality, psychologists have both categorized personality types and sought out ways to test individuals for their conformity with such types. These tests can give the individuals as well as their employers useful insights into the personality traits of those tested.

Since employees' personalities may dictate how well they perform their jobs, such personality testing is meaningful to and useful for management. Personality may indicate how hard a person will work, how organized he is, how well he will interact with others, and how creative he is. In recent years, more organizations have been using self-reporting personality tests to identify personality traits as part of their hiring or management development processes. Employers recognize that experience, education, and intelligence may not be the only indicators of who the best hire might be. Additionally, understanding one's own personality characteristics may improve one's ability to develop as an employee and manager.

There are a number of different ways in which personality has been categorized, and different opinions exist about the number of dimensions of personality. Early tests of personality were developed to diagnose mental illness, and while some of these tests were used in employment settings, their acceptability and applicability were questionable. However, there are now tests specifically for use in normal adult populations, each of which is based on different conceptions of the dimensionality of personality.

MINNESOTA MULTIPHASIC PERSONALITY INVENTORY AND CALIFORNIA PSYCHOLOGICAL INVENTORY

Some of the earlier tests used to assess the personality of job applicants and employees were the Minnesota Multiphasic Personality Inventory (MMPI) and the California Psychological Inventory (CPI), which is based on the MMPI.

The MMPI was developed for psychological clinical profiling and includes ten clinical scales. While some of these scales may be applicable to predicting job performance in a selection tool, others are not. Additionally, the items used in the MMPI may be off-putting to job applicants. However, before personality tests became commercially available for use in a business setting, organizations often used the MMPI to assess the personality characteristics of applicants and employees.

Using the psychological basis of the MMPI, the CPI was created to assess the personality of normal adult populations. It assesses seventeen different dimensions of performance, including dominance, responsibility, empathy, and sociability. The CPI is much more appropriate for business settings than the MMPI, but was not created for use in business hiring.

FIVE-FACTOR MODEL

A different conception of personality is captured in the Sixteen Personality Factor Questionnaire, also called the 16 PF. It yields scores of sixteen different personality traits, including dominance, vigilance, and emotional stability. These sixteen factors can be combined to express five "global factors" of personality. These five global factors are often called the Big Five or the Five-Factor Model.

Most researchers agree that while more than five dimensions of personality are present in human beings, nearly all of them can be subsumed within five: emotional stability, conscientiousness, agreeableness, extraversion, and openness to experience. They are summarized in Table 1.

In addition to the 16 PF instrument, the Revised NEO Personality Inventory (NEO PI-R), developed by Costa and McCrae, assesses the five personality dimensions of the Five-Factor Model and thirty additional traits used to create the scores on these dimensions. For instance, to determine scores on the Neuroticism (i.e., Emotional Stability) scale, the following facets are measured: anxiety, angry hostility,

Table 1		
Personality Factor	**Characteristics of Individuals High in Factor**	**Characteristics of People Low in Factor**
Emotional Stability	• Calm • Resistant to stress • Secure • Stable	• Anxious • Depressed • Insecure • Susceptible to stress
Conscientiousness	• Dependable • Organized • Persevering • Punctual	• Disorganized • Easily discouraged • Unpredictable • Unreliable
Agreeableness	• Amiable • Cooperative • Flexible • Trusting	• Aloof • Contrary • Suspicious • Unfriendly
Extraversion	• Active • Assertive • Excitable • Sociable	• Apprehensive • Dull • Shy • Timid
Openness to Experience	• Creative • Curious • Insightful • Intellectual	• Bored • Intolerant • Routine-oriented • Uninterested

depression, self-consciousness, impulsiveness, and vulnerability. This NEO PI-R was developed specifically for use in business settings.

Emotional Stability. Emotional stability (also called neuroticism, when scored oppositely) involves a person's ability to remain stable and balanced. A person who is high in emotional stability is even-tempered, calm, and somewhat resistant to stress. A person who is low in emotional stability tends to be moody, depressed, and very susceptible to stress. In most professions, a person who is high in emotional stability is preferred. Employees with low emotional stability are more likely to be distracted from work by stress, deadlines, or situations in their personal lives, whereas those with high levels of this trait are more able to control their emotions and feelings at work.

Conscientiousness. Conscientiousness is a person's ability to be dependable, organized, punctual, and to persist in the face of setbacks. Research indicates that conscientiousness is the personality characteristic that is most related to job performance across a variety of jobs. Thus, in nearly every situation, a person who is high in conscientiousness will be better suited to perform a job. Individuals who are low in conscientiousness do not give much attention to detail, are likely to overlook deadlines, or may lose important documents. Additionally, individuals low in conscientiousness are more likely to give up when faced with challenges or difficulties in their work, whereas employees with high conscientiousness will continue to persist.

Agreeableness. Agreeableness, when high, indicates that a person is warm, friendly, and tactful. Low agreeableness is demonstrated when employees are cold, abrasive, and unfriendly. Preference on whether to hire an employee high in agreeableness or low in agreeableness is somewhat dependent on the type of job.

In general, a person with high agreeableness can be easier to work with, because they tend to be easier to talk to and interact within a group setting. And, in some jobs, being highly agreeable is an advantage, such as in sales, or in other jobs that require patient and friendly interactions with people. However, there are some jobs in which being too warm and friendly can be a detriment, such as a collections agent; and in these jobs, being low in agreeableness could be advantageous.

Extraversion. Extraversion is how outgoing and social a person is. Someone high in extraversion enjoys crowds, social gatherings, and working in groups. A person low in extraversion is more comfortable working on his or her own and is less gregarious. As with agreeableness, the level of extraversion that is desired in an employee is dependent on the job. In jobs that involve interacting with others, such as sales, teaching, or public relations, high extraversion may be helpful. However, if a job requires independent work and solitude, such as computer programming, having a person high in extraversion may be difficult, and thus a person lower in extraversion would be preferred.

Openness to Experience. Openness to experience refers to the open-mindedness of a person. An individual who is high in openness to experience is curious, imaginative, open-minded, and enjoys trying new things. People who are low in openness to experience are routine-oriented, close-minded, literal, and prefer not to try new things.

As with agreeableness and extraversion, the degree to which an employee is benefited by openness depends on the job. High openness is important in jobs that require creativity and flexibility; one would definitely prefer to have high openness in advertising or research positions. However, some jobs reward routine work, and in those jobs in which creativity is not needed or desired, a person low in openness may find these jobs more rewarding.

In summary, high emotional stability and conscientiousness are desirable in nearly all jobs, and the level of agreeableness, extraversion, and openness to experience are dependent on the job duties and requirements. While personality can relate to how well a person performs a job, it is not the only characteristic upon which a hiring decision should be made. Ideally, a person's education, experience, and intelligence should be evaluated for a position, with personality being part of the criteria considered.

MYERS-BRIGGS TYPE INDICATOR

The Myers-Briggs Type Indicator (MBTI) is a very popular test, primarily used in organizations to develop managers, improve employee performance, and build teams. It is very different from the other personality tests. Rather than tapping the Big Five personality characteristics, the MBTI is based on the work of Jung and addresses four areas of personality to create sixteen distinct types. The four areas of personality are:

- Perception—sensing vs. intuiting
- Judgment—thinking vs. feeling
- Extraversion—extraversion vs. introversion
- Orientation towards the outer world—perceiving vs. judging

The scores along these four dimensions can be combined to create sixteen different "types." The scores on each dimension represent the strength of dimension; so a person might be "sensing, thinking, introverted, and perceiving" and very strong in sensing, but somewhat less strong in thinking.

While the other personality inventories are often used as a selection tool in the organization, the MBTI is best used for career development, counseling, and team selection. Another difference between the MBTI and other personality tests is that strengths on the different dimensions are all seen as valuable. So, a person who is strong in "thinking" is seen as just as skilled an employee as one who is strong in "feeling," but is believed to be more suited to different types of tasks and duties. Contrast this with the NEO-PI: on that instrument, a low score on some dimensions, like conscientiousness, would be undesirable to an organization.

While the Myers-Briggs Type Indicator is used in many organizations and is very popular among employers and employees, there is not as much empirical evidence of its validity and usefulness compared to other personality inventories. Several studies have shown that about 50 percent of people who are retested only several weeks later are classified as a different type; that percentage increases to over 60 percent when people are tested over nine months later. Thus, it is typically not recommended as a tool for employee selection, but rather is best suited for employee self-development, team-building, and managerial information.

USING PERSONALITY TESTS FOR SELECTION

When employers first began to learn about personality and the impact that it could have on job performance, they did not have specific employment tests to measure personality. Therefore, many turned to psychologists and existing personality tests (e.g., the MMPI) to determine the characteristics of job applicants. Unfortunately, the purpose of some of these tests was to diagnose mental illness or psychological disorders, and although they could provide some information related to personality, the test items were likely to seem strange and intrusive to job applicants.

Furthermore, because the tests were not written in an employment context, the information that they provided typically went beyond what was needed to make an informed hiring decision. For these reasons, many managers had negative experiences with personality testing in the workplace and thought it to be inappropriate and useless. However, there are now tests designed specifically for business hiring needs. These tests tap into the Big Five personality characteristics and are written in such a way as to not offend the average job applicant.

Because of the availability of several different tests, human resources departments need to investigate which tests are available and most appropriate to their company before adopting personality testing. Before adopting a particular personality test for employee screening and selection processes, human resources managers need to evaluate its reliability, validity, and acceptability.

Reliability. Reliability, or the degree to which a test measures some characteristic consistently, is a necessary requirement for a selection test. If a test does not measure consistently, then it cannot be valid; thus, assessing the reliability of personality tests is crucial for accurate selection. In general, most commercial personality tests have demonstrated high reliability, though as noted above, the MBTI has been shown to have a low level of testing consistency.

Reliability can be assessed in several different ways. The test-retest method of assessing reliability involves giving one group the same test twice and statistically evaluating the consistency of scores. Because personality tests are intended to measure stable, enduring personality traits, the test-retest reliability of these tests should be high.

The equivalent measures method of determining reliability involves creating two tests that evaluate the same content domains, giving them to the same group, and statistically comparing the scores of each individual. If the two tests truly are equal in content, then high reliability will be indicated by very similar scores on both tests.

Finally, internal consistency is one of the most used measures of reliability. An assessment of internal consistency only requires one version of a test and one sample of people; the test is then broken into two parts, and the consistency of responses on the two parts is determined. A well-known form of the internal consistency approach, called coefficient alpha, averages the correlations between all possible splits of a test, and therefore results in a highly accurate assessment of reliability.

Validity. The validity, or accuracy, of personality tests has been measured in a number of research studies and can be assessed in two main ways: content validity and criterion-related validity. Additionally, meta-analysis has been used to understand the validity of personality tests.

Content validity is an assessment of the degree to which the items on a test capture the domain of interest. This assessment is made by subject matter experts, such as trained psychologists or expert managers. While content validity is an important assessment of the usefulness of a selection test, criterion-related validity provides empirical evidence as to a test's accuracy.

Criterion-related validity indicates how well a test predicts job performance, and it can be evaluated concurrently or predictably. In a concurrent criterion-related validity study of a personality test, job incumbents are given the personality test, and their job performance is measured at the same time. A correlation between test scores and job performance indicates the level of validity of the new test.

With predictive criterion-related validity, job applicants are given the new personality test, but it is not used when making the hiring decisions. After a certain time period, the scores on the personality test are correlated with job performance scores of the new employees to determine the validity of the test. While concurrent validity studies are often preferred because they can be done quickly, the motivation of current employees to do well on these tests may not be high, or at least not as high as the motivation of job applicants.

With predictive validity, the benefit occurs with the use of actual job applicants; however, the time lag involved is often a major drawback.

In both cases, a big concern is range restriction; that is, because the full range of scores on the test is not evaluated (since not all applicants are hired and, presumably, current employees would have high scores on the personality test), the actual validity of a test may be underestimated.

Meta-analysis is a statistical technique that can be used to further explore the validity of selection tests. Meta-analysis combines individual research studies to indicate an overall average validity for most jobs; using this, the general validity of selection tests can be estimated. Based on information from meta-analysis, most personality tests have low to moderate validity, as compared to other selection methods such as intelligence tests, work samples, and structured interviews. However, they are still useful for hiring in many jobs because the information they provide is unique.

Intelligence tests and work samples cannot indicate a person's level of different personality traits, and although structured interview questions may be written to capture some elements of personality, such as conscientiousness, or agreeableness, typically, a personality test will provide information above and beyond other employment tests. Therefore, the inclusion of a validated personality test may increase the overall validity of the selection battery for certain jobs.

There are three major threats to the validity of personality tests: faking, socially desirable responding, and careless responding. While all occur for different reasons, the effects of these types of responses can reduce the validity of personality tests.

Faking occurs when a job applicant purposely attempts to score more positively than he or she would if answering items truthfully. Because many personality inventories include response choices that are easily seen as more desirable than others, applicants may be able to deliberately misrepresent themselves to look more favorable, or "fake good."

Although most personality tests include instructions that request that applicants answer truthfully, they may choose not to follow these instructions. There are no firm conclusions on the amount of faking that occurs, or its effect on test scores, but many researchers argue that when faking occurs, it is unlikely to skew test results appreciably.

Socially desirable responding is similar to faking in that the applicant answers items falsely in order to look better; however, unlike faking, socially desirable responding is not deliberate. These unconscious and unintended responses are chosen in order to conform to social norms. For instance, an applicant may overestimate his punctuality or organization skills on a personality test because these are skills that the employer wants. However, this decision would not be conscious, but instead would represent a generous view of one's own habits.

Response carelessness occurs when an applicant does not pay careful enough attention to the items on the test and therefore responds incorrectly. This occurs when the applicant has poor reading skills, is in a hurry, is bored, or is not motivated to take the test. Careless responses can harm the reliability and the validity of the test because they lack consistency and accuracy.

To avoid these problems, many personality inventories now include scales to detect faking, socially desirable responding, and response carelessness from which scores can be used to adjust the scores on the other scales. Thus, most published personality inventories have the means to avoid and/or correct for these threats to validity.

Acceptability. Acceptability is an assessment made by job applicants. Their reaction to taking the personality test may have an influence on their motivation to take the test, their continuation in the hiring process, or their opinions about the company. For example, if a job applicant is asked a number of questions on a personality test that she believes to be invasive and too personal, she may be offended and therefore not accept a job offer. She may then complain to friends about the company's selection tests—reducing the number of people who might have applied for jobs with the organization. Additionally, prospective employees may take legal action against companies using tests with invasive or offensive questions. Any of these outcomes are likely to hurt recruitment and selection efforts, and thus, only tests with high levels of acceptability should be used.

Understanding the personality traits of employees can be useful in the workplace. In recent decades, a number of personality tests have been developed and are now commercially available. These tests are easily accessed, purchased, and administered on the Internet. The easy availability and affordableness of a great range of personality tests makes it easy for employers to select and administer one or more tests to employees or prospective employees. Because of this, more and more firms are turning to some kind of personality testing as part of their selection and employee-development processes. While hard data on the use of personality testing is hard to come by, estimates

within the testing industry indicate that between 60 and 90 percent of companies now use some form of employee assessment testing.

While the ease of administration makes testing far more common in the twenty-first century than it was in previous decades, companies seem to be reasonably selective in basing important decisions on these tests. Research into validity and reliability supports the use of tests based on the Five-Factor Model of personality for selection. The Myers-Briggs Type Indicator, a very popular inventory, can be useful for development and team-building in the organization, but its low level of reliability makes it inappropriate for employee screening and selection.

SEE ALSO *Employee Screening and Selection; Employment Law and Compliance; Human Resource Management; Leadership Theories and Studies; Management Styles*

BIBLIOGRAPHY

Barrick, Murray R., and Michael K. Mount. "The Big Five Personality Dimensions and Job Performance: A Meta Analysis." *Personnel Psychology* 44 (1991): 1–26.

"Employee Personality Type Tests." Available from: http://www.business.com/directory/human_resources/hiring_and_retention/employment_screening/personality_testing/.

Gardner, William L., and Mark J. Martinko. "Using the Myers-Briggs Type Indicator to Study Managers: A Literature Review and Research Agenda." *Journal of Management* 22, no. 1 (1996): 45–83.

Hart, Anne, and George Sheldon. *Employment Personality Tests Decoded* Franklin Lakes, NJ: Career Press, 2007.

Kaplan, Robert M., and Dennis P. Saccuzzo. *Psychological Testing: Principles, Applications, and Issues.* 7th ed. New York: Wadsworth, 2008.

Kroeger, Otto, Janet M. Thuesen, and Hile Rutledge. *Type Talk at Work* Rev. ed. New York: Dell, 2002.

McCrae, Robert R., and Paul T. Costa, Jr. "Validation of the Five-Factor Model of Personality Across Instruments and Observers." *Journal of Personality and Social Psychology* 52, no. 1 (1987): 81–90.

McFarland, Lynn A., and Ann Marie Ryan. "Variance in Faking Across Noncognitive Measures." *Journal of Applied Psychology* 85, no. 5 (2000): 812–821.

Schneider, Benjamin, and D. Brent Smith. *Personality and Organizations.* Mahwah, NJ: Lawrence Erlbaum Associates, 2004.

Urbina, Susana. *Essentials of Psychological Testing.* New York: Wiley, 2004.

PIONEERS OF MANAGEMENT

The study of management as a discipline is relatively new, especially when compared with other scientific disciplines. Yet, to truly understand current management thought it is necessary to examine the historical links. It is best to consider not only the theories of management pioneers, but also the contextual and environmental factors that helped to clarify the developmental process behind the theories. Therefore, management pioneers may be easily placed along a historical timeline.

Using the work of Daniel Wren as a guide, the following categories are employed: (1) early management thought; (2) the scientific management era; (3) the social man era; and (4) the modern era.

EARLY MANAGEMENT THOUGHT: THE ECONOMIC FACET

Adam Smith and James Watt have been identified as the two men most responsible for destroying the old England and launching the world toward industrialization. Adam Smith brought about the revolution in economic thought, and James Watt's steam engine provided cheaper power that revolutionized English commerce and industry. In doing so, they also laid the foundation for modern notions of business management theory and practice.

Adam Smith. Adam Smith (1723—1790) was a Scottish political economist. His *Wealth of Nations,* published in 1776, established the "classical school" and with its publication, he became the father of "liberal economics." Smith argued that market and competition should be the regulators of economic activity and that tariff policies were destructive. The specialization of labor was the mainstay of Smith's market system. According to Smith, division of labor provided managers with the greatest opportunity for increased productivity.

James Watt and Matthew Boulton. Aided by Matthew Boulton (1728—1809), James Watt (1736—1819) built on the work of his predecessors and developed his first workable steam engine in 1765. Together, the partners founded the engineering firm of Boulton, Watt, and Sons.

Recognized as his greatest breakthrough, Watt developed a steam engine with rotary, rather than the traditional up-and-down, movement in 1771. This made the engine more adaptable to factory uses as the engine replacing waterwheel power for grinding grain, driving textile machines, and operating bellows for iron works.

Steam power lowered production costs, lowered prices, and expanded markets. In 1800 the sons of Boulton and Watt took over the management of the company and instituted one of the first complete applications of scientific management. In this plant there is evidence of market research, including machine layout study involving workflow, production standards, cost accounting, employee training, employee incentives, and employee welfare programs.

EARLY MANAGEMENT THOUGHT: MANAGEMENT PIONEERS IN THE FACTORY SYSTEM

The division of labor, combined with the advances in technology, provided the economic rationale for the factory system. However, the factory system brought new problems for owners, managers, and society. Four management pioneers proposed solutions for coping with the pressures of the new large-scale industrial organizations. They were Robert Owens, Charles Babbage, Andrew Ure, and Charles Dupin.

Robert Owens. Robert Owens (1771—1858) was a successful Scottish entrepreneur and a utopian socialist who sowed the first seeds of concern for factory workers. Repulsed by the working conditions and poor treatment of workers in the factories across Scotland, Owen became a reformer. He reduced the use of child labor and used moral persuasion rather than corporal punishment in his factories. He chided his fellow factory owners for treating their equipment better than they treated their workers.

Owen deplored the evils of the division of labor; in his ideal system, he believed each man would do a number of different jobs, switching easily from one job to another. Additionally, Owen hated the modern factory system, so he decided to revolutionize it. In 1813 he proposed a factory bill to prohibit employment of children under the age of ten and to limit hours for all children to 10 ½ hours per day with no night work. The bill became law six years later, but was limited to cotton mills, reduced the age limit to nine, and included no provision for inspections; therefore, the law had little impact.

Feeling frustrated in his attempts to reform Britain, Owen traveled to America in 1824. He continued on to New Harmony, Indiana, where he had purchased a large plot of land. New Harmony was the first and most famous of sixteen U.S.-based Owenite communities appearing between 1825 and 1829. None, however, lasted more than a few years as full-fledged socialist communities.

Charles Babbage. Charles Babbage (1792—1871) is known as the patron saint of operations research and management science. Babbage's scientific inventions included a mechanical calculator (his "difference engine"), a versatile computer (his "analytical engine"), and a punch-card machine. His projects never became a commercial reality; however, Babbage is considered the originator of the concepts behind the present day computer.

Babbage's most successful book, *On the Economy of Machinery and Manufacturers,* described the tools and machinery used in English factories. It discussed the economic principles of manufacturing, and analyzed the operations; the skills used and suggested improved practices.

Babbage believed in the benefits of division of labor and was an advocate of profit sharing. He developed a method of observing manufacturing that is the same approach utilized today by operations analysts and consultants analyzing manufacturing operations.

Andrew Ure and Charles Dupin. Andrew Ure (1778—1857) and Charles Dupin (1784—1873) were early industrial educators. Ure provided academic training at Anderson's College in Glasgow for managers in the early factory system. He published a text in 1835 that dealt mainly with the technical problems of manufacturing in the textile industry, but also dealt with problems of managing.

Obviously pro-management, Ure advocated an "automatic plan" to provide harmony and to keep any individual worker from stopping production. He was a defender of the factory system and believed workers must recognize the benefits of mechanization and not resist its introduction.

Dupin was a French engineer and professor who pioneered industrial education in France. He is credited with having a great influence on the writings of Henri Fayol. Dupin published *Discours sur le Sort Des Ouvriers,* translated Discourse on the Condition of the Workers, in 1831. This manuscript included concepts such as time study and the need to balance workloads after introducing division of labor. He wrote of the need for workers to receive concise instructions and the need to discover and publish the best way to perform work with the least amount of worker energy.

THE SCIENTIFIC MANAGEMENT ERA

Since management relied heavily on engineers for advice in the new factories, it is not surprising that associations of engineers were some of the first to examine and write about management problems. The American Society of Mechanical Engineers (ASME) was founded in 1880 and was one of the first proponents of the search for scientific management.

Henry Towne. Henry Towne, president of the Yale and Towne Manufacturing Company, began applying systematic management practices as early as 1870. In 1866 he wrote a paper, *The Engineer as an Economist,* that suggested that ASME become a clearinghouse for information on managerial practices, since there was no management association.

Towne also published several papers and a book, *Evolution of Industrial Management,* on the use of "gain sharing" to increase worker productivity. In his last book Towne contrasted the status of scientific management in 1886 and in 1921, noting the establishment of industrial

management courses, and crediting Frederick Taylor as the apostle of the scientific movement.

Frederick A. Halsey. Frederick A. Halsey was another engineer who wrote papers presented to ASME outlining his ideas about wages. He attacked the evils of profit sharing and proposed a special "premium plan" for paying workers based on time saved. Halsey proposed incentives based on past production records, including a guaranteed minimum wage and a premium for not doing work. Halsey's plan, along with Taylor's ideas on piece rates, had a major influence in the United States and Great Britain on the design of pay schemes.

Henry Metcalfe. Another early application of the scientific principles of management occurred when Captain Henry Metcalfe developed a system of controls that he applied to the management of the Frankford Arsenal. In 1885, Metcalfe published *The Cost of Manufactures and the Administration of Workshops, Public and Private.* This book is considered a pioneer work in the area of management science.

Daniel McCallum. Unlike many industries, the railroad industry forced managers to develop special ways of managing a labor force that was dispersed over a wide geographical area. Daniel McCallum (1815—1878) became general superintendent of the Erie Railroad in 1854. He developed principles of management that included discipline, division of labor, detailed job descriptions, promotion and pay based on merit, frequent and accurate reporting of worker performance, and a clearly defined chain of command.

McCallum also designed a formal organizational chart and a sophisticated information management system using the telegraph. His system and rules, however, ran afoul of the militant union and he resigned after a six-month strike. Later, McCallum successfully ran the Northern railroads during the Civil War. He also served as a management consultant for several railroads after the war.

Frederick Taylor. Probably the most famous management pioneer of all is Frederick W. Taylor (1856—1915), the father of scientific management. Taylor rose from common laborer to chief engineer in six years, and completed a home study course to earn a degree in mechanical engineering in 1883.

In trying to overcome soldiering by the workers, Taylor began a scientific study of what workers ought to be able to produce. This study led to the beginnings of scientific management. Taylor used time studies to break tasks down into elementary movements, and designed complementary piece-rate incentive systems.

Taylor believed management's responsibility was in knowing what you want workers to do and then seeing that they do it in the best and cheapest way. He developed many new concepts such as functional authority. In other words, Taylor proposed that all authority was based on knowledge, not position. He wrote *Shop Management* in 1903, became the president of the American Society of Mechanical Engineers in 1906, and was a widely traveled lecturer, lecturing at Harvard from 1909 to 1914.

Taylor published *Principles of Scientific Management* in 1911. Its contents would become widely accepted by managers worldwide. The book described the theory of scientific management. Scientific management was defined as methods aimed at determining the one best way for a job to be done.

During this same period, organized labor waged an all-out war on Taylorism resulting in a congressional investigation. In February of 1912, however, the committee reported finding no evidence to support abuses of workers or any need for remedial legislation. Taylor did not neglect the human side of work, as often suggested. He simply emphasized the individual worker not the group. Taylor called for a revolution that would fuse the interests of labor and management into a mutually rewarding whole.

Henry Gantt. Henry Gantt (1861—1919) worked with Taylor at the Midvale Steel Company and was considered a Taylor disciple. Gantt felt the foreman should teach the workers to be industrious and cooperative which, in turn, would facilitate the acquisition of all other knowledge.

Gantt also designed graphic aids for management called Gantt charts using horizontal bars to plan and control work. Similar to Taylor, Gantt called for the scientific study of tasks, movements, working conditions, and worker cooperation. He also focused on the connection between the involvement of management and financial interests.

Frank Gilbreth. Frank Gilbreth (1868—1924) and Lillian Gilbreth (1878—1972) were a husband and wife team that brought many significant contributions, as well as color, to scientific management. Frank began working at age seventeen as an apprentice bricklayer, and later became a chief superintendent and independent contractor. Frank's early work parallels Taylor's and, in later years, Frank formed his own management consulting company, which was closely associated with scientific management methods.

Frank Gilbreth published a series of books describing the best way of laying bricks, handling materials, training apprentices, and improving methods while lowering costs and paying higher wages.

In 1907 Frank Gilbreth met Frederick Taylor and soon became one of Taylor's most devoted advocates.

Frank turned his attention away from construction, and extended his interest in motion study (similar to Taylor's time study) to the general field of management.

To supplement the human eye, Gilbreth used motion picture cameras, lights, and clocks calibrated in fractions of minutes to create "micromotion" study. Gilbreth also developed a list of seventeen basic motions he called "therbligs" (Gilbreth spelled backwards) to help analyze any worker movement. Unfortunately, the partnership of Frank and Lillian came to an end in 1924 when Frank died of a heart attack. Lillian continued their work through motion study seminars and consulting, later becoming a professor of management at Purdue University (1935—1948).

Lillian Gilbreth. Dr. Lillian Gilbreth, known as the first lady of management, played an important role in Frank's research and made many contributions of her own. Lillian pursued a degree in psychology, and in addition to her marriage and family of twelve, she assisted Frank with his work. Lillian's thesis-turned-book, *The Psychology of Management,* is one of the earliest contributions to understanding the human side of management.

Lillian faced many incidents of discrimination during her life, including the fact that her book could only be published if her initials were used so readers would not know she was a woman. Dr. Gilbreth's work was always more management than psychology. Her work illustrated concern for the worker and attempted to show how scientific management would benefit the individual worker, as well as the organization. Lillian wrote about reduction of worker fatigue, how to retool for disabled veteran workers returning to the workplace, and how to apply principles of scientific management to the home. The Gilbreth's partnership and their family was made famous by the 1946 book *Cheaper by the Dozen,* written by son, Frank Gilbreth Jr. and daughter, Ernestine Gilbreth Carey.

Harrington Emerson. Harrington Emerson (1853—1931) was educated in Germany and symbolized a new breed of "efficiency engineers" who were bringing new methods of time and cost savings to American industry. Emerson practiced his system as general manager of the Burlington Railroad, but saw the need for applications of his system in other industries.

The Engineering Magazine published a series of articles by Emerson in 1908 and 1909 that were later issued as a single volume. To Emerson, organization was one of the greatest problems that led to inefficiency. Emerson embraced the general staff concept where each firm was to have a chief of staff and four major sub groupings of staff under him: one for employees, one for machines, one for materials, and one for methods. Staff advice was available to all levels and focused on planning.

Emerson made other contributions in the areas of cost accounting and in setting standards for judging workers and shop efficiency. In 1913 Emerson published *Twelve Principles of Efficiency.* This publication became a landmark in the history of management thought. Harrington Emerson achieved renown in his time and his legacy lives on today.

Morris Cooke. While Taylor, the Gilbreths, Gantt, and Emerson were working with industrial enterprises, Morris Cooke (1872—1960) was extending the gospel of efficiency in non-industrial organizations. Cooke focused his attention on educational and municipal organizations.

Cooke conducted a study of administration in educational organizations funded by the Carnegie Foundation for the Advancement of Teaching. The resulting study was a bombshell in the academic world. Cooke's findings included, among other things, widespread use of inbreeding (hiring your own graduates), inefficient committee management, autonomous departments working against university coordination, and pay based on tenure.

In 1911 Cooke was selected as director of public works and brought scientific management to the governance of Philadelphia. In four years he saved the city over one million in garbage collection costs alone. Cooke wrote *Our Cities Awake* (1918) to put forth his case for using scientific management for better-managed municipalities.

Cooke became a close friend of Samuel Gompers, president of the American Federation of Labor, and tried to bring labor and management together in a time when they were becoming more antagonistic.

Hugo Munsterberg. While the efficiency engineers studied mechanical efficiency, the industrial psychologists studied human efficiency, with the same goal in mind of improving productivity. The father of industrial psychology was Hugo Munsterberg (1863—1916). In 1892 Munsterberg established his psychological laboratory at Harvard, which was to become the foundation stone in the industrial psychology movement.

Munsterberg published *Psychology and Industrial Efficiency* (1913), which included theories directly related to Taylor's scientific management. The book contained three parts. Part one, the "best possible man," was a study of the demand jobs made on people, and the importance of finding people whose mental capabilities made them well-matched for the work. Part two, the "best possible work," described the psychological conditions under which the greatest output might be obtained from every worker. Part three, the "best possible effect," examined the necessity of creating the influences on human needs that were desirable for the interests of business.

Munsterberg's proposals were based on his own evidence from studies involving telephone operators, trolley drivers, and naval officers.

Walter Dill Scott. Walter Dill Scott (1869—1955) taught at Northwestern University from 1901 to 1920 and then served as president of the university for nineteen years. Scott was interested in employee attitudes and motivation in production and devised a system, adopted by the army, for classifying personnel and testing officer candidates. In fact, he was awarded the Distinguished Service Medal for his work.

From March 1910 until October 1911, Scott wrote a series of articles entitled *The Psychology of Business* later published in *System* magazine. These articles were based on actual business cases and represented one of the earliest applications of the principles of psychology to motivation and productivity in industry.

THE EMERGENCE OF ADMINISTRATIVE THEORY

Henri Fayol. Two contributors to the administrative theory of management are Henri Fayol (1841—1925) and Max Weber (1864—1920). Both wrote during the scientific management era in America, but neither was accorded the full measure of his contribution until some decades after his death.

Fayol was trained as a mining engineer and became the managing director of a coal-mining and iron foundry combine. From his own experience, he formulated and wrote papers about his ideas of administrative theory as early as 1900. His first mention of the "elements" of administration came in a book published in 1916. However, America was not thoroughly exposed to Fayol's theory until the book was translated in 1949 and titled *General and Industrial Management.*

Fayol identified the major elements or functions of management as planning, organization, command, coordination, and control. Planning and organization received the majority of his attention in his writings. Fayol believed that management could be taught, that managerial ability was sorely needed as one moved up the ladder, and that management was a separate activity applicable to all types of undertakings.

Fayol's fourteen principles of management included: division of labor, authority, discipline, unity of command, unity of direction, subordination of individual interests to the general interest, remuneration, centralization, scalar chain, order, equity, stability of tenure of personnel, initiative, and *esprit de corps* (morale).

Max Weber. The work of Max Weber (1864—1920) runs chronologically parallel to that of Fayol and Taylor.

Weber was a German intellectual with interests in sociology, religion, economics, and political science. He was a professor, editor, government consultant, and author. Weber used the concept of "bureaucracy" as an ideal organizational arrangement for the administration of large-scale organizations. His work was not translated into English until 1947.

Weber's concept of the best administrative system was actually similar to Taylor's. Some of Weber's essential elements included division of labor, and chain of command. He also believed that selection should be based on technical qualifications, officials'/managers' appointments should be based on qualifications, managers should not be owners, and impersonal and uniform rules should be applied.

Peter Drucker. Peter Drucker (1909—2005) made an enduring contribution to understanding the role of manager in a business society. Unlike the previous Fayolian process texts, Drucker, author of more than thirty-five books, developed three broader managerial functions: (1) managing a business; (2) managing managers; and (3) managing workers and work. He proposed that in every decision, the manager must put economic considerations first. Drucker recognized that there may be other non-economic consequences of managerial decision, but that the emphasis should still be placed on economic performance. Known as the "father of modern management," Drucker later was a critic of excessive executive pay.

As noted in *Business Week*, Drucker introduced the following ideas between the 1940s and the 1970s: the decentralization of large organizations (1940s); the corporation as a "human community," where workers were viewed as assets of and not liabilities to the organization, a view which gained him a strong following in Japan (1950s); using substantive institutional practices and policies over "charismatic cult leaders" in shaping the direction of the organization (1960s); and the realization of the growing importance of "knowledge capital" in the evolving economy. In fact, Drucker is credited with coining the term "knowledge worker" in the 1970s.

THE SOCIAL MAN ERA

The behavioral school of management thought began late in the scientific management era, but did not achieve large-scale recognition until the 1930s. The real catalyst for the emergence of the behavioral school was a series of research studies conducted at the Hawthorne plant of Western Electric between 1924 and 1932. This research became known as the Hawthorne experiments.

Elton Mayo and the Hawthorne Studies. Elton Mayo (1880—1949) joined the Harvard faculty in 1926 as associate professor of industrial research, and two years

later was asked to work with Western Electric, as part of the Harvard research group, to continue the Hawthorne studies.

Mayo was intrigued by the initial results of the early illumination studies that showed output had increased upon changes in illumination—either brighter or darker—but no one knew why. Mayo believed the increased output came from a change in mental attitude in the group as the workers developed into a social unit.

Other experiments included the piecework experiment, the interviewing program, and the bank wiring room experiments. From these experiments the Mayoists concluded that employees have social needs as well as physical needs, and managers need a mix of managerial skills that include human relations skills.

Mary Parker Follett. Another contributor to the behavioral school of thought was Mary Parker Follett. Follett (1868—1933) was trained in philosophy and political science, and became interested in vocational guidance and the emerging field of social psychology. She had an international reputation as a political philosopher and in 1924 published *Creative Experience,* a book that was widely read by businessmen of the day.

Follett advocated a business philosophy that embraced integration as a way to reduce conflict without compromise or domination. She also proposed the "law of the situation," where parties agree to take their orders from the situation instead from an individual.

Another facet of her philosophy focused on coordination as a fundamental principle of organization. Follett believed the primary leadership task was to define the purpose of the organization and integrate that purpose with individual and group purposes. In other words, she thought that organizations should be based on a group ethic rather than individualism. Thus, managers and employees should view themselves as partners rather than adversaries.

Chester Barnard. Chester Barnard (1886—1961) was a self-made scholar who attended Harvard on a scholarship, but never graduated because he lacked a laboratory science course. He joined the AT&T system in 1909 and became the president of New Jersey Bell in 1927.

Barnard is best-known for his 1938 work, *The Functions of the Executive,* a collection of eight lectures in which he described a theory of organizations in order to stimulate others to examine the nature of cooperative systems. Looking at the disparity between personal and organizational motives, Barnard described an "effective-efficient" dichotomy.

According to Barnard, effectiveness deals with goal achievement, and efficiency is the degree to which individual motives are satisfied. He viewed formal organizations as integrated systems where cooperation, common purpose,

and communication are universal elements, whereas the informal organization provides communication, cohesiveness and maintenance of feelings of self-worth. Barnard also developed the "acceptance theory of authority" based on his idea that bosses only have authority if subordinates accept that authority.

THE MODERN ERA: TOTAL QUALITY MANAGEMENT

A quality revolution swept through the business sector during the latter part of the twentieth century. The universal term used to describe this phenomenon was "total quality management" or TQM. This revolution was led by a small group of quality gurus; the most well known were W. Edwards Deming (1900—1993) and Joseph Juran (b. 1904).

W. Edwards Deming. Deming, an American, is considered to be the father of quality control in Japan. In fact, Deming suggested that most quality problems are not the fault of employees, but the system. He emphasized the importance of improving quality by suggesting a five-step chain reaction. This theory proposes that when quality is improved, (1) costs decrease because of less rework, fewer mistakes, fewer delays, and better use of time and materials; (2) productivity improves; (3) market share increases with better quality and prices; (4) the company increases profitability and stays in business; and (5) the number of jobs increases. Deming developed a 14-point plan to summarize his teachings on quality improvement. These fourteen points are listed in Table 1.

Table 1
Deming's 14 Points

1. Create consistency of purpose toward the improvement of product and service, and communicate this goal to all employees.
2. Adopt the new philosophy of quality throughout all levels with the organization.
3. Cease dependence on inspection to achieve quality; understand that quality comes from improving processes.
4. No longer select suppliers based solely on price. Move towards developing a long-term relationship with a single supplier.
5. Processes, products, and services should be improved constantly; reducing waste.
6. Institute extensive on-the-job training.
7. Improve supervision.
8. Drive out fear of expressing ideas and concerns.
9. Break down barriers between departments. People should be encouraged to work together as a team.
10. Eliminate slogans and targets for the workforce.
11. Eliminate work quotas on the factory floor.
12. Remove barriers that rob workers of their right to pride of workmanship.
13. Institute a program of education and self-improvement.
14. Make sure to put everyone in the company to work to accomplish the transformation.

Joseph M. Juran. Joseph Juran's experience led him to conclude that more than 80 percent of all quality defects are caused by factors within management's control. He referred to this as the "Pareto principle." From this theory, he developed a management trilogy that included quality planning, control, and improvement. Juran suggested that an area be selected which has experienced chronic quality problems. It should be analyzed, and then a solution is generated and finally implemented.

The quality work of Joseph Juran and W. Edwards Deming changed the way people looked at business.

THE MODERN ERA: CONTEMPORARY MANAGEMENT HISTORIANS

The following group of individuals have proven themselves to be great teachers and intellectual leaders in matters of fundamental concern to management history. Their leadership and research have contributed greatly to our understanding of the evolution of management.

Arthur Bedeian. Arthur Bedeian, a management professor at Louisiana State University, is a management historian with universal interests. He has written on a variety of management-related topics, many of which fall within the area of management history. Bedeian has made several significant contributions to management history. These include his research into specific areas of inquiry such as scientific management and his bibliographic investigations and memoriams. However, perhaps his most important contribution to the field is his editorship of the four volumes of the *Management Laureates: A Collection of Autobiographical Essays.*

Alfred Bolton. Alfred Bolton was born in Canada in 1926. At the age of fifty-four, he began work on his doctorate at Nova University. It was during this time that he developed an interest in management history. His most significant contribution to the body of management history knowledge is his work with Ron Greenwood regarding the Hawthorne study participants. The work resulting from this collaborative effort has provided a unique glimpse into the groundbreaking experiments at Western Electric.

Daniel Wren. Daniel Wren (b. 1932) is considered one of the leading authorities on the history of management thought. He is one of the most prolific writers in this field. His textbook, *The Evolution of Management Thought,* focuses on describing management history by providing a conceptual framework for understanding the evolution of management. Both his research and teaching in this area have led many to consider Wren as one of the management history gurus of the twentieth century.

SEE ALSO *Management Thought; Quality and Total Quality Management; Quality Gurus*

BIBLIOGRAPHY

Byrne, John A., "The Man Who Invented Management," *Business Week,* 28 November 2005. Available from: http://www.businessweek.com/magazine/content/05_48/b3961001.htm.

Deming, W. Edwards. *Out of the Crisis.* Cambridge, MA: Massachusetts Institute of Technology, 2000.

Duncan, W. Jack. *Great Ideas in Management: Lessons from the Founders and Foundations of Managerial Practice.* San Francisco, CA: Jossey-Bass, 1989.

Gazell, J.A. "Drucker on Effective Public Management." *Journal of Management History* 6, no. 1 (2000): 48–62.

Gibson, Jane Whitney, Richard M. Hodgetts, and Jorge M. Herrer. "Management History Gurus of the 1990s: Their Lives, Their Contributions." *Journal of Management History* 5, no. 6 (1999): 380–397.

Lewis, P.S., S. H. Goodman, and P.M. Fandt. *Management: Challenges for Tomorrow's Leaders.* Cincinnati, OH: Thompson South-Western, 2005.

Robbins, Stephen R., and David A. DeCenzo. *Fundamentals of Management.* Upper Saddle River, NJ: Pearson Prentice Hall, 2004.

Spigener, J.B. "What Would Deming Say?" *Quality Progress* 34, no. 3 (2001): 61–64.

Wrege, Charles D., Ronald G. Greenwood, and R. Greenwood. "A New Method of Discovering Primary Management History: Two Examples Where 'Little Things Mean A Lot.'" *Journal of Management History* 3, no. 1 (1997): 59–92.

Wren, Daniel A. *The Evolution of Management Thought.* New York, NY: John Wiley & Sons, 2004.

Wren, Daniel A., Arthur G. Bedeian, and J.D. Breeze. "The Foundations of Henri Fayol's Administrative Theory." *Management Decision* 40, no. 9 (2002): 906–918.

Wren, Daniel A., and Ronald G. Greenwood. *Management Innovators.* New York, NY: Oxford University Press, 1998.

PLANNING

Planning is the management function that involves setting goals and deciding how to best achieve them. Setting goals and developing plans helps the organization to move in a focused direction while operating in an efficient and effective manner. Long-range planning essentially is the same as strategic planning; both processes evaluate where the organization is and where it hopes to be at some future point. Strategies or plans are then developed for moving the organization closer to its goals. Long-range plans usually pertain to goals that are expected to be met five or more years in the future.

People often confuse the roles of planning and scheduling. They are different methodologies and utilize different sets of tools. Planning takes a futuristic view and sets anticipated timelines, while scheduling focuses on an organization's day-to-day activities. For example, most enterprise

resource planning (ERP) systems are good at the planning function, but are very poor at the scheduling function. A tool like finite capacity scheduling (FCS) is necessary to facilitate the daily tracking of material and labor movements.

LONG-RANGE PLANNING AND STRATEGIC MANAGEMENT

Since the purpose of strategic management is the development of effective long-range plans, the concepts often are used interchangeably. The traditional process models of strategic management involve planning organizational missions; assessing relationships between the organization and its environment; and identifying, evaluating, and implementing strategic alternatives that enable the organization to fulfill its mission.

One product of the long-range planning process is the development of corporate-level strategies. Corporate strategies represent the organization's long-term direction. Issues addressed as part of corporate strategic planning include questions of diversification, acquisition, divestment, and formulation of business ventures. Corporate strategies deal with plans for the entire organization and change relatively infrequently, with most remaining in place for five or more years.

Long-range plans usually are less specific than other types of plans, making it more difficult to evaluate the progress of their fulfillment. Since corporate plans may involve developing a research-intensive new product or moving into an international market, which may take years to complete, measuring their success is rarely easy. Traditional measures of profitability and sales may not be practical in evaluating such plans.

Top management and the board of directors are the primary decision makers in long-range planning. Top management often is the only level of management with the information needed to assess organization-wide strengths and weaknesses. In addition, top management typically is alone in having the authority to allocate resources toward moving the organization in new and innovative directions.

WHY ENGAGE IN LONG-RANGE PLANNING?

Research has found that firms engaged in strategic planning outperform firms that do not follow this approach. Because planning helps organizations to consider environmental changes and develop alternative responses, long-range planning seems particularly useful for firms operating in dynamic environments.

A review of studies regarding long-range and strategic planning and performance allows a number of generalizations to be made about how long-range planning can contribute to organizational performance.

1. Long-range plans provide a theme for the organization. This theme is useful in formulating and evaluating objectives, plans, and policies. If a proposed objective or policy is not consistent with the existing theme, it can be changed to better fit the organization's strategies.

2. Planning aids in the anticipation of major strategic issues. It enhances the ability of a firm to recognize environmental changes and begin courses of action to prevent potential problems. Rewarding employees for recognizing and responding to environmental changes sensitizes employees to the need for planning.

3. Planning assists in the allocation of discretionary resources; future costs and returns from various alternatives can be more easily anticipated. Strategies also reflect priorities resulting from multiple objectives and business-unit interdependencies.

4. Plans guide and integrate diverse administrative and operating activities. The relationship between productivity and rewards is clarified through strategic planning, guiding employees along the path to the desired rewards. Strategies also provide for the integration of objectives, avoiding the tendency for subunit objectives to take precedence over organizational objectives.

5. Long-range planning is useful for developing prospective general managers. Strategic planning exposes middle managers to the types of problems and issues they will have to face when they become general managers. Participation in strategic planning also helps middle managers to see how their specialties fit into the total organization.

6. Plans enable organizations to communicate with groups in the environment. Plans incorporate the unique features of the product or company that differentiate it from its competitors. Branding communicates to the public an image of product attributes (e.g., price, quality, and style). Similarly, dividend policies make a difference in the attractiveness of a stock to blue-chip, growth, and speculative investors.

THE STRATEGIC MANAGEMENT/ LONG-RANGE PLANNING PROCESS

The first basic step in long-range planning, is the definition of the organization's mission. Essentially, the mission is what differentiates the organization from others providing similar goods or services. Strategies are developed from mission statements to aid the organization in operationalizing its mission.

Long-range planning primarily is the responsibility of boards of directors, top management, and corporate planning staffs. Strategic decision makers are responsible for identifying and interpreting relevant information about the business environment. Thus, a key part of strategic management involves identifying threats and opportunities stemming from the external environment and evaluating their probable impact on the organization.

Environmental analysis, another key component of long range-planning, identifies issues to be considered when evaluating an organization's environment. The environment consists of two sets of factors. These include the macro-environment, consisting of factors with the potential to affect many businesses or business segments, and the task environment, with elements more likely to relate to an individual organization. Industry analysis is an especially important part of analyzing the specific environment of an organization.

Internal characteristics of an organization must be thoroughly identified and accounted for in order to effect long-term planning. Internal factors can represent either strengths or weaknesses. Internal strengths provide a basis upon which strategies can be built. Internal weaknesses represent either current or potential problem areas that may need to be corrected or minimized by appropriate strategies. Internal planning issues commonly involve the functional areas of finance, marketing, human resource management, research and development, operations/production, and top management.

Once the organization's mission is determined and its internal and external strengths and weaknesses are identified, it is possible to consider alternative strategies that provide the organization with the potential to fulfill its mission. This process essentially involves the identification, evaluation, and selection of the most appropriate alternative strategies. Strategic alternatives include strategies designed to help the organization grow faster, maintain its existing growth rate, reduce its scope of operations, or a combination of these alternatives. Corporate grand strategies are evaluated later in this discussion.

Strategy implementation is another important part of long-range planning. Once a strategic plan has been selected, it must be operationalized. This requires the strategy to be implemented within the existing organizational structure, or the modification of the structure so that it is consistent with the strategy. Implementing a strategy also requires integration with the organization's human component.

A final element of long-range planning is strategic control, which evaluates the organization's current performance and compares this performance to its mission. Strategic control essentially brings the strategic management process full circle in terms of comparing actual results to intended or desired results.

CORPORATE-LEVEL PLANS

Corporate-level plans are most closely associated with translating organizational mission statements into action. In a multi-industry or multiproduct organization, managers must juggle the individual businesses to be managed so that the overall corporate mission is fulfilled. These individual businesses may represent operating divisions, groups of divisions, or separate legal business entities. Corporate-level plans primarily are concerned with:

1. Scope of operations. What businesses should we be in?

2. Resource allocation. Which businesses represent our future? Which businesses should be targeted for termination?

3. Strategic fit. How can the firm's businesses be integrated to foster the greatest organizational good?

4. Performance. Are businesses contributing to the organization's overall financial picture as expected, in accordance with their potential? The business must look beyond financial performance to evaluate the number and mix of business units. Has the firm been able to achieve a competitive advantage in the past? Will it be able to maintain or achieve a competitive advantage in each business in the future?

5. Organizational structure. Do the organizational components fit together? Do they communicate? Are responsibilities clearly identified and accountabilities established?

CORPORATE PORTFOLIO ANALYSIS

The Boston Consulting Group (BCG) Model is a relatively simple technique for helping managers to assess the performance of various business segments and develop appropriate strategies for each investment within the corporate portfolio.

The BCG Model classifies business unit performance on the basis of the unit's relative market share and the rate of market growth. Products and their respective strategies fall into one of four quadrants. The typical starting point for a new business is as a *question mark*. If the product is new, it has no market share but the predicted growth rate is good. What typically happens is that management is faced with a number of these types of products, but with too few resources to develop all of them. Thus, long-range planners must determine which of the products to attempt to develop into commercially viable products and which ones to drop from consideration. Question marks are cash users in the organization. Early in their life, they contribute no revenues and require expenditures

for market research, test marketing, and advertising to build consumer awareness.

If the correct decision is made and the product selected achieves a high market share, it becomes a *star* in the BCG Model. Star products have high market share in a high growth market. Stars generate large cash flows for the business, but also require large infusions of money to sustain their growth. Stars often are the targets of large expenditures for advertising and research and development in order to improve the product and to enable it to establish a dominant industry position.

Cash cows are business units that have high market share in a low-growth market. These often are products in the maturity stage of the product life cycle. They usually are well-established products with wide consumer acceptance and high sales revenues. Cash cows generate large profits for the organization because revenues are high and expenditures are low. There is little the company can do to increase product sales. The plan for such products is to invest little money into maintaining them, and to divert the large profits generated into products with more long-term earnings potentials (i.e., question marks and stars).

Dogs are businesses with low market share in low-growth markets. These often are cash cows that have lost their market share or are question marks the company has elected not to develop. The recommended strategy for these businesses is to dispose of them for whatever revenue they will generate and reinvest the money in more attractive businesses (question marks or stars).

Another, later form of the BCG Model is the GE/McKinsey Matrix, which differs in three ways from the BCG Model: (1) a broader measurement—competitive strength—is used instead of market share in order to assess the business unit's relative industry performance; (2) market industry attractiveness is used as a measurement of the product's performance, instead of just market growth; and (3), instead of using a two-by-two matrix in which to place the product—as used in the BCG Model—the GE/McKinsey Matrix uses a three-by-three matrix, which allows for a middle category for measuring product attractiveness.

CORPORATE GRAND STRATEGIES

Corporate strategies can be classified into three groups or types. Collectively known as grand strategies, these involve efforts to expand business operations (growth strategies), maintain the status quo (stability strategies), or decrease the scope of business operations (retrenchment strategies).

Growth Strategies. Growth strategies are designed to expand an organization's performance, usually as measured by sales, profits, product mix, or market coverage.

Typical growth strategies involve one or more of the following:

1. Concentration strategy, in which the firm attempts to achieve greater market penetration by becoming very efficient at servicing its market with a limited product line.

2. Vertical integration strategy, in which the firm attempts to expand the scope of its current operations by undertaking business activities formerly performed by one of its suppliers (backward integration) or by undertaking business activities performed by a business in its distribution channel.

3. Diversification strategy, which the firm moves into different markets or adds different products to its mix. If the products or markets are related to its existing operations, the strategy is called *concentric diversification.* If the expansion is in products and markets unrelated to the existing business, the diversification is called *conglomerate.*

Stability Strategies. When firms are satisfied with their current rate of growth and profits, they may decide to employ a stability strategy. This strategy basically extends existing advertising, production, and other strategies. Such strategies typically are found in small businesses in relatively stable environments. The business owners often are making a comfortable income operating a business that they know, and see no need to make the psychological and financial investment that would be required to undertake a growth strategy.

Retrenchment Strategies. Retrenchment strategies involve a reduction in the scope of a corporation's activities. The variables to be considered in such a strategy primarily involve the degree of reduction. Retrenchment strategies can be subdivided into the following:

1. Turnaround strategy, in which firms undertake a temporary reduction in operations to make the business stronger and more viable in the future. These moves are popularly called downsizing or rightsizing. The hope is that a temporary belt tightening will allow the firm to pursue a growth strategy at some future point.

2. Divestment, in which a firm elects to spin off, shut down, or sell a portion of its business. This strategy would commonly be used with a business unit identified as a dog by the BCG Model. Typically, a poor performing unit is sold to another company and the money is reinvested in a business with greater potential.

3. Liquidation strategy, which is the most extreme form of retrenchment. Liquidation involves the selling or

closing of the entire business operation, usually when there is no future for the business. Employees are released, buildings and equipment are sold, and customers no longer have access to the product. This generally is viewed as a strategy of last resort, and is one that most managers work hard to avoid.

The purpose of an organization is its role as defined by those who maintain authority over it. How the organization elects to fulfill this role constitutes its plan. Mission statements differentiate the organization from other organizations providing similar goods or services. Objectives are the intermediate goals or targets to be completed as the organization fulfills its mission. Plans outline how a firm intends to achieve its mission. Policies provide guidelines or parameters within which decisions are made so that decisions are integrated with other decisions and activities.

SEE ALSO *Forecasting; Strategic Planning Tools; Strategy Formulation; Strategy in the Global Environment; Strategy Levels*

BIBLIOGRAPHY

Cooper, Robert G., Edgett, Scott J., and Kleinschmidt, Elko J. *Portfolio Management for New Products.* 2nd edition. New York: Basic Books, 2001.

Plenert, Gerhard. *The eManager: Value Chain Management in an eCommerce World.* Dublin, Ireland: Blackhall Publishing Ltd., 2001.

———. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

Plenert, Gerhard Johannes, and Bill Kirchmier. *Finite Capacity Scheduling: Management, Selection, and Implementation.* New York: John Wiley & Sons Inc., 2000.

POISON PILL STRATEGIES

Poison pill strategies are defensive tactics that allow companies to thwart hostile takeover bids from other companies. Many companies may find themselves unprepared when facing such bids. By adopting a poison pill strategy, a company can be somewhat reassured that acquiring companies will approach its board of directors, not the shareholders. Poison pill strategies are also known as shareholders' protection rights plans.

HISTORY

During the late 1950s and early 1960s, several large corporations began acquiring other companies to diversify their operations. Diversification allowed them to offset their losses in a failing industry with profits from other unrelated, successful industries. Such phenomena caused concerns about the potential of conglomerates to concentrate excessive economic power in the hands of a few corporations. This led to the passage of the Williams Act in 1968, which required the acquiring company to fully disclose the terms of an impending acquisition and to allow a period for competing offers for the target company to be made.

By the late 1970s, the pace of acquisitions nearly came to a halt. In 1982, however, the U.S. Supreme Court passed a landmark ruling in the case of *Edgar v. MITE Corp* that invalidated the basis for anti-takeover laws in thirty-seven states. Furthermore, under the Reagan administration, the U.S. Department of Justice followed a lax policy towards enforcing anti-takeover laws. No longer able to shelter themselves against unfriendly takeover bids, many companies opted to devise anti-takeover strategies. At that time there was a significant increase in poison pill adoptions. However, in light of recent corporate scandals and an overall perception of poor corporate ethics poison pills began to show a decline in the early twenty-first century.

TYPES OF POISON PILL STRATEGIES

"Flip-Over" Rights Plan. Most poison pill strategies involve some form of discrimination against the acquiring company. The most commonly used strategy is called the "flip over," or the shareholder rights plan. Under this strategy, the holders of common stock of a company receive one right for each share held, which allows them an option to buy more shares in the company. The rights have a set expiration date and do not carry voting power. They are worthless at the time of the offering because the exercise price is set well above the going market price of common shares. A shareholder cannot sell these rights independently as they trade together with the shares. When a suitor company makes an unwelcome bid, the rights begin trading separately from the shares. If the takeover bid is successful, the shareholder rights may be exercised to purchase shares at a discount of as much as 50 percent from the going market price. All the shareholders except the acquirer can exercise their rights to purchase shares at discount. This results in a significant dilution in the share holdings of the acquirer, possibly placing the control of the firm in jeopardy. The attempted takeover bid becomes expensive. If the takeover bid is abandoned, the company might redeem the rights, usually at five cents per share.

"Flip-in" Rights Plan. A variation of the flip over is the "flip-in" plan. The plan allows the rights holder to purchase shares in the target company at a discount upon the mere accumulation of a specified percentage of stock by a potential acquirer. For example, the rights become exercisable to purchase the target company's common stock at

50 percent discount from market price in the event the acquirer purchases more than, say, 30 percent ownership in the target company. The acquirer is precluded from exercising flip-in rights. This strategy allows more power than the "flip-over" rights plan and, therefore, has become a common form of poison pill adopted by many U.S. corporations.

Poison Debt. The target company issues debt securities on certain stipulated terms and conditions to discourage a hostile takeover bid. Examples include covenants that severely restrict the company's ability to sell assets, an increase in the interest rates, an acceleration of the maturity date, a conversion of debt to equity at favorable rates, and rights to buy notes at a substantial premium to the prevailing market price at the time of the takeover bid.

"Put Rights" Plan. Under this plan, the target company issues rights to its stockholders in the form of a dividend. When an acquirer purchases a specified percentage ownership in the target company, the target shareholders, excluding the acquirer, are entitled to sell their common stock back to the company for a specified sum of cash, debt securities, preferred stock, or some combination thereof. This form of poison pill strategy is rarely used by the U.S. corporations.

Voting Poison Pill Plan. This poison pill strategy is designed to dilute the controlling power of the acquirer. Under this plan, the target company issues a dividend of securities, conferring special voting privileges to its stockholders. For example, the target company might issue shares that do not have special voting privileges at the outset. When a potential hostile bid occurs, the stockholders, other than the acquiring party, receive super voting privileges. Alternately, the target company's stockholders might receive securities with voting rights that increase in value over period.

Examples of Rights Plans. On 5 November 1998, Motorola, Inc. adopted a new rights plan to replace an existing plan. Under the plan, one right attaches to each existing share of common stock. If a person or group acquires a 10 percent stake, all other right holders will be entitled to purchase the company's stock at a 50 percent discount. Motorola may redeem the new rights at one cent per right at any time before a person or group takes a 10 percent stake.

On 13 October 1998, Baldwin Piano & Organ Company announced a shareholder rights plan by declaring a dividend of one stock purchase right for each share of common stock owned. Unlike rights plans adopted by other companies, Baldwin's innovative plan would permit a qualified offer to go forward without the board's approval. A qualified offer must be all cash, made to all share-

holders, contain a firm financing commitment, and a fairness opinion from an investment bank. A qualified offer must result in the acquirer gaining at least 70 percent of Baldwin's then outstanding shares.

In late 2004, PeopleSoft management attempted to use a poison pill that would be triggered when 20 percent of the company was acquired. However, shareholder interest in accepting the takeover by Oracle Corp. led to an eventual merger of the two companies.

Cisco had implemented a poison pill plan triggered when an individual or group acquired more than 15 percent of the company. The plan was set to expire in 2008; however, in March 2005 Cisco decided to end the shareholder rights' program, citing revision of its corporate governance procedures.

Yahoo instituted a poison pill strategy in 2001, also triggered when a buyer acquired 15 percent of the company. This came to light during Microsoft's attempt to buy Yahoo in 2008, and allowed shareholders to acquire more stock once the 15 percent threshold was breached by a buyer. In February 2008, Yahoo expanded the poison pill by increasing severance packages to its employees in the event of an acquisition. As a result of the proposed severance packages, Yahoo stockholder and corporate investor Carl Icahn initiated a proxy fight in an attempt to replace Yahoo's board of directors. Subsequently, a group of institutional stockholders filed suit to block the February expansion of the poison pill.

In June 2008, the *Wall Street Journal* reported that at least two companies, Louisiana-Pacific Corp. and Micrel Inc., announced they would take into account derivatives holdings when calculating "beneficial ownership" levels that trigger their respective poison pills.

THE NET EFFECTS OF POISON PILL STRATEGIES

The net effect of a poison pill strategy is to make it prohibitively expensive for an acquirer to buy the control of a company. The underlying assumption is that the board will always act in the best interest of the shareholders, a view that is explicitly rejected by agency theorists. Agency theorists have argued that the practice of allowing management to adopt poison pill strategy has reduced the number of potential offers and actual takeovers. In doing so, they have protected incumbent management at the expense of shareholders. It is argued that poison pills have the effect of perpetuating inefficiencies and poor management that ultimately is reflected in lower stock values.

Boards of directors invariably argue that poison pill strategies have exactly the opposite effect on stock values. They help maintain their independent decision making power to run their companies in the best interests of the shareholders. Poison pill strategies also provide bargaining

strength to the board in order to extract the most value for the stock from a potential acquirer.

While there are merits to the arguments on both sides, an efficient allocation of resources through merger and acquisition activities can only enhance shareholders' wealth no matter how hostile the tender offers of corporate raiders. Many of the defensive tactics of management should be opposed by the shareholders as they might cause a loss of their wealth, although other defensive actions—for example, by soliciting competitive bids—can increase their wealth.

SEE ALSO *Diversification Strategy; Leveraged Buyouts; Mergers and Acquisitions*

BIBLIOGRAPHY
Dolbeck, A. "Hard to Swallow: Poison Pills on the Decline." *Weekly Corporate Growth Report,* 22 March 2004, 1–3.

Helft, Miguel. "Yahoo Shareholders Seek Repeal of Severance Plan." *New York Times,* June 10, 2008. Available from: http://www.nytimes.com/2008/06/10/technology/10yahoo.html?_r=1&partner=rssnyt&emc=rss&oref=slogin.

Lemos-Stein, Mara. "Poison Pills Target Derivatives." *Wall Street Journal,* June 18, 2008. Available from: http://online.wsj.com/article/SB121376250857283657.html?mod=todays_us_marketplace.

Letzing, John. "Yahoo Vulnerable if Microsoft Goes 'Hostile'." *Marketwatch,* February 11, 2008. Available from: http://www.marketwatch.com/news/story/yahoo-exposed-proxy-fight-poison/story.aspx?guid=%7BCB075A77-BD12-417C-B880-9063B4E0DEC4%7D.

Lowry, J.P. "Poison Pills in U.S. Corporations—A Re-examination." *Journal of Business Law,* May 1992, 337–341.

Simon, C.E., and J.M. Bryan. *Corporate Anti-Takeover Defenses: The Poison Pill Device.* St. Paul, MN: Thomson West, 2004.

Slater, Dan. "Responding to Activist Investors, Companies Give Poison Pill More Punch." *Wall Street Journal,* June 18, 2008. Available from: http://blogs.wsj.com/law/2008/06/18/responding-to-activist-investors-companies-give-poison-pill-more-punch/

Velasco, J. "The Enduring Illegitimacy of the Poison Pill" *Journal of Corporation Law* 27, no. 3 (Spring 2002): 381–423.

U.S. Securities and Exchange Commission. "Form 8-K, Current Report." February 13, 2008. Yahoo! Inc. Available from: http://www.sec.gov/Archives/edgar/data/1011006/000095013408002747/f38149e8vk.htm.

POKA-YOKE

Poka-yoke is a technique for avoiding simple human error in the workplace. Also known as mistake-proofing, goof-proofing, and fail-safe work methods, poka-yoke is simply a system designed to prevent inadvertent errors made by workers performing a process. The idea is to take over repetitive tasks that rely on memory or vigilance and guard against any lapses in focus. Poka-yoke can be seen as one of the three common components of Zero Defect Quality Control performed by Japanese companies (source inspection and feedback are the other two).

Poka-yoke can be applied in physical, operational, and philosophical aspects of either manufacturing or service firms. Physical mistake-proofing involves establishing automated mechanisms that eliminate conditions that are prone to errors from a system. Mistake-proofing of operations is achieved through modification of systems with relevant devices which monitor the proper sequences for procedures. Philosophical approach to mistake-proofing involves addressing situations that impede quality and efficiency in production processes (such as inadequate or unskilled workforce).

Dr. Shigeo Shingo, a renowned authority on quality control and efficiency originally developed the mistake-proofing idea. Realizing its value as an effective quality control technique, he formalized its use in Japanese manufacturing as the poka-yoke system. One hundred percent inspections catch unacceptable products but do nothing to improve the process. Shingo was emphatic that the purpose of this system be to improve the process not sort out defective parts.

The poka-yoke concept is in wide use in Japan and other countries throughout the world. Toyota Motor Corporation, whose production system Shingo helped design, averages twelve poka-yoke devices per machine in their manufacturing plants, statistics that clearly validate the concept as beneficial to industry. Patel, Dale, and Shaw, in the article "Set-Up Time Reduction and Mistake Proofing Methods: An Examination in Precision" list the potential benefits as:

- Elimination of set-up errors and improved quality

- Decreased set-up times with associated reduction in production time and improved production capacity

- Simplified and improved housekeeping

- Increased safety

- Lower costs

- Lower skill requirements

- Increased production flexibility

- Improved operator attitudes

In a *Quality* magazine article, Melissa Larson provides interesting details about benefits resulting from the implementation of poka-yoke systems at the Supply Support Activity (SSA) at Fort Carson, Colorado, a military retail supply operation of the U.S. Army.

Inventory, receipt, and batch processing all improved quantifiably. Location survey accuracy was approximately sixty-five percent prior to implementation. After implementing the use of the bar-code readers location accuracy increased to ninety-eight percent. Inventory adjustments

averaged $3,000 a month. Inventory adjustments dropped to an average of $250 per month.

The rate of incorrect receipt closures to the supplier had been ninety percent. This rate dropped to zero percent. Batch processing was also significantly improved. Traditionally, the SSA had approximately fifteen to twenty batch processing failures per month, and a myriad of system file failures due to operators performing the process out of proper sequence. Since the poka-yoke implementations, there have been zero batch process failures.

Catalog update improvements also resulted. The error rate was twenty-two percent but dropped to zero percent. Original request processing time was 12.5 days, but with the new request processing time is 1.6 days. Actual dollars invested in these activities totaled less than $1,000.

TYPES OF POKA-YOKES

Poka-yoke is based on prediction and detection. That is, recognizing that a defect is about to occur or recognizing that a defect has occurred. Consequently, there are two basic types of poka-yoke systems. The control poka-yoke does not allow a process to begin or continue after an error has occurred. It takes the response to a specific type of error out of the hands of the operator. For example, a fixture on a machine may be equipped with a sensing device that will not allow the process to continue unless the part is properly inserted. A second type of poka-yoke provides some type of warning when an error occurs. This does not prevent the error, but immediately stops the process when an error is detected. This type of poka-yoke is useful for mass production environments with rapid processing as the device prevents mass production of scrapped material. For environments where large losses of time or resources do not result, a warning poka-yoke is warranted. All that is needed is a way to ensure that the error is investigated and corrected in a timely manner.

Poka-yokes can be as simple as a steel pin on a fixture that keeps incorrectly placed parts from fitting properly, or they can be as complex as a fuzzy logic neural network used to automatically detect tool breakage and immediately stop the machine. Surprisingly, the simple low-cost devices tend to be in the majority. Regardless of degree of simplicity, all poka-yokes fall into one of three categories: contact methods, fixed-value methods, and motion-step methods. Each is briefly discussed.

Contact Methods. Contact methods are based on some type of sensing device which detects abnormalities in the product's shape or dimension and responds accordingly. Interference pins, notches with matching locator pins, limit switches and proximity switches are sometimes used to ensure that a part is positioned correctly before work occurs. Asymmetric parts with matching work fixtures can

also alleviate incorrect positioning. If orientation is not critical, symmetrical designs can then be used to prevent defects.

Contact methods are useful in situations which encourage mistakes. Such situations involve rapid repetition, infrequent production, or environmental problems such as poor lighting, high or low heat, excess humidity, dust, noise, or anything which distracts a worker. Paul Dvorak, in "Poka-Yoke Designs Make Assemblies Mistake-proof," an article appearing in *Machine Design,* recommends that the maintenance engineer investigate at least four areas for potential problems that require contact method solutions.

1. Look for where the product will fail if parts are assembled incorrectly.

2. Look for small features critical to proper assembly.

3. Beware of relying on subtle differences to determine top from bottom or front from back, especially if the parts are painted dark colors.

4. Beware of designs so complicated that they confuse inexperienced operators.

Fixed-Value Methods. Fixed-value methods are used in processes where the same activity is repeated several times, such as tightening of bolts. This method frequently involves very simple techniques, such as methods that allow operators to easily track how often this activity has been performed. Dvorak gives the example of an operator who is responsible for tightening down six bolts on a product. Before passing the product on, the tightening process is performed a fixed number of times (six). A simple poka-yoke device would incorporate the use of a wrench dipped in diluted paint. Since loose bolts will not have paint on them, the operator can easily see if he or she has performed the process the required number of times. A second example (from Dvorak) would be the use of packaged material in the exact (fixed) quantities needed to complete the process. If the bolts were stored in containers of six, the operator could easily see when the process was still incomplete as the box would still contain one or more bolts.

Motion-Step Method. The motion-step method is useful for processes requiring several different activities performed in sequence by a single operator. This is similar to the fixed-value situation in that the operator is responsible for multiple activities but instead of performing the same activity multiple times the operator performs different activities. First, each step in the process is identified by the specific motions needed to complete it. Then devices are created to detect whether each motion is performed and then alert the operator when a step is skipped. An assembly process could utilize a device that

Table 1

Examples of Poka-Yokes

	Contact Type	Warning Type
Contact Method	A steel pin on a fixture keeps incorrectly placed parts from fitting properly.	A device on a drill counts the number of holes drilled in a work piece; a buzzer sounds if the work piece is removed before the correct number of holes have been drilled.
Fixed-value Type	Light sensors determine if each crayon is present in each box; if a crayon is missing, the machines will stop automatically.	Bolts are tightened with a wrench dipped in paint. Bolts with no paint on them are still un-tightened.
Motion-Step Method	A simple proximity switch opens after all components are loaded in the proper order.	A device detects when each component is removed from a dispenser; if a component is not removed, the device alerts the assembler before he can move on to another unit.

senses when all required components are present at the start of the process for each unit. The devices could then detect when each component is removed from its dispenser, if a component is not removed, the sensing device alerts the assembler before he/she can move on to another unit.

SELF CHECKS

Poka-yoke devices which provide the fastest possible feedback about defects and allow workers to assess the quality of their own work are referred to as self-checks. Self-checks can be used to allow workers to rapidly identify slips or work errors such as incomplete or omitted operations and to verify the existence or absence of an attribute. For example, at Brigham and Women's Hospital, a computer system is used to check and process doctors' prescriptions.

Examples. A number of "real world" applications are presented in the business and engineering literature. Below is a list of examples of poka-yoke applications. James R. Evans and William M. Lindsay present these examples in their book *The Management and Control of Quality:*

- Color-coding a wiring template to assist the worker.

- Installing a device on a drill to count the number of holes drilled in a work piece; a buzzer sounds if the work piece is removed before the correct number of holes has been drilled.

- Cassette covers were frequently scratched when the screwdriver slipped out of the screw slot and slid against the plastic covers. The screw design was changed to prevent the screwdriver from slipping.

- A metal roller is used to laminate two surfaces bonded with hot melted glue. The glue tended to stick to the roller and cause defects in the laminate surface. An investigation showed that if the roller were dampened the glue would not stick. A secondary roller was added to dampen the steel roller during the process, preventing the glue from sticking.

- One production step at Motorola involves putting alphabetic characters on a keyboard, then checking to make sure each key is placed correctly. A group of workers designed a clear template with the letters positioned slightly off center. By holding the template over the keyboard, assemblers can quickly spot mistakes.

John Grout presented these examples in "Mistake-Proofing Production," an article written for *Production and Inventory Management Journal:*

- Trinity Industries Railcar Division workers created a layout jig to avoid having to use a tape measure and chalk to position subassemblies on each car individually. The jig has tops that allow it to be quickly positioned correctly on the car's chassis. Each component that is to be attached to the car has a corresponding cutout on the jig. The jig eliminates two modes of worker error. It eliminates incorrect measurements and inaccurate positioning of parts. It also eliminates the worker vigilance required to ensure all of the components are attached. Omitted parts are made very obvious because an empty space exists on the layout jig. Without the jig, there would be no indication that anything is missing. Once parts are spot-welded in place, the jig is lifted off and welding is completed. Not only is dependence on worker vigilance reduced, cost savings result from the simplified, accelerated process.

- Binney and Smith, maker of Crayola Crayons, uses light sensors to determine if each crayon is present in each box of crayons they produce. If a crayon is

missing, the machines will stop automatically. Producing complete boxes of crayons right the first time is the preferred outcome.

- A mail-order computer company has designed its boxes and packing material to avoid mistakes. The inner flaps of the box bottom have a large brightly colored warning to "Stop! Open the other side." When the correct side is opened, a book titled "Setting Up Your Computer" is on top of the packing material. The sequence of the book matches the arrangement of the contents of the box. Each instruction involves the next item from the box.

- Airplane lavatory lights come on only when the door lock is engaged. This keeps customers from failing to lock the door.

- John Deere produced a gearbox that was assembled without oil, mounted on a machine, and required replacement after factory tests. A team streamlined production with a simple proximity switch that opens after all components were loaded into an assembly fixture. The switch prevents workers from using air wrenches to tighten bolts on the assembly until they cycle an oil gun into the gearbox. After filling the gearbox a solenoid releases the interlock sending air to the wrench. Then workers can tighten cover bolts and send the box to the next station.

- The electrical connectors in one machine control formerly used only three-pin connectors to join each in a series. Labels instructed assemblers which boards went where and which connectors should be joined. However, in the field, assemblers connecting and disconnecting them wear or bend the pins, which meant putting on a new plug. Soon the label was gone. The simple solution involved three-, four-, and five-pin connectors that cannot join others and demand a single assembly sequence.

- Ficarra's solution to labels that come off is to machine them into parts, especially when the function is to determine the correct orientation.

- On Varian machines, assemblers are guided by small machined-in pictures that cannot wear off.

SERVICE APPLICATIONS

Poka-yoke can also be applied to service-based organizations. The following is summarized from the paper "Using Poka-Yoke Concepts to Improve a Military Retail Supply System," which was printed in *Production and Inventory Management Journal*.

While manufacturing typically only considers errors made by the producer, service industries must consider errors from both the server and the customer. Additionally, service organizations interface in many different ways to transfer a service to the customer. Because of the possibility that service errors can be created by both the customer and the server, service poka-yokes are grouped into two categories: fail-safing the server and fail-safing the customer.

SERVER POKA-YOKES

There are three types of poka-yoke systems that can be used to fail-safe the server: task poka-yokes, treatment poka-yokes, and tangible poka-yokes.

Task poka-yokes. Task poka-yokes focus on server tasks and common mistakes servers make while performing the service/task for the customer. A good example of a control-oriented, task poka-yoke is the coin return machine used in many fast-food restaurants. The coin portion of a customer's change from payment is returned automatically through these machines. This takes the control out of the hands of the cash register operator, eliminating errors and speeding up the processing of customers.

Treatment poka-yokes. Treatment poka-yokes focus on the social interaction between the customer and the server (i.e., eye contact, greeting). By mistake-proofing/standardizing what servers say and do to customers, managers can reasonably ensure that customers receive proper, fair, and consistent treatment. Burger King utilized warning-oriented, treatment poka-yokes by placing "cue cards" at the service point, ensuring that servers know what to say the minute they interface with the customer. Automated teller machines (ATM) in banks are programmed with sequenced interactive response systems that guide customers through the process of withdrawing or depositing money; they prevent occurrence of errors such as use of wrong secret identification numbers by customers or withdrawal of more money than what is available in a bank account.

Tangible poka-yokes. Tangible poka-yokes attempt to improve the tangible, physical impression and experience for the customer in addition to the direct task of the server (i.e., dirty office, unkempt server, sloppy documents). Motorola uses a control-oriented poka-yoke in the legal department by having a second lawyer inspect all legal work for spelling, presentation, and arithmetic. In this way, the legal department is ensuring that the "tangibles" of the service are satisfactory in addition to the task of the service (legal work).

CUSTOMER POKA-YOKES

Fail-safing the customer also consists of three of poka-yoke systems: preparation poka-yokes, encounter poka-yokes, and resolution poka-yokes.

Preparation poka-yokes. Preparation poka-yokes attempt to fully prepare the customer before they even enter the service. An example of a warning-oriented, preparation poka-yoke is the notice a university sends to each student prior to registration for the next semester detailing the courses he needs to finish his degree. This system could be converted to a control system by having an automated registration process which would not allow students to sign up for classes out of sequence or until all prerequisites are met.

Encounter poka-yokes. Encounter poka-yokes attempt to fail-safe a customer at a service who may misunderstand, ignore, or forget the nature of the service or their role in it. A good example of a control-oriented, encounter poka-yoke is the use of concrete curbing at an oil and lubes shop that directs customers so that they do not/cannot pull the wrong way into the station. This system also assists in the selection process so that customers are not served out of order.

Resolution poka-yokes. Resolution poka-yokes attempt to remind customers of the value of their input to the continuous improvement of a service. A hotel which uses an automated check-out system through the television in each room could attach a few questions to the check-out process to ensure the customer provides feedback on key issues. This would be a control-oriented resolution poka-yoke. Obviously, one of the keys to the success of any customer-oriented poka-yoke is to obtain willing customer participation.

BARRIERS TO IMPLEMENTATION AND RECOMMENDATIONS

Patel, Dale and Shaw note that there are a number of barriers a firm may face when implementing poka-yoke devices within their system. These include:

- Difficulty in accepting change
- Justification of the investment
- Using inappropriate and ineffective methods
- Time requirements
- Difficulty encountered as a result of continuous process

Stewart and Grout, in an article titled "The Human Side of Mistake-Proofing," make the following recommendations for the implementation of poka-yoke devices:

1. The outcome of the process or routine must be known in advance so as to have a standard for comparison.

2. The process must be stable, i.e., outcomes are not changing.

3. There must be an ability to create a break between cause and effect in the process so as to provide an opportunity to insert a poka-yoke.

4. Environments requiring substantial operator skill are prime locations for poka-yoke devices.

5. Environments where training or turnover cost is high are prime locations for poka-yoke devices.

6. Environments with frequent interruptions and distractions are prime locations for poka-yoke devices.

7. Environments with a consistent set of mixed products are prime locations for poka-yoke devices.

8. The beginning of any process where there are multiple other possible processes that could be initiated are a prime location for poka-yoke devices.

9. Locations in the process with similarly positioned or configured parts, controls or tools are prime locations for poka-yoke devices.

10. Any point in the process requiring replacement or orientation of parts in order to prevent wrong positioning is a prime location for poka-yoke devices.

11. Any point in the process where adjustments are made for machine or process setups is a prime location for poka-yoke devices.

John Grout attributed defects to three sources: variance, mistakes, and complexity. Complexity requires techniques which simplify the process while managing variance can be accomplished by utilizing statistical process control (SPC). However, if quality problems are the result of mistakes, poka-yoke devices are the appropriate technique to use. In this case, poka-yoke provide an even more effective quality improvement tool than SPC. Other poka-yoke benefits include reduced training costs and the advantage of freeing workers' time and minds for more creative and value-adding activities.

As a key component of the Zero Defect Quality Control, poka-yoke is widely applied in the design and development of modern software and other information technology processes. Software developers incorporate clear warning signals that aid end users and client-developers in identifying errors in a system before they occur, as is usually the case with the automated warnings that computer software generate upon expiry of anti-virus certificates. Poka-yoke systems facilitate the achievement of lean software development initiatives in information technology processes.

Manivannan is categorical that the application of poka-yoke in analytical processes—such as failure mode and effects analysis (FMEA)—aids the identification and implementation of appropriate mistake-proofing mechanisms that ensure process improvement and efficiency.

FMEA is an analysis tool that is applied by the functional teams across a firm to evaluate manufacturing and process-related activities with the objective of quantifying results in terms of risk priorities.

Circumstances where poka-yoke is not the appropriate response are situations involving high speed production, situations where X-bar ($\bar{X}$) and R charts are effective, and use in destructive testing. Other situations, however, provide opportunities for simple, inexpensive, and fail-safe devices to improve performance. Grout relates the example of Lucent Technologies, which reported that half of their 3,300 mistake-proof devices cost less than $100. However, they estimate a net savings of $8.4 million or about $2,545 per device. Poka-yoke is a most impressive and powerful tool.

SEE ALSO *Japanese Management; Quality and Total Quality Management*

BIBLIOGRAPHY

Adzik, Gojko. "The Poka-Yoke principle and how to write better software." *The Quest for Software++.* 9 May 2007. Available from: http://gojko.net/2007/05/09/the-poka-yoke-principle-and-how-to-write-better-software/.

Dvorak, Paul. "Poka-Yoke Designs Make Assemblies Mistakeproof." *Machine Design,* 10 March 1998, 181–184.

Evans, James R., and William M. Lindsay. *The Management and Control of Quality.* South-Western Publishing, 2004.

Ghinato, Paulo. "Quality Control Methods: Towards Modern Approaches Through Well Established Principles." *Total Quality Management* 9, no. 6 (August 1998).

Grout, John R. "Mistake-Proofing Production." *Production and Inventory Management Journal* 38, no. 3 (3rd Quarter 1997): 33–37.

Larson, Melissa, "Drill Template Illustrates 'Poka-Yoke.'" *Quality* 10, no. 6 (June 1998).

Manivannan, S. Poka-Yoke for Quality. *Quality Magazine* 27 February 2008. Available from: http://www.qualitymag.com/CDA/Articles/Web_Exclusive/BNP_GUID_9-5-2006_A_10000000000000271080.

Melnyk, Steven A. and R.T. Christensen. *Back to Basics: Your Guide to Manufacturing Excellence.* St.Lucie Press, 2007.

Ngo, Minh, N. and Hee B. K. Tan. "Empirical-based recovery and maintenance of input error-correction features." *Journal of Software Maintenance and Evolution: Research and Practice.* 19, no.6, November–December 2007. Available from: http://www3.interscience.wiley.com/journal/116329929/abstract.

Patel, S., B.G. Dale, and P. Shaw. "Set-up Time Reduction and Mistake Proofing Methods: An Examination in Precision Component Manufacturing." *The TQM Magazine* 13, no. 3 (2001): 175–179.

Poppendieck, Mary, and Tom Poppendieck. *Implementing Lean Software Development: From Concept to Cash,* 1st ed. Addison-Wesley Professional. 2006.

Snell, Todd, and J. Brian Atwater. "Using Poka-Yoke Concepts to Improve a Military Retail Supply System." *Production and Inventory Management Journal* 37, no. 4 (1996).

Stewart, Douglas M., and John R. Grout. "The Human Side of Mistake-Proofing." *Production and Operations Management* 10, no. 4 (2001): 440–459.

Stewart, Douglas M., and Steven A. Melnyk. "Effective Process Improvement: Developing Poka-Yoke Processes." *Production and Inventory Management Journal* 41, no. 4 (2000): 48–55.

POPULAR PRESS MANAGEMENT BOOKS

The past several decades have witnessed a profusion of management books published in the popular press, many becoming best sellers. This trend often starts during economic hard times, when managers search for some easy-to-understand cures for their organizations' financial woes. Even when the overall economy improves, managers continue to look for new insights that might help them improve their own or their organizations' fortunes.

Despite their enormous sales, popular management books must weather a rather severe image problem. They are often perceived as hastily assembled tracts that do little more than attempt to capitalize on a hot (and usually short-lived) management fad. They are borne of managers' frazzled attempts to overcome obstacles and challenges that do not generalize well for a wide audience, but the books hide these faults behind hyperbolic and trendy word spinning. Typically relying as much on their style as on their substance, popular management books are criticized for lacking both empirical and rational justification, assuming factors that one would be ill-advised to assume, and excessively simplifying very complex problems. Lastly, critics skeptically eye the sheer volume of such books, along with the frequency with which new ones arrive in bookstores before sliding into the background, typically just in time for a new generation of popular books to detail the next fad.

Since a systematic analysis of popular-press management books would be an endless odyssey, what follows are brief summaries of fourteen quite popular titles. The purpose is not so much to critically examine the books, since the criticisms, like the books themselves, do not generalize reliably; rather, the more modest goal is to lay the foundation for what a reader can expect from popular-press management books, from which one can deduce the degree of usefulness therein for one's own purposes.

COMPETITIVE ADVANTAGE THROUGH PEOPLE

Stanford professor Jeffrey Pfeffer in his book *Competitive Advantage Through People* has described the potential impact of human resource management practices on competitive advantage. Based on his study of popular and

academic business literature and interviews with people from a wide range of the business community, Pfeffer identified sixteen human resource management practices that, in his opinion, can enhance a firm's competitive advantage, including employment security, high wages, incentive pay, employee ownership, team and job redesign, and symbolic egalitarianism.

THE ONE-MINUTE MANAGER

Written by Kenneth Blanchard and Spencer Johnson, *The One-Minute Manager* warns managers of the perils of treating employees too harshly or too softly. In the first instance, the employer wins; in the latter, the employee wins. The ideal is to manage employees in a way that both parities win. This aim can be accomplished if managers use three techniques: goal setting, positive reinforcement, and verbal reprimand, each of which can be implemented within one minute.

The use of one-minute goals helps clarify the employees' specific responsibilities and lets them know performance standards to which they will be held. The manager should then frequently review the employees' goal achievements to ensure they remain on target. Moreover, managers should focus their time on catching their employees doing something right, rather than something wrong. Immediate praise should accompany these behaviors. Finally, when seen doing something wrong, employees should receive immediate feedback, indicating exactly what was done wrong and how the manager feels about it. Following the reprimand, the manager should praise the individual as a person, thus establishing a clear separation between the person and the problem behavior.

WHO MOVED MY CHEESE?

Written by Spencer Johnson, M.D., *Who Moved My Cheese?* is a simple parable that reveals profound truths about change. It is an amazing and enlightening story of four characters that live in a "Maze" and look for "Cheese" to nourish them and make them happy. Two mice are named Sniff and Scurry—nonanalytical and nonjudgmental, they just want cheese and are willing to do whatever it takes to get it. Hem and Haw are "little people," mouse-size humans who have an entirely different relationship with cheese. It's not just sustenance to them; it's their self-image. Their lives and belief systems are built around the cheese they've found.

Most of us reading the story will see the cheese as something related to our livelihoods—our jobs, our career paths, the industries we work in—although it can stand for anything, from health to relationships. In the story, the characters are faced with unexpected change. Eventually, one of them deals with it successfully, and writes what he has learned from his experience on the maze walls. When the reader sees the "handwriting on the wall," he or she can

discover for him or herself how to deal with change more effectively. One of the most eloquent of the wall sayings is "what would you do if you weren't afraid?" The point of the story is that we have to be alert to changes in the cheese, and be prepared to go running off in search of new sources of cheese when the cheese we have runs out.

GUNG HO!

Blanchard (*The One-Minute Manager,* 1984), along with co-author Bowles (*Raving Fans,* Morrow, 1993), recounts an organizational turnaround based on three Native American lessons. This inspirational story of business leaders Peggy Sinclair and Andy Longclaw uses allegory to explain fundamental techniques to boost enthusiasm and performance.

Meet Peggy Sinclair, the newly promoted factory manager who was sent to the worst plant of the thirty-two owned by the company, with the expectation to shut it down in six months—and Andy Longclaw, who is pointed out to her the first day, in spite of his area's remarkable performance, as a "troublemaker" by one of her executive staff. Longclaw patiently shows Sinclair Native American principles that help turn Walton Works #2 from the worst plant in the company to a workplace recognized by the White House as one of the nation's finest workplaces. Those three important principles are as follows:

1. "The Spirit of the Squirrel" teaches a lesson of the power of worthwhile work.
2. "The Way of the Beaver" showcases empowerment.
3. "The Gift of the Goose" shows the exponential factor of motivation.

GOOD TO GREAT

Jim Collins' book, *Good to Great,* is based on extensive research on a set of companies that moved from mediocre performance to great results and sustained those results for at least fifteen years. (The good-to-great companies generated cumulative stock returns that beat the general stock market by an average of seven times in fifteen years.)

The findings of the *Good to Great* study:

1. Level 5 Leaders: During the transition years, all of the companies were led by humble individuals who channel their ego needs away from themselves and into the larger goal of building a great company. It is not that Level 5 leaders have no ego or self-interest. Indeed, they are incredibly ambitious—but their ambition is first and foremost for the institution, not themselves.
2. First Who Then What: The good-to-great leaders began the transformation by first getting the right people on the bus (and the wrong people off the bus) and then figured out where to drive it. The

comparison companies frequently followed the "genius with a thousand helpers" model where the leader sets a vision and then enlists a crew of highly capable "helpers" to make the vision happen. This model fails when the genius departs.

3. Confront the Brutal Facts (Yet Never Lose Faith): Create a culture where people have a tremendous opportunity to be heard, and where, ultimately, the truth is heard. Leadership begins with getting people to confront the brutal facts and to act on the implications. Retain absolute faith that you can and will prevail in the end, regardless of the difficulties.

4. Hedgehog Concept: See what is essential and ignore the rest. Hedgehog companies understand what they can be the best at, what they can feel passionate about, and what drives their economic engine.

5. A Culture of Discipline: Good-to-great firms have a high ethic of responsibility and a high culture of discipline. Get disciplined people to engage in disciplined thought and take disciplined action.

6. Technology Accelerators: Good-to-great companies avoid technology fads and yet they become pioneers in the application of carefully selected, relevant technologies.

7. The Flywheel and the Doom Loop: Good-to-great companies follow a pattern of buildup leading to breakthrough. They accumulate successes and use the cumulative consistent momentum to push them yet further out in front. There is no dramatic, revolutionary event.

THE TIPPING POINT

Malcolm Gladwell's bestseller of 2000 explores the difference between trends that take hold and attempts at fame that dissolve into failure. The tipping point itself is the key factor or group of factors that propels an idea into fame and fortune, often a smaller or subtle quality. *The Tipping Point* explores these subtleties and how they can effect products, companies, and innovation.

By studying the way events slowly link together before bursting into success, Gladwell was able to come up with several theories on what makes a difference (also handily divided into the names of chapters), such as the Law of the Few, The Stickiness Factor, and The Power of Context, what are called collectively the Three Rules of Epidemics, epidemics being a good thing in terms of successful marketing.

The first rule, the Law of the Few, says that all trends begin with a small number of people—certain types of people especially. Gladwell identifies these people based on their parts in the marketing framework, and calls them Connectors, Mavens, or Salesmen. Connectors unite dem-

ographic markets, while Mavens inform consumers as to their choices, and Salesmen influence people to make particular choices. These three groups are instrumental.

The second rule, the Stickiness Factor, theorizes that certain qualities about products or services themselves allow them to develop into trends. These qualities are usually unique, going against prevailing notions and giving people memorable impressions. If something is memorable and defiant, it becomes sticky—people remember it, and often take it into consideration in future decision-making.

The third rule is the Power of Context. This rule states that not only the right people and the right idea are necessary, but also the right time and place. Innovations should be introduced into the market when the market is prepared. There may be an obvious need, a large demographic who is willing to try a new concept, a particular economic or environmental pressure, or other effects which make the timing for trend-setting products perfect.

FIRST, BREAK ALL THE RULES

First, Break All the Rules was written by Marcus Buckingham and Curt Coffman as a summary of research done among approximately 80,000 different managers. The book draws conclusions from the research and gives several methods for achieving results when working with goal-oriented employees. It contains many suggestions for achieving status as a relational and effective manager, such as "reject conventional wisdom," "treat every employee as an individual," "focus on strengths, not weaknesses," and "know you are on stage every day." More than a book on breakthrough behavior or marketing, *First, Break All the Rules* is a book on treating employees the right way in order to maximize organizational success.

21 LEADERS FOR THE 21ST CENTURY

This book, by famed management consultants Fons Trompenaars and Charles Hampden-Turner, is a series of interviews and studies with the most successful leaders in the world, including Michael Dell of Dell Computers and Karrel Vursteen of the Heineken Company. *21 Leaders* is a unique book, not necessarily for its management advice, but because it tries to give an outline of successful management procedures and attitudes in an international market. Some nations can have legislation, economies, and goals so different from each other that conducting business with them can be a trial. Trompenaars and Hampden-Turner address this problem with the insights of global executives and studies of their companies.

In certain places the book's advice is simple and well-placed, suggesting to hold back quick judgments when meeting other cultures that express emotion differently, and other such common-sense ideas. Other ideas are more

complex, such as the literary gaffe of "surfing on a three-legged stool," which is used as a metaphor to show how business leaders can please multiple parties at the same time using creative resolution techniques.

BECOMING A SUCCESSFUL MANAGER

Grossman and Parkinson's *Becoming a Successful Manager* acts as a personal training guide to someone new to the management experience, from beginning a shift as a supervisor to moving up to middle or top management teams. It starts with the line, "Congratulations on being promoted to manager!" and moves on from there, breaking down departmental and employee needs into lessons on how to succeed in the management world.

Much of the book focuses on the differences between Professional and Nonprofessional managers, and how to become the former. A Nonprofessional manager is one without experience, who fumbles decisions and acts without confidence. When questioned or given advice, nonprofessionals tend to be defensive, refusing help and causing others to mistrust their judgments. A Professional manager, on the other hand, is in full control, acts with confidence, and concentrates much more on producing results and mastering their responsibilities than on maintaining a particular image or facade. Most of the book's department-maintaining and trust-building advice is centered around this concept.

BROKEN WINDOWS, BROKEN BUSINESS

In 1982, two criminologists by the names of Wilson and Kelling published a famous paper dealing with crime concepts and the "Broken Window" theory. This theory, applied to cities, said that if smaller laws were enforced, such as laws against graffiti or other vandalism, and basic living standards were maintained (broken windows were fixed), then large-scale crimes and gang-related activity would decrease as a natural, trickle-down reaction. This theory single-handedly changed the landscape of New York City crime in the 1990s.

In 2005, Michael Levine wrote *Broken Windows, Broken Business* as an application of the Broken Window theory to the world of business. If companies tend to the small needs of the customers, then a natural attitude will be installed, resulting in good treatment of customers in key areas and a successful business. For this reason, Levine recommends a rigorous employee satisfaction strategy, including regular mystery-shoppers and highly skilled, happy customer service people. The worst attitude a business can have, according to Levine, is broken window hubris, or a top-down view that the company is so successful that they do not need to pay attention to what the customer wants.

THE LEADERSHIP PIPELINE

Charan, Dotter, and Noel wrote this book to train managers in developing their skills to peak condition. The Leadership Pipeline goes through several phases as the manager progresses in talent and experience. First, the manager must learn to apply lessons learned in managing one's self to managing other people (the employees). This includes basic delegation and analysis. Then the manager moves from managing others to managing managers, who have a set of needs different from regular employees. Then the manager learns about Functional managers, or those who run the departments. This requires a broader view of the company. After that, the manager moves to join Business managers or into a more theoretical framework where the company's larger operations become even more important. Next are the Group managers, where managers learn to help others succeed at running their part of the business and become adept at creating and running other operations. The last stage occurs when managers become Enterprise managers, or the CEOs and presidents of companies.

SACRED COWS MAKE THE BEST BURGERS

According to David Brandt and Robert Kriegel, a company can be ruined by its sacred cows, and it can profit by finding and reinventing them. A sacred cow is defined as a business operation or process that the company finds too valuable or traditional to change; Brandt and Kriegel propose that those are the parts of the business most in need of change. They give many examples of managers who challenged sacred cows and either transformed a business operation or saved their companies significant profits by disbanding the cow and replacing it with a more efficient process.

The book gives several ways to spot sacred cows and go on a "cow hunt." Challenging authority and outdated practices is encouraged, while other steps are suggested, such as fostering an environment of change, creating a cow-finding event for employees (including rewards), and training both one's self and others to keep an eye out for any part of the business about which can be asked, "Why do we do that?"

BEFORE THE BRAND

Alycia Perry and David Wisnom put this book together to help companies create a powerful brand identity before they actually implement it, focusing on key issues such as the difference between identity and image, and the necessary long-term strategies associated with owning a brand. Some companies have their name and their image, but are not sure how to broadcast themselves—what can they say about themselves? *Before the Brand* gives methods through which businesses can advertise through effective messages as well as image. It also deals with digital identity and the effect of

various names in today's society (what can be descriptive? Is there such a thing as a good acronym?). Perry and Winsom also include several different brand formulas, such as Ingredient branding and Technology branding.

THE SEVEN HABITS OF HIGHLY EFFECTIVE PEOPLE

Though it was first published in 1989, Stephen Covey's bestselling book has remained a core training tool in the business management world (an anniversary edition was printed in 2004). The book gives seven different suggestions that are meant to be adopted as a holistic approach to self-improvement:

- Be proactive.
- Begin with the end in mind.
- Put first things first.
- Think win-win.
- Seek first to understand, then to be understood.
- Synergize by working in teams with other talented people.
- Sharpen the saw, or be sure to rest, but rest in healthy ways.

SEE ALSO *The Art and Science of Management; Management Styles*

BIBLIOGRAPHY

Blanchard, K., and S. Bowles. *Gung Ho!* New York: Morrow, 1998.

Blanchard, K., and S. Johnson. *The One-Minute Manager.* New York: Morrow, 1982.

Buckingham, Michael, and Curt Coffman. *First, Break All the Rules.* Simon & Schuster, 1999.

Charan, Ram, and Steven Drotter, and James Noel. *The Leadership Pipeline.* John Wiley and Sons, Inc, 2001.

Collins, J. *Good to Great.* Harper Business, 2001.

Covey, Stephen R. *The 7 Habits of Highly Effective People.* Free Press, 1990.

Gladwell, Malcolm. *The Tipping Point.* Back Bay, 2000.

Goleman, D., R. Boyatzis, and A. McKee *Primal Leadership.* Harvard Business School Press, 2002.

Grossman, Jack H., and J. Robert Parkinson. *Becoming a Successful Manager.* New York: McGraw-Hill Professional, 2001.

Johnson, Spencer, M.D. *Who Moved My Cheese?* Putnam, 1998.

Kriegel, Robert, and David Brandt. *Sacred Cows Make the Best Burgers.* Warner Books, Inc, 1997.

Levine, Michael. *Broken Windows, Broken Business.* Business Plus, 2005.

McCarthy, Mary Pat, Jeffrey Stein, and Rob Brownstein. *Agile Business for Fragile Times.* New York: McGraw-Hill Professional, 2002.

Perry, Alycia, and David Wisnom. *Before the Brand: Creating the Unique DNA of an Enduring Brand Identity.* New York: McGraw-Hill Professional, 2002.

Pfeffer, J. *Competitive Advantage Through People.* Boston: Harvard Business School Press, 1994.

Trompenaars, Fons, and Charles Hampden-Turner. *21 Leaders for the 21st Century.* New York: McGraw-Hill, 2001.

PORTER'S FIVE-FORCES MODEL

Porter's five-forces model is a strategy framework that provides corporations with clear analysis of their competitive strategies. The model was developed and advanced by Michael Porter, a renowned marketing strategist. Porter's five-forces model looks at the strength of five distinct competitive forces, which when taken together, determine long-term profitability and competition. Porter's work has had a greater influence on business strategy.

The five-forces model was developed in Porter's 1980 book, *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* To Porter, the classic means of developing a strategy—a formula for competition, goals, and policies to achieve those goals—was antiquated and in need of revision. Porter was searching for a solution between the two schools of prevailing thought. One was centered on the Harvard Business School, and it urged firms to adjust to a unique set of changing circumstances. The other strategy, championed by the Boston Consulting Group, was based on the experience curve, whereby the more a company knows about the existing market, the more its strategy can be directed to increase its share of the market. Porter applied microeconomic principles to business strategy and analyzed the strategic requirements of industrial sectors, not just specific companies.

THE FIVE FORCES

The five forces are competitive factors, which determine industry competition and include: suppliers, rivalry within an industry, substitute products, customers or buyers, and new entrants (see Figure 1).

Although the strength of each force can vary from industry to industry, the forces, when considered together, determine long-term profitability within the specific industrial sector. The strength of each force is a separate function of the industry structure, which Porter defines as "the underlying economic and technical characteristics of an industry." Collectively, the five forces affect prices, necessary investment for competitiveness, market share, potential profits, profit margins, and industry volume. The key to the success of an industry, and thus the key to the model, is analyzing the changing dynamics and continuous flux between and within the five forces. Porter's model depends on the concept of power within the relationships of the five forces.

Figure 1

POTENTIAL ENTRANTS

Threat of new entrants

INDUSTRY COMPETITORS

SUPPLIERS

Bargaining power of suppliers

Bargaining power of buyers

BUYERS

Rivalry Among Existing Firms

Threat of substitute products or services

SUBSTITUTES
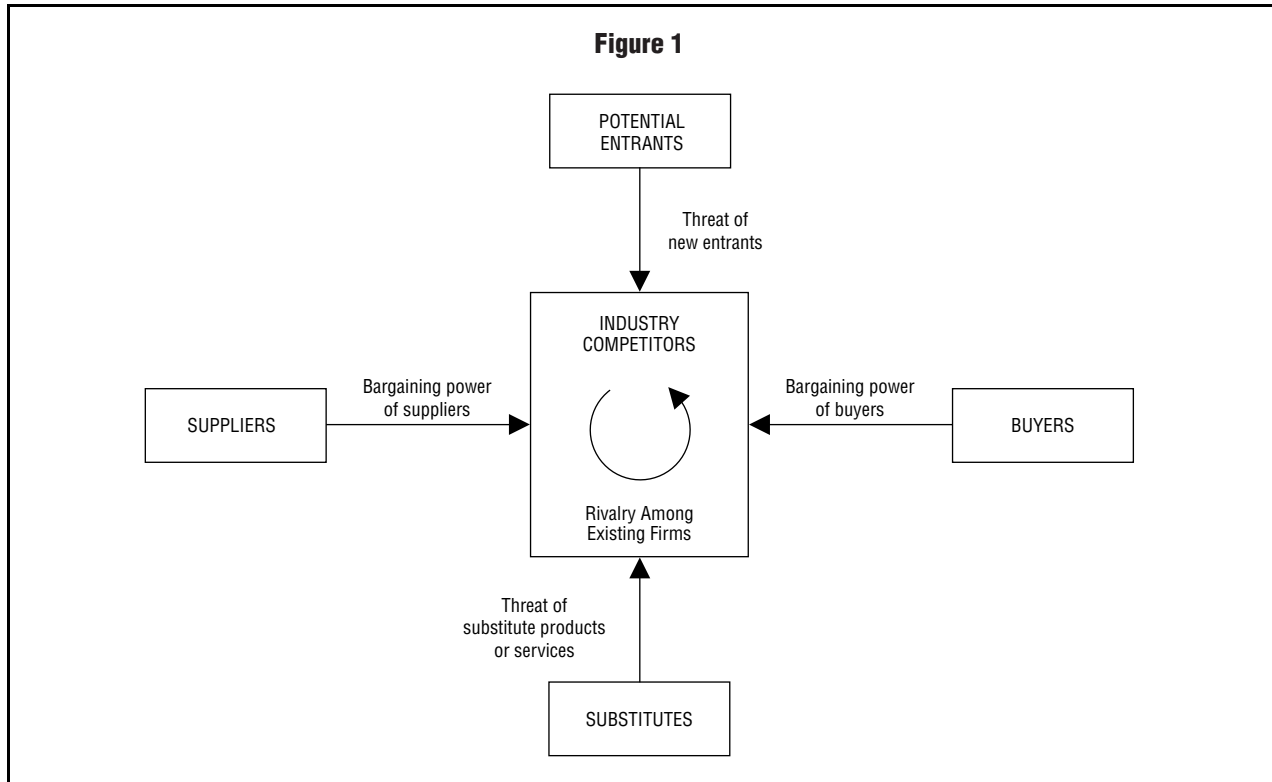
Industry Competitors. Rivalries naturally develop between companies competing in the same market. Competitors use means such as advertising, introducing new products, more attractive customer service and warranties, and price competition to enhance their standing and market share in a specific industry. To Porter, the intensity of this rivalry is the result of factors like equally balanced companies, slow growth within an industry, high fixed costs, lack of product differentiation, overcapacity and price-cutting, diverse competitors, high-stakes investment, and the high risk of industry exit. There are also market entry barriers.

Pressure from Substitute Products. Substitute products are the natural result of industry competition, but they place a limit on profitability within the industry. A substitute product involves the search for a product that can do the same function as the product the industry already produces. Porter uses the example of security brokers, who increasingly face substitutes in the form of real estate, money-market funds, and insurance. Substitute products take on added importance as their availability increases.

Bargaining Power of Suppliers. Suppliers have a great deal of influence over an industry as they affect price increases and product quality. A supplier group exerts even more power over an industry if it is dominated by a few companies; there are no substitute products; the industry is not an important consumer for the suppliers; their product is essential to the industry; and forward integration potential of the supplier group exists. Labor supply can also influence the position of the suppliers. These factors are generally out of the control of the industry or company but strategy can alter the power of suppliers.

Bargaining Power of Buyers. The buyer's power is significant in that buyers can force prices down, demand higher quality products or services, and, in essence, play competitors against one another, all resulting in potential loss of industry profits. Buyers exercise more power when they are large-volume buyers, the product is a significant aspect of the buyer's costs or purchases, the products are standard within an industry, there are few changing or switching costs, the buyers earn low profits, potential for backward integration of the buyer group exists, the product is not essential to the buyer's product, and the buyer has full disclosure about supply, demand, prices, and costs. The bargaining position of buyers changes with time and a company's (and industry's) competitive strategy.

Potential Entrants. Threats of new entrants into an industry depend largely on barriers to entry. Porter identifies six major barriers to entry:

- Economies of scale, or decline in unit costs of the product, which force the entrant to enter on a large

scale and risk a strong reaction from firms already in the industry, or accepting a disadvantage of costs if entering on a small scale.

- Product differentiation, or brand identification and customer loyalty.

- Capital requirements for entry; the investment of large capital, after all, presents a significant risk.

- Switching costs, or the cost the buyer has to absorb to switch from one supplier to another.

- Access to distribution channels. New entrants have to establish their distribution in a market with established distribution channels to secure a space for their product.

- Cost disadvantages independent of scale, whereby established companies already have product technology, access to raw materials, favorable sites, advantages in the form of government subsidies, and experience.

BARRIERS TO ENTRY STRATEGY

The six factors identified by Porter can be narrowed down into two major categories of barriers to entry; market barriers to entry and mobility barriers to entry. Market barriers to entry are the structural characteristics of a market, which favor established firms to the disadvantage of new entrants in the market in such a way that established firms enjoy the flexibility of raising prices over costs without attracting new entrants. Mobility barriers shield a firm operating in one segment of the market from entry by other firms operating in different segments of the same market.

Armstrong and Kotler reckon that barriers to entry as a strategy does not occur naturally and has to be initiated by organizations through anticipatory approach. The major strategies of barriers to entry commonly employed by established firms include adoption of sunk costs, squeezing of new entrants, and raising the costs of competitors.

Sunk costs are one of the most effective barriers to entry strategies that a firm can adopt. This is done by locking itself into a market in such a way that new entrants find it difficult to initiate and enforce counter strategies that would kick the incumbent firm out of business. A firm sinks costs through commitment of substantial capital towards purchasing, expanding, and sustaining its investment resources such as plant, machinery, equipments, and acquisition of advanced technologies which enable the firm to draw the advantages of low pricing through economies of scale. Dell, a leading manufacturer of personal computers, is one of the best examples of companies that have successfully applied this strategy. Dell has been able to retain the lion's share of the personal computer market for many years despite

the entry of Macintosh Computers and even the subsequent merger of Hewlett-Packard and Compaq Computers because of the low pricing advantage that it draws from the economies of scale of its vast resources.

Squeezing of new entrants and raising the costs of a competitor are closely related strategies, which focus on creation of a difficult market environment; this denies competitors the likelihood of achieving positive returns on their investments. These strategies of barrier to entry involve introduction of measures such as increased expenditures on advertising, heavy research and development, minimization of access to channels of distribution, patenting of innovations, lowering of prices, optimization of government subsidies, and development of cheaper alternative product ranges in the same market.

New entrants can also expect a barrier in the form of government policy through federal and state regulations and licensing. New firms can expect retaliation from existing companies and also face changing barriers related to technology, strategic planning within the industry, and manpower and expertise problems. The entry deterring price or the existence of a prevailing price structure presents an additional challenge to a firm entering an established industry.

Whereas established firms may find it easy to manipulate the different strategies of barriers to entry according to prevailing market conditions, new entrants always find it difficult to break these barriers and may even run the risks of incurring heavy losses during the efforts to establish favorable market share for their products. It is equally important for management of established firms to adopt a balanced approach when implementing market barrier techniques against competitors and imitators by ensuring that additional costs incurred are appropriately recovered through increased sales volumes.

In summary, Porter's five-forces model concentrates on five structural industry features that comprise the competitive environment, and hence profitability, of an industry. Applying the model means, to be profitable, the firm has to find and establish itself in an industry so that the company can react to the forces of competition in a favorable manner. For Porter, *Competitive Strategy* is not a book for academics but a blueprint for practitioners—a tool for managers to analyze competition in an industry in order to anticipate and prepare for changes in the industry, new competitors and market shifts, and to enhance their firm's overall industry standing.

Throughout the relevant sections of *Competitive Strategy,* Porter uses numerous industry examples to illustrate his theory. Although immediate praise for the book and the five-forces model was exhaustive, critiques of Porter have appeared in business literature. Porter's model does not, for example, consider nonmarket changes, such as events in

the political arena that impact an industry. Furthermore, Porter's model has come under fire for what critics see as his under-evaluation of government regulation and anti-trust violations. Overall, criticisms of the model find their nexus in the lack of consideration by Porter of rapidly changing industry dynamics. In virtually all instances, critics also present alternatives to Porter's model.

Yet, in a *Fortune* interview in early 1999, Porter responded to the challenges, saying he welcomed the "fertile intellectual debate" that stemmed from his work. He admitted he had ignored writing about strategy in recent years but emphasized his desire to reenter the fray discussing his work and addressing questions about the model, its application, and the confusion about what really constitutes strategy. Porter's publications on competitive strategies span across all spheres of business as demonstrated by his 2006 book titled *Redefining Health Care: Creating Value-Based Competition on Results.*

SEE ALSO *Competitive Advantage; Generic Competitive Strategies; Product Life Cycle and Industry Life Cycle; Strategy Formulation*

BIBLIOGRAPHY

Armstrong, Gary, and Peter Kotler. *Marketing: An Introduction.* Upper Saddle River, NJ: Prentice Hall, 2007.

Clow, K. E., and Donald Baack. *Integrated Advertising, Promotion and Marketing Communications.* Upper Saddle River, NJ: Prentice Hall, 2007.

Competitive Advantage: Creating and Sustaining Superior Performance. New York: Free Press, 1998.

Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Free Press, 1998.

"The Global Competitiveness Report". *World Economic Forum,* 2006. Available from: http://www.weforum.org/gcr.

Mahon, J.F., and R.A. McGowan. "Modeling Industry Political Dynamics." *Business and Society* 37, no. 4 (1998): 390–413.

Porter, Michael E. *Michael Porter on Competition.* Boston, MA: Harvard Business School Press, 1998.

"Professor Porter Ph.D.: Management Theorists." *Economist, 333* (1994): 75.

Sandberg, Birgitta. *Marketing New Technology.* Routledge Publications, 2008.

Siaw, I., and A. Yu. "An Analysis of the Impact of the Internet on Competition in the Banking Industry, Using Porter's Five Forces Model." *International Journal of Management.* 21, no. 4 (2004): 514–524.

Slater, S. F. and E.M.A. Olson. "Fresh Look at Industry and Market Analysis." *Business Horizons* 45, no. 1, (2002): 15–23.

Stone, Marilyn, A. and John Desmond. *Fundamentals of Marketing.* Routledge Publications, 2006.

Surowiecki, J. "The Return of Michael Porter." *Fortune* 139, no. 2 (1999): 135–138.

PRICING POLICY AND STRATEGY

Managers should start setting prices during the development stage as part of strategic pricing to avoid launching products or services that cannot sustain profitable prices in the market. This approach to pricing enables companies to either fit costs to prices or scrap products or services that cannot be generated cost-effectively. Through systematic pricing policies and strategies, companies can reap greater profits and increase or defend their market shares. Setting prices is one of the principal tasks of marketing and finance managers in that the price of a product or service often plays a significant role in that product's or service's success, not to mention in a company's profitability.

Generally, pricing policy refers to how a company sets the prices of its products and services based on costs, value, demand, and competition. Pricing strategy, on the other hand, refers to how a company uses pricing to achieve its strategic goals, such as offering lower prices to increase sales volume or higher prices to decrease backlog. Despite some degree of difference, pricing policy and strategy tend to overlap, and the different policies and strategies are not necessarily mutually exclusive.

After establishing the bases for their prices, managers can begin developing pricing strategies by determining company pricing goals, such as increasing short-term and long-term profits, stabilizing prices, increasing cash flow, and warding off competition. Managers also must take into account current market conditions when developing pricing strategies to ensure that the prices they choose fit market conditions. In addition, effective pricing strategy involves considering customers, costs, competition, and different market segments.

Pricing strategy entails more than reacting to market conditions, such as reducing pricing because competitors have reduced their prices. Instead, it encompasses more thorough planning and consideration of customers, competitors, and company goals. Furthermore, pricing strategies tend to vary depending on whether a company is a new entrant into a market or an established firm. New entrants sometimes offer products at low cost to attract market share, while incumbents' reactions vary. Incumbents that fear the new entrant will challenge the incumbents' customer base may match prices or go even lower than the new entrant to protect its market share. If incumbents do not view the new entrant as a serious threat, incumbents may simply resort to increased advertising aimed at enhancing customer loyalty, but have no change in price in efforts to keep the new entrant from stealing away customers.

The following sections explain various ways companies develop pricing policy and strategy. First, cost-based pricing is considered. This is followed by the second topic

of value-based pricing. Third, demand-based pricing is addressed followed by competition-based pricing. After this, several strategies for new and established pricing strategies are explained.

COST-BASED PRICING

The traditional pricing policy can be summarized by the formula:

Cost + Fixed profit percentage = Selling price

Cost-based pricing involves the determination of all fixed and variable costs associated with a product or service. After the total costs attributable to the product or service have been determined, managers add a desired profit margin to each unit such as a 5 or 10 percent markup. The goal of the cost-oriented approach is to cover all costs incurred in producing or delivering products or services and to achieve a targeted level of profit.

By itself, this method is simple and straightforward, requiring only that managers study financial and accounting records to determine prices. This pricing approach does not involve examining the market or considering the competition and other factors that might have an impact on pricing. Cost-oriented pricing also is popular because it is an age-old practice that uses internal information that managers can obtain easily. In addition, a company can defend its prices based on costs, and demonstrate that its prices cover costs plus a markup for profit.

However, critics contend that the cost-oriented strategy fails to provide a company with an effective pricing policy. One problem with the cost-plus strategy is that determining a unit's cost before its price is difficult in many industries because unit costs may vary depending on volume. As a result, many business analysts have criticized this method, arguing that it is no longer appropriate for modern market conditions. Cost-based pricing generally leads to high prices in weak markets and low prices in strong markets, thereby impeding profitability because these prices are the exact opposites of what strategic prices would be if market conditions were taken into consideration.

While managers must consider costs when developing a pricing policy and strategy, costs alone should not determine prices. Many managers of industrial goods and service companies sell their products and services at incremental cost, and make their substantial profits from their best customers and from short-notice deliveries. When considering costs, managers should ask what costs they can afford to pay, taking into account the prices the market allows, and still allow for a profit on the sale. In addition, managers must consider production costs in order to determine what goods to produce and in what amounts.

Nevertheless, pricing generally involves determining what prices customers can afford before determining what amount of products to produce. By bearing in mind the prices they can charge and the costs they can afford to pay, managers can determine whether their costs enable them to compete in the low-cost market, where customers are concerned primarily with price, or whether they must compete in the premium-price market, in which customers are primarily concerned with quality and features.

VALUE-BASED PRICING

Value prices adhere to the thinking that the optimal selling price is a reflection of a product or service's perceived value by customers, not just the company's costs to produce or provide a product or service. The value of a product or service is derived from customer needs, preferences, expectations, and financial resources as well as from competitors' offerings. Consequently, this approach calls for managers to query customers and research the market to determine how much they value a product or service. In addition, managers must compare their products or services with those of their competitors to identify their value advantages and disadvantages.

Yet, value-based pricing is not just creating customer satisfaction or making sales; customer satisfaction may be achieved through discounting alone, a pricing strategy that could also lead to greater sales. However, discounting may not necessarily lead to profitability. Value pricing involves setting prices to increase profitability by tapping into more of a product or service's value attributes. This approach to pricing also depends heavily on strong advertising, especially for new products or services, in order to communicate the value of products or services to customers and to motivate customers to pay more if necessary for the value provided by these products or services.

DEMAND-BASED PRICING

Managers adopting demand-based pricing policies are, like value prices, not fully concerned with costs. Instead, they concentrate on the behavior and characteristics of customers and the quality and characteristics of their products or services. Demand-oriented pricing focuses on the level of demand for a product or service, not on the cost of materials, labor, and so forth.

According to this pricing policy, managers try to determine the amount of products or services they can sell at different prices. Managers need demand schedules in order to determine prices based on demand. Using demand schedules, managers can figure out which production and sales levels would be the most profitable. To determine the most profitable production and sales levels, managers examine production and marketing cost estimates at different sales levels. The prices are determined

by considering the cost estimates at different sales levels and expected revenues from sales volumes associated with projected prices.

The success of this strategy depends on the reliability of demand estimates. Hence, the crucial obstacle manager's face with this approach is accurately gauging demand, which requires extensive knowledge of the manifold market factors that may have an impact on the number of products sold. Two common options managers have for obtaining accurate estimates are enlisting the help from either sales representatives or market experts. Managers frequently ask sales representatives to estimate increases or decreases in demand stemming from specific increases or decreases in a product or service's price, since sales representatives generally are attuned to market trends and customer demands. Alternatively, managers can seek the assistance of experts such as market researchers or consultants to provide estimates of sales levels at various unit prices.

COMPETITION-BASED PRICING

With a competition-based pricing policy, a company sets its prices by determining what other companies competing in the market charge. A company begins developing competition-based prices by identifying its present competitors. Next, a company assesses its own product or service. After this step, a company sets it prices higher than, lower than, or on par with the competitors based on the advantages and disadvantages of a company's product or service, as well as on the expected response by competitors to the set price. This last consideration—the response of competitors—is an important part of competition-based pricing, especially in markets with only a few competitors. In such a market, if one competitor lowers its price, the others will most likely lower theirs as well.

This pricing policy allows companies to set prices quickly with relatively little effort, since it does not require as accurate market data as the demand pricing. Competitive pricing also makes distributors more receptive to a company's products because they are priced within the range the distributor already handles. Furthermore, this pricing policy enables companies to select from a variety of different pricing strategies to achieve their strategic goals. In other words, companies can choose to mark their prices above, below, or on par with their competitors' prices and thereby influence customer perceptions of their products.

For example, if a Company A sets its prices above those of its competitors, the higher price could suggest that Company A's products or services are superior in quality. Harley-Davidson used this with great success. Although Harley-Davidson uses many of the same parts suppliers as Kawasaki, Yamaha, and Honda, they price

well above the competitive price of these competitors. Harley's high prices—combined with its customer loyalty and mystique—help overcome buyer resistance to higher prices. Production efficiencies over the last two decades, however, have made quality among motorcycle producers about equal, but pricing above the market signals quality to buyers, whether or not they get the quality premium they pay for.

STRATEGIES FOR NEW AND ESTABLISHED PRODUCTS

Product pricing strategies frequently depend on the stage a product or service is in its life cycle; that is, new products often require different pricing strategies than established products or mature products.

New Product Pricing Strategy. Entrants often rely on pricing strategies that allow them to capture market share quickly. When there are several competitors in a market, entrants usually use lower pricing to change consumer spending habits and acquire market share. To appeal to customers effectively, entrants generally implement a simple or transparent pricing structure, which enables customers to compare prices easily and understand that the entrants have lower prices than established incumbent companies.

Complex pricing arrangements, however, prevent lower pricing from being a successful strategy in that customers cannot readily compare prices with hidden and contingent costs. The long-distance telephone market illustrates this point; large corporations have lengthy telephone bills that include numerous contingent costs, which depend on location, use, and service features. Consequently, competitors in the corporate long-distance telephone service market do not use lower pricing as the primary pricing strategy as they do in the consumer and small-business markets, where telephone billing is much simpler.

In a book titled *Pricing Policies and Strategies*, Brassington and Pettitt warn that low-pricing strategy for new products should be designed to achieve the right impressions in the target market or else consumers may interpret the low prices as constituting low quality value of the products on offer. Managers can overcome such hurdles by employing low introductory prices on a promotional basis and adjust the prices once a product achieves considerable market share.

Market skimming also serves as a reliable strategy for pricing new products. Market skimming involves setting high initial prices for new products to optimize revenue earnings and gradually reduce the prices as a product gains greater market share. Market skimming pricing strategy is particularly suitable to high technology products that have unique qualities and high entry barriers that dissuade competitors from making entry with undercut prices.

Established Product Pricing Strategy. Sometimes established companies need not adjust their prices at all in response to entrants and their lower prices, because customers frequently are willing to pay more for the products or services of an established company to avoid perceived risks associated with switching products or services.

However, when established companies do not have this advantage, they must implement other pricing strategies to preserve their market share and profits. When entrants are involved, established companies sometimes attempt to hide their actual prices by embedding them in complex prices. This tactic makes it difficult for customers to compare prices, which is advantageous to established companies competing with entrants that have lower prices.

In addition, established companies also may use a more complex pricing plan, such as a two-part pricing tactic. This tactic especially benefits companies with significant market power. Local telephone companies, for example, use this strategy, charging both fixed and per-minute charges. In a strategy aimed at protecting its market share, 3 Group, the 3G mobile broadband operator in the United Kingdom launched the "3 Like Home" in 2007, a pricing policy that allows 3G customers to utilize other 3G networks for a price similar to that on their home network. This is a rare pricing strategy through which the 3 Group extends transparent and attractive pricing on an established product while expanding its market share among customers who are frequent travelers.

MARKET SEGMENTATION

Because all customers do not have the same needs, expectations, and financial resources, managers can improve their pricing strategies by segmenting markets. Successful segmentation comes about when managers determine what motivates particular markets and what differences exist in the market when taken as a whole. For example, some customers may be motivated largely by price, while others are motivated by functionality and utility. The idea behind segmentation is to divide a large group into a set of smaller groups that share significant characteristics such as age, income, geographic location, lifestyle, and so on. By dividing a market into two or more segments, a company can devise a pricing scheme that will appeal to the motivations of each of the different market segments or it can decide to target only particular segments of the market that best correspond to its products or services and their prices.

Managers can use market segmentation strategically to price products or services in order to attain company objectives. Companies can set prices differently for different segments based on factors such as location, time of sale, quantity of sale, product design, and a number of others, depending on the way companies divide up the market. By doing so, companies can increase their profits, market share, cash flow, and so forth.

SEE ALSO *Product Design; Product Life Cycle and Industry Life Cycle; Product-Process Matrix; Strategy Formulation*

BIBLIOGRAPHY

Brassington, Frances, and Stepeh Pettitt. *Principles of Marketing,* 4th ed. Pearson Education Limited, Upper Saddle River, New Jersey: 2006.

Jobber, David, and Geoffrey Lancaster. *Selling and Sales Management,* 7th ed. Pearson Education Limited, Upper Saddle River, New Jersey: 2006.

Kardes, F.R., M.L. Cronley, J.J. Kellaris, and S.S. Posavac. "The Role of Selective Information Processing in Price-Quality Inference." *Journal of Consumer Research* 31, no. 2 (2004): 368–375.

Mac mini at a glance, 2008. Available from: http://www.apple.com/macmini/.

Meyvis, T. and C. Janiszewski. "When Are Broader Brands Stronger Brands? An Accessibility Perspective on the Success of Brand Extensions." *Journal of Consumer Research* 31, no. 2 (2004): 346–358.

Potter, D. "Confronting Low-End Competition." *MIT Sloan Management Review* 45, no. 4 (2004): 73–79.

Smagalla, D. "Does Promotion Pricing Grow Future Business?" *MIT Sloan Management Review* 45, no. 4 (2004): 9.

PRIVACY, PRIVACY LAWS, AND WORKPLACE PRIVACY

Privacy, privacy laws, and workplace privacy are issues of major concern to individuals and organizations in the modern world. Privacy violation and encroachment have become a norm as a result of the surveillance capabilities of the new and emerging electronic gadgets and information technology (IT) systems. This trend has prompted many countries to pass laws that govern the handling and collection of personal information of individuals and organizations with the use of electronic instruments.

WHAT IS PRIVACY?

What constitutes an encroachment to an individual's or an organization's rights to privacy? In legal terms, privacy simply refers to the accepted standards of related rights that safeguard human dignity. Definitions of privacy vary according to the environment, the participating interests, and the contextual limits. In many countries, the concept of data protection is included in the definition of privacy to achieve an interpretation that views privacy in terms of boundaries to an individual's personal information or an organization's data.

The subject area of privacy is concerned with wide-ranging issues that include rights to information privacy, bodily privacy, territorial privacy, and privacy of communications. Information privacy is defined by regulations governing the handling of the private data of individuals such as company, employees, business partners, or owners. Bodily privacy spells out the aspects of privacy that concern trespass of the physical selves of individuals through invasive procedures (such as blood tests). Territorial privacy defines the limits of intrusion across physical boundaries of physical properties belonging to private individuals or firms, whereas privacy of communications defines the limits of intrusions in other people's communication processes such as telephone conversations, e-mails, or ordinary mail.

Privacy is definitely a fundamental human right that underpins the values of human dignity curved around the principles of freedom of association, freedom of expression, and freedom of speech. These values are entrenched in international covenants and protected by specific laws and constitutional provisions in different countries. Privacy is a subject that is always characterized by many controversies that arise from varying interpretations of what constitutes privacy.

PRIVACY LAWS

Privacy law is a concept that has experienced a long history of constitutional declarations as well as landmark court rulings and interpretations. In the book titled *Essentials of Human Rights*, Rhoda Smith and Christian Anker note that the concept can be traced to as far back as the fourteenth century, when the Justices of the Peace Act in England provided for the arrest of peeping toms and eavesdroppers. The preceding years have seen the development of specific protections for privacy in many countries throughout the world.

Privacy laws form the basis of protection for privacy rights, which are seen as the boundaries that determine the allowable levels of intrusion that an individual, a society, or an organization can commit into the activities of an individual or any legally recognized entity. In the United States, the historical transformations of protection of privacy rights can be traced in numerous constitutional declarations and Supreme Court rulings. For example, the Declaration of the Rights of Man and the Citizen of 1792 recognized the sanctity of private property and outlawed violations to private property.

In their 2006 book titled *Constitutional and Administrative Law, Second Edition*, Joanne Coles and Jane Reynolds point out that the benchmark for modern privacy laws can be traced in the 1948 Universal Declaration of Human Rights, which particularly advocates for communications privacy and territorial privacy. Article 12 of the articles clearly states that "At no one time should an individual's privacy, family, home, or correspondence be subjected to arbitrary interference, and neither should the reputation or honor of an individual be subjected to attacks as well, because everyone has the right to enjoy the protection of law against such arbitrary attacks or interference." The authors also note that the declaration is further reinforced by the International Covenant on Civil and Political Rights and the European Declaration of Human Rights which expand the boundaries of the rights to privacy.

Countries such as the United States, Sweden, Germany, and France introduced amendments in their privacy laws in the 1970s and 1980s that broadened data protection rights to include electronic data.

Sniffing. Sniffing of messages on the Internet is one of the ways through which state intelligence agencies monitor public e-mail communications. In the book titled *Internet Literacy,* Fred T. Hofstetter defines sniffing as the act of intercepting information by hacking into gateways that link the networks to the information superhighway. In the United States, for example, the Federal Bureau of Investigation (FBI) uses Carnivore, a customizable intelligence gadget with the capacity to break Internet security and encryption codes and to monitor multiple forms of Internet communications such as e-mails, chats, file transfers, and instant messaging. Carnivore churns through Internet communications and automatically forwards to the FBI messages that may contain clues to cases the intelligence organization is dealing with.

FBI computerized monitoring intensified in 2001 with the passing of the USA Patriot Act of 2001 which introduced amendments to the Electronic Communications Privacy Act of 2006 and Computer Matching and Privacy Protection Act of 1988 to allow the FBI to issue National Security Letters to Internet Service Providers demanding the disclosure of personal information and data about their clients. The USA Patriot Act of 2001 also introduced amendments to the Right to Financial Privacy Act of 1978 that mandated the access of intelligence agencies to private financial information. In a move geared towards protecting U.S. citizens from arbitrary monitoring by state intelligence agencies such as the FBI, the United States passed the USA Patriot Improvement and Reauthorization Act of 2005, which outlawed the provisions in the USA Patriot Act of 2001 that provided FBI with unlimited access to private information and data of US citizens.

INTERNATIONAL INSTRUMENTS OF PRIVACY LAWS

The Council of Europe's Convention on the Protection of Individuals with Regard to the Automatic Processing of

Personal Data and the Organization for Cooperation and Development (OECD) Guidelines Governing the Protection of Privacy and Cross Border Data Flows are the main international law instruments that stipulate specific guidelines concerning the handling of electronic data across international borders. The two documents form the basis for laws that govern the protection of data in many countries, because they provide adequate description of personal information that is subject to protection at every stage of collecting, storing, and disseminating data. The underlying principle of the international privacy and data protection laws is that personal information should be obtained accurately, lawfully, and subjected only to the original purpose for which it was intended.

The European parliament further enhanced the levels of protection for each of its states in the 1990s by passing the Europe-Wide Directive on the Protection of Individuals with regard to the processing of personal data, which provides citizens of member countries with protection against a wider range of privacy and data abuse. Each of the European Union (EU) member countries has passed legislations that compliment the directive to ensure harmonious application of privacy protection laws concerning the flow of data throughout the EU.

EMPLOYEE MONITORING AND WORKPLACE PRIVACY

Workplace privacy is a very important yet controversial issue that dogs the modern workplace environment. Computer-based technologies are increasingly providing government agencies and organizations in the private sector with technologically advanced channels for conducting mass surveillance on people both at the workplace and on the streets, developments that have led to the transformation of privacy into a crucial concern for individual rights.

Employee monitoring in organizations has become a prominent practice with many organizations crafting policies that regulate employee behaviors and use of equipment and facilities. E-mail communications and use of the system's computers, Internet, and telephones are usually the most monitored employee activities in organizations. For example, Continental Airlines IT policies clearly stipulate that all e-mail and other Internet-based communications of employees are subject to monitoring with the objective of ensuring that they meet the requirements of the company.

The modern work environment is always characterized by ever-evolving information technology systems and equipment that employers keep on acquiring with the objective of facilitating speed, convenience, and productivity in organizational work processes. Employers are reaping enhanced benefits from these systems as they can comfortably utilize the multimedia capacities of these technological systems to track and monitor the activities

of employees in the systems. As much as organizations cite workplace security as the main reason behind the practice of monitoring employees through technological devices, there is much concern that the organizations are openly breaching the privacy rights of the employees.

Workplace security is a critical issue in organizations that subject the properties and business interests of employers to extreme protection from misuse and unauthorized exposure to competitors. Moreover, employee productivity may be hampered if employees use the IT systems of the organization to gamble, run private businesses, play computer games, or log on to sites with adult content. Therefore, workplace policing often focuses on protecting the organization from employee actions that may result in the misuse of the company's physical and intellectual properties, use of company database for personal purposes, revelation of trade secrets to competitors, or the transmssion of malicious and damaging information through the organization's IT systems.

But the big question is; how far should organizations extend their protection? There is genuine need for organizations to draw a balance between security of information policies and the privacy of employees. Managers take advantage of company policies to intercept employee communications at will without regard to the privacy rights of the employees. In fact, employers have the leeway to even incorporate the rights for filming employees at their work stations. Nonetheless, whatever employers deem fit and good for the organization, managers should always provide clear company policy guidelines concerning extents and limits of employee monitoring, taking into account that privacy is a fundamental component of human rights.

There is prevailing urgency for increased privacy protection legislation as a result of the increased sophistication of information technology which enhances the capacity for state authorities and organizations to collect, analyze, and share information on individuals without infrastructural constraints. Emerging information technologies link chains of computers through high-speed networks equipped with high-speed processors capable of creating comprehensive dossiers on any individual without the need for particular central computer control systems.

ETHICAL APPROACH TO WORKPLACE PRIVACY

Protection of workforce data can be observed through enforcement of codes of practice within both private and public organizations. Organizational managers can choose to observe either the rights-view approach or the utilitarian approach when dealing with issues that concern workplace privacy. Respect and recognition of individual privileges and liberties, with due regard to the rights of employees to privacy and due process, form the cornerstone principles

for managers who observe the rights-viewpoint of workplace privacy ethics. However, this approach is not favored by many managers because it creates a burdensome legalistic work environment that can encourage inefficiency and unproductive practices among employees.

A utilitarian approach to ethical issues concerning workplace privacy requires managers to base their decisions on the consequences that employee actions portend to the organization. Managers seek to achieve the most favorable results for their organizations by implementing policies that portend greater good in terms of productivity and efficiency in the organizations, with little regard to the punitive measures such policies may bear upon employees. The utilitarian approach toward workplace ethics is favored by many organizations because it mainly focuses on maximum utility of resources and maximization of profits.

Managers should pursue policies that achieve a balance between organizational policies and employee privacy rights. Appropriate IT systems technologies—such as encryption and firewall protection—should be employed to protect employees' use of Internet-based communications from unauthorized access by individuals both within and outside the organization.

BIBLIOGRAPHY

Coles, Joanne and Jane Reynolds, eds. *Constitutional and Administration Law, 2nd ed.* Hodder Arnold, 2006.

Griffin, S. *Company Law: The Fundamental Principles, 4th ed.* Pearson Education Limited, 2006.

Hofstetter, Fred, T. *Internet Literacy, 4th ed.* McGraw-Hill Companies Inc., 2006.

Liptak, Adam. "Judge Voids FBI Tool Granted by Patriot Act." *New York Times,* 7 September 2007). Available from: http://www.nytimes.com/2007/09/07/washington/07patriot.html?_r=1&adxnnl=1&oref=slogin&adxnnlx=1219310178-mnLBZ419enwOXmHMVCziDg.

Smith, Rhona K. M., and Christien van den Anker. *The Essentials of Human Rights.* Hodder Arnold, 2006.

"USA Patriot Improvement and Reauthorization Act of 2005". *US Public Law* 120 STAT. 193 (March 9, 2006): 109–177.

PROBLEM SOLVING

A managerial problem can be described as the gap between a given current state of affairs and a future desired state. Problem solving may then be thought of as the process of analyzing the situation and developing a solution to bridge the gap. While it is widely recognized that different diagnostic techniques are appropriate in different situations, problem solving as a formal analytical framework applies to all but the simplest managerial problems. The framework is analogous to the scientific method used in chemistry, astronomy, and the other physical sciences. In both cases, the purpose underlying

the analytic process is to minimize the influence of the investigator's personal biases, maximize the likelihood of an accurate result, and facilitate communication among affected parties.

Problem solving was popularized by W. Edwards Deming and the expansion of the total quality management movement in the 1980s. While Deming described what he called the Shewhart cycle, the technique is more commonly known as the Deming Wheel or simply as the PDCA cycle. Regardless of the name, a problem solver is urged to follow a step-by-step approach to problem solving—plan, do, check, act (hence the PDCA acronym).

In the planning stage, a manager develops a working hypothesis about why a given problem exists and then develops a proposed solution to the problem. The second step is to implement, or do, the proposed remedy. Next, the manager studies or checks the result of the action taken. The focus of this review is to determine whether the proposed solution achieved the desired result—was the problem solved? The fourth step then depends upon the interpretation of the check on results. If the problem was solved, the manager acts to institutionalize the proposed solution. This might mean establishing controls or changing policy manuals to ensure that the new way of doing business continues.

However, if the check indicates that either the problem was not solved or was only partially corrected, the manager should act by initiating a new cycle. Indeed, the technique is represented as a cycle based on the belief that many problems are never fully solved. For example, suppose that the problem in a given manufacturing facility is determined to be that labor productivity is too low. A change in processing methods may be found to successfully increase labor productivity. However, this does not preclude additional increases in labor productivity. Therefore, the PDCA cycle suggests that managers should pursue a course of continuous improvement activity.

The problem-solving framework can be used in a wide variety of business situations, including both large-scale management-change initiatives and routine improvement or corrective activity. Indeed, management consultants may be thought of as professional problem solvers. By relying on the proven problem-solving framework, external consultants are often able to overcome their lack of specific industry experience or knowledge of an organization's internal dynamics to provide meaningful analysis and suggestions for improvement. To more fully explore the issues presented by problem solving, the four-step PDCA cycle is expanded to a nine-step framework in the next section.

Perhaps the only generalizable caveat regarding problem solving is to guard against overuse of the framework. For example, Florida Power & Light became well known for their problem-solving ability in the late 1980s. One of their most successful initiatives was to institute an aggressive tree-

trimming program to anticipate and prevent power failure due to downed limbs falling on electrical lines during storms. They were so successful that they integrated the problem-solving framework into their day-to-day managerial decision-making and organizational culture.

While this resulted in well-reasoned decisions, it also meant that implementing even simple changes (like moving a filing cabinet closer to the people using it) required an overly bureaucratic approval process. This phenomenon is commonly referred to as paralysis of analysis. Therefore, managers should remain aware of the costs in both time and resources associated with the problem-solving framework. Accordingly, the nine-step framework described below is offered as a suggested guide to problem solving. Managers should feel free to simplify the framework as appropriate given their particular situation.

THE PROBLEM-SOLVING FRAMEWORK

Although business problems in the form of a broken piece of machinery or an irate customer are readily apparent, many problems present themselves in a more subtle fashion. For example, if a firm's overall sales are increasing, but its percentage of market share is declining, there is no attention-grabbing incident to indicate that a problem exists. However, the problem-solving framework is still helpful in analyzing the current state of affairs and developing a management intervention to guide the firm toward the future desired state. Therefore, a solid approach to problem solving begins with a solid approach to problem identification.

Problem Identification. Whatever techniques are used, a firm's approach to problem identification should address three common identification shortfalls. First and most obviously, the firm wants to avoid being blindsided. Many problems develop over time; however, unless the firm is paying attention, warning signals may go unheeded until it is too late to effectively respond.

A second common error of problem identification is not appropriating properly. This means that although a firm recognizes that an issue exists, they do not recognize the significance of the problem and fail to dedicate sufficient resources to its solution. It can be argued that not prioritizing properly has kept many traditional retail firms from responding effectively to emerging internet-based competitors.

Finally, a third common error in problem identification is overreaction—the Chicken Little syndrome. Just as every falling acorn does not indicate that the sky is falling, neither does every customer complaint indicate that a crisis exists. Therefore, a firm's problem identification methods should strive to present an accurate assessment of the problems and opportunities facing the firm.

While no specific problem-identification technique will be appropriate for every situation, there are several techniques that are widely applicable. Two of the most useful techniques are statistical process control (SPC) and benchmarking.

SPC is commonly used in the repetitive manufacturing industries, but can also prove useful in any stable production or service-delivery setting. A well formulated SPC program serves to inform managers when their operational processes are performing as expected and when something unexpected is introducing variation in process outputs. A simplified version of SPC is to examine performance outliers-those instances when performance was unusually poor or unusually good. It is believed that determining what went wrong, or conversely what went right, may inspire process or product modifications.

Benchmarking may take the form of either competitive analysis or best practices evaluation of competitors. Competitive benchmarking allows managers to keep tabs on their competition and thereby gauge their customers' evolving expectations. For instance, benchmarking might involve reverse engineering-disassembling a competitor's product-to study its design features and estimates the competitor's manufacturing costs. Best practices benchmarking is a qualitative intelligence approach that allows a manager to focus on a particular aspect or phase of the production processes, methodologies, or systems of a competitor. This is done in order to compare and gauge the competitive capabilities of their own company.

Additional listening and problem identification techniques include the time-tested management-by-walking-around, revamped with a Japanese influence as "going to the gemba." (The *gemba* is the "real place.") The technique suggests that managers go to where the action is—to the production floor, point of delivery, or even to the customer's facilities to directly observe how things are done and how the product is used. Other methods include active solicitation of customer complaints and feedback as well as persistent research and development practices. ARDEC, the 2007 winner of the coveted Malcolm Baldrige National Quality Award, involves its Picatinny-based customers in its transformational life-cycle lethality research and technology in a bid to elicit independent judgments about the effectiveness of the company's products.

Problem Verification. The amount of resources that should be dedicated to verification will vary greatly depending upon how the problem itself is manifested. If the problem is straightforward and well defined, only a cursory level of verification may be appropriate. However, many business problems are complex and ill defined. These situations may be similar to the case of a physician who is confronted with a patient that has self-diagnosed his medical condition. While

considering the patient's claim, the doctor will conduct her own analysis to verify the diagnosis.

Similarly, the need for verification is especially important when a manager is asked to step in and solve a problem that has been identified by someone else. The introduction of the manager's fresh perspective and the possibility of a hidden agenda on the part of the individual who initially identified the issue under consideration suggest that a "trust, but verify" approach may be prudent. Otherwise, the manager may eventually end up spending a great deal of time and effort pursuing a solution to the wrong problem.

In the case of particularly ambiguous problems, McKinsey & Company, a management-consulting group, uses a technique they call Forces at Work. In this analysis, McKinsey's consultants review the external pressures on the client firm arising from suppliers, customers, competitors, regulators, technology shifts, and substitute products. They then attempt to document the direction and magnitude of any changes in the various pressures on the firm. In addition, they review any internal changes, such as shifts in labor relations or changes in production technology.

Finally, they look at how the various factors are impacting the way the firm designs, manufactures, distributes, sells, and services its products. Essentially, McKinsey attempts to create comprehensive before-and-after snapshots of their client's business environment. Focusing on the differences between the two, they hope to identify and clarify the nature of the challenges facing the firm.

Problem Definition. The next step in problem solving is to formally define the problem to be addressed. This is a negotiation between the individuals tasked with solving the problem and the individuals who oversee their work. Essentially, the parties need to come to an agreement on what a solution to the problem will look like. Are the overseers anticipating an implementation plan, a fully operational production line, a recommendation for capital investment, or a new product design? What metrics are considered important—cycle time, material costs, market share, scrap rates, or warranty costs?

Complex problems may be broken down into mutually exclusive and collectively exhaustive components, allowing each piece to be addressed separately. The negotiation should recognize that the scope of the problem that is defined will drive the resource requirements of the problem solvers. The more focused the problem definition, the fewer resources necessary to generate a solution.

Finally, the time frame for problem analysis should also be established. Many business problems require an expedited or emergency response. This may mean that the problem solvers need to generate a temporary or interim solution to the problem before they can fully explore the underlying causes of the problem. Ensuring that the over-

seers recognize the limitations inherent in an interim solution serves to preserve the credibility of the problem solvers.

Root-Cause Analysis. Now that the problem has been formally defined, the next step is for the problem solvers to attempt to identify the causes of the problem. The ultimate goal is to uncover the root cause or causes of the problem. The root cause is defined as that condition or event which, if corrected or eliminated, would prevent the problem from occurring. However, the problem solver should focus on potential root causes that are within the realm of potential control. For example, findings that a particular weight of motor oil is insufficient to protect an engine from overheating readily leads to an actionable plan for improvement. Finding that the root cause of a problem is gravity does not.

A common technique for generating potential root causes is the cause-and-effect diagram (also known as the fishbone or Ishikawa diagram). Using the diagram as a brainstorming tool, problem solvers traditionally review how the characteristics or operation of raw materials, labor inputs, equipment, physical environment, and management policies might cause the identified problem. Each branch of the diagram then becomes a statement of a causal hypothesis. For example, one branch of the diagram might suggest that low salaries are leading to high employee turnover, which in turn results in inexperienced operators running the machinery, which leads to a high scrap rate and ultimately higher material costs. This analysis suggests that to address the problem of high material costs, the firm may have to address the root cause of insufficient salaries.

Collection and examination of data may also lead the problem solver toward causal hypotheses. Check sheets, scatter plots, Pareto diagrams, data stratification, and a number of other graphical and statistical tools can aid problem solvers as they look for relationships between the problems identified and various input variables. Patterns in the data, changes in a variable over time, or comparisons to similar systems may all be useful in developing working theories about why something is happening. The problem solver should also consider the possibility of multiple causes or interaction effects. Perhaps the problem manifests only when a specific event occurs and certain conditions are met-the temperature is above 85 degrees or the ambient humidity is abnormally low.

Once the problem solver has identified the likely root causes of the problem, an examination of the available evidence should be used to confirm or disconfirm which potential causes actually are present and impacting the performance under consideration. This might entail developing an experiment where the candidate cause is controlled to determine whether its manipulation influences the

presence of the problem. At this stage of the analysis, the problem solver should remain open to disconfirming evidence. Many elegant theories fail to achieve the necessary confirmation when put to the test. Also, at this stage of the analysis it is common for the problem solver to discover simple, easily implemented actions that will solve all or part of the problem. If this occurs, then clearly the problem solver should grasp the opportunity to "pick the low hanging fruit." Even if only a small component of the problem is solved, these interim wins serve to build momentum and add credibility to the problem-solving process.

Alternative Generation. Once the root causes of the problem have been identified, the problem solver can concentrate on developing approaches to prevent, eliminate, or control them. This is a creative process. The problem solver should feel free to challenge assumptions about how business was conducted in the past. At times, an effective approach is to generalize the relationship between the cause and the problem. Then the problem solver can look for similar relationships between other cause and effects that might provide insight on how to address the issues at hand. In general, it is useful to attempt to generate multiple candidate solutions. By keeping the creative process going, even after a viable solution is proposed, the problem solver retains the possibility of identifying a more effective or less expensive solution to the problem.

Evaluation of Alternatives. Assuming that the problem was well defined, evaluation of the effectiveness of alternative solutions should be relatively straightforward. The issue is simply to what extent each alternative alleviates the problem. Using the metrics previously identified as important for judging success, the various alternatives can generally be directly compared. However, in addition to simply measuring the end result, the problem solvers may also want to consider the resources necessary to implement each solution. Organizations are made up of real people, with real strengths and weaknesses. A given solution may require competencies or access to finite resources that simply do not exist in the organization. In addition, there may be political considerations within the organization that influence the desirability of one alternative over another. Therefore, the problem solver may want to consider both the tangible and intangible benefits and costs of each alternative.

Implementation. A very common problem-solving failure is for firms to stop once the plan of action is developed. Regardless of how good the plan is, it is useless unless it is implemented. Therefore, once a specific course of action has been approved, it should continue to receive the necessary attention and support to achieve success. The

work should be broken down into tasks that can be assigned and managed. Specific milestones with target dates for completion should be established. Traditional project management techniques, such as the critical path method (CPM) or the program evaluation and review technique (PERT) are very useful to oversee implementation efforts.

Post-Implementation Review. Another common failure is for firms to simply move on after a solution has been implemented. At a minimum, a post-implementation evaluation of whether or not the problem has been solved should be conducted. If appropriate, and using the metrics that were established earlier, this process should again be relatively straightforward—were the expected results achieved? The review can also determine whether additional improvement activities are justified. As the PDCA cycle suggests, some problems are never solved, they are only diminished. If the issue at hand is of that nature, then initiating a new cycle of problem-solving activity may be appropriate.

A secondary consideration for the post-implementation review is a debriefing of the problem solvers themselves. By its very nature, problem solving often presents managers with novel situations. As a consequence, the problem-solving environment is generally rich in learning opportunities. To the extent that such learning can be captured and shared throughout the organization, the management capital of the firm can be enhanced. In addition, a debriefing may also provide valuable insights into the firm's problem-solving process itself. Given the firm's unique competitive environment, knowing what worked and what did not may help focus future problem-solving initiatives.

Institutionalization and Control. The final step in problem solving is to institutionalize the results of the initiative. It is natural for any system to degrade over time. Therefore, any changes made as a result of the problem-solving effort should be locked in before they are lost. This might entail amending policy manuals, establishing new control metrics, or even rewriting job descriptions. In addition, the firm should also consider whether the problem addressed in the initiative at hand is an isolated incident or whether the solution can be leveraged throughout the organization. Frequently, similar problems are present in other departments or other geographic locations. If this is the case, institutionalization might involve transferring the newly developed practices to these new settings.

The overall success of problem-solving activities in organizations is determined by the levels of anticipatory mechanisms and subsequent response measures set up by the management of the organizations. Managers can achieve much success in problem solving by fostering an

organizational culture that encourages continuous adaptation to new situations and creates mechanisms for instant response to unanticipated occurrences. The involvement of employees in problem solving processes is of paramount importance for managers seeking to perpetuate a problem-solving culture defined by teamwork and the tenets of collective responsibility.

SEE ALSO *Project Management*

BIBLIOGRAPHY
"ARDEC's Transformation Role." *Armament Research Development and Engineering Center.* 2008. Available from: http://www.pica.army.mil/PicatinnyPublic/organizations/ardec/t_role.asp.

Deming, W. Edwards. *Out of the Crisis.* Cambridge: Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1992.

Ketola, Jeanne, and Kathy Roberts. *Correct! Prevent! Improve!: Driving Improvement Through Problem Solving and Corrective and Preventive Action.* Milwaukee, WI: ASQ Quality Press, 2003.

Laufer, Alexander. "From Planned Football to Spontaneous Basketball." *Academy Sharing Knowledge: The NASA Source for Project Management and Engineering Excellence.* 2007. Available from: http://appel.nasa.gov/ask/issues/03/overview/3_resources_letterfromtheeditor.html.

"Learning Organization Benchmarking." *Bersin & Associates.* 1 June 2007. Available from: http://bersin.wordpress.com/2007/06/01/learning-organization-benchmarking/.

Malcolm Baldrige National Quality Award Program. "Award Recipients." *National Institute of Standards and Technology.* 1999. Available from: www.quality.nist.gov.

Rabe, C.B., *The Innovation Killer: How What We Know Limits What We Can Imagine—and What Smart Companies Are Doing About It.* New York: American Management Association, 2006.

Rasiel, Ethan M. *The McKinsey Mind: Using the Techniques of the World's Top Strategic Consultants to Help You and Your Business.* New York: McGraw-Hill, 2001.

———. *The McKinsey Way—Understanding and Implementing the Problem-Solving Tools and Management Techniques of the World's Top Strategic Consulting Firm.* New York: McGraw-Hill, 1999.

Smith, Gerald F. *Quality Problem Solving.* Milwaukee: ASQ Quality Press, 1998.

van Aken, Joan Ernst, Hans Berends, and Hans van der Bij. *Problem Solving in Organizations: A Methodical Handbook for Business Students.* New York: Cambridge University Press, 2007.

PROCESS MANAGEMENT

Process management is a concept that integrates quality/performance excellence into the strategic management of organizations. It is Category 6.0 of the Malcolm Baldrige National Quality Award. Process management includes (1) process design or engineering, which is the invention of new processes; (2) process definition, which requires the description of existing processes; (3) process docu-

mentation; (4) process analysis and control; and (5) process improvement.

Process design and definition includes describing what must be done and how it is to be accomplished. After defining a process, it must be documented using a flow-chart, a process map, or even a simple checklist. Until the process is described and documented, one cannot be assured that a process is in place. At that point, the process can be analyzed and improved.

There are many process analysis tools, including cause-and-effect diagrams, statistical process control, and trend analyses. Process improvement may result from gradual, continuous improvement or a dramatic reinvention or reengineering of the process.

HISTORICAL PERSPECTIVE

Process management can trace its roots back to the early days of industrial engineering and quality management (quality control and quality engineering). The earliest focus was on streamlining factory processes to increase productivity. However, process management concepts are now used in all types of organizations to improve process baselines (safety, quality, cycle time, productivity, on-time delivery, etc.), as well as to improve financial and operational results.

In 1911, Frederick Taylor published *The Principles of Scientific Management.* Some of his ideas are the predecessors for modern industrial engineering tools and concepts that are used to reduce cycle time and/or improve productivity. Frank and Lillian Gilbreth also used time and motion studies to improve processes and to increase productivity by evaluating how much time it took to do each task within a process, and the best way to do each task (the motions involved). (The Gilbreths' work and personal lives were publicized in the book, *Cheaper by the Dozen.*)

One of the world's leading experts on improving the manufacturing process, Shigeo Shingo, created—with Taiichi Ohno—many of the features of just-in-time (JIT) manufacturing methods, systems, and processes that constitute the Toyota Production System. Much of Shingo's work is documented in books he has written, such as *A Study of the Toyota Production System from An Industrial Engineering Viewpoint* (1989).

Experts in the field of quality developed many process-management concepts and tools. Some well-known experts include the following:

1. Dr. W. Edwards Deming (1900—1993) is famous for his work in Japan in the 1950s and for theories such as his Fourteen Points and Plan-Do-Check-Act (PDCA) Cycle (also referred to as the Shewhart Cycle). He also refined and publicized other concepts and tools, including statistical process control. Many of Dr. Deming's theories are contained in his book, *Out of the Crisis.*

2. Dr. Joseph Juran (1904—2008) also worked with the Japanese beginning in the 1950s. Some of his theories supporting process management are Juran's Trilogy (process planning, process control, and process improvement); Big Q (the quality department is responsible for quality) vs. Little Q (everyone is responsible for quality); and the Quality Planning Roadmap. Juran's books include *Juran's Quality Control Handbook* and *A History of Managing for Quality.*

3. Dr. Kaoru Ishikawa (1915—1989), author of *Guide to Quality Control,* invented the cause-and-effect diagram and taught people involved in teams (quality circles) to ask what caused each effect.

4. Dr. Walter Shewhart (1891—1967), a statistician who worked at Western Electric and Bell Laboratories, and who used statistics to explain process variability, first published his theories in his book *Economic Control of Quality of Manufactured Product* (1931).

PROCESS THINKING

Examples of simple, essential questions in process thinking are:

1. What is a process?
2. Who are the internal and external customers of a process?
3. Who are the process owners?
4. Who improves processes—process owners, customers, suppliers?
5. How do you improve processes?
6. What might not add value for customers?
7. What role does measurement play?

WHAT IS A PROCESS?

A process is a series of connected steps or actions with a beginning and an end that can be replicated. Organizations should be viewed as a set or hierarchy of processes that produce outputs of value to a customer, as well as a set of functions such as engineering, manufacturing, accounting, and marketing.

The most successful organizations are managed from a horizontal (process) perspective, as well as from a vertical (function) perspective. Understanding an organization from the process perspective will cause changes in the way one thinks about people and processes as depicted in Figure 1.

Examples of processes in various organizations are included in the following list. Please note that many of the processes could be found in all the various organization types.

Figure 1	
Functional Focus	**Cross-Functional (Process) Focus**
Employees are the problem.	The process is the problem.
Measure individuals.	Measure process results.
Motivate people.	Remove process barriers and constraints.
Who made this error?	What caused the error?
Evaluate employees.	Evaluate the process.
Vertical organizations.	Cross-functional (horizontal) organizations.

1. University
   - Teaching students
   - Paying for classes
2. Hospital
   - Emergency care
   - Payroll
3. Factory
   - Purchasing material
   - Training workers
4. Federal Agency
   - Procurement
   - Hiring new employees
5. Retail Store
   - Selling products
   - Employee scheduling
6. Bank
   - Opening new accounts
   - Statement distribution
7. Church
   - Recruiting members
   - Maintaining facilities
8. Restaurant
   - Preparing meals
   - Advertising
9. Construction
   - Budgeting
   - Managing subcontractors
10. Not for Profit
    - Distribution of funds
    - Employee recruitment

A process involves the steps or stages by which inputs such as people, materials, methods, machines, and environment are transformed into outputs (products and services).

WHO ARE THE CUSTOMERS OF A PROCESS?

Because a transformation process exists to satisfy customer requirements, process owners need to understand who their customers are, what they want, and how to provide what they want. The customers of a process are the people who require the products and services that are the result of the process or one phase of the process. They are classified as: (1) external customers—people who ultimately use the products and/or services (process outputs or work results) of an organization; and (2) internal customers—the owners of the next phases in the process who must wait for the delivery of a product or service before completing work.

External and internal customers must be satisfied if organizations are to experience the highest levels of success. Individuals and teams must understand their roles as suppliers to internal and external customers if customer satisfaction is to be a reality. At the same time, individuals and teams must act as internal customers who communicate requirements to internal suppliers.

Customer/Supplier Relationships. Concepts relating to customer/supplier relationships and satisfaction are as follows:

- Customers (internal and external) have a right to expect quality products and services.

- Every member of an organization has an internal customer—the next phase in the process.

- If each team member treats other team members like valuable customers, relationships and work results (individual and team performance) will improve.

- The customer determines if the product or service is what he or she ordered and if it has the value expected and promised by the supplier.

Individuals and team members should ask internal customers and suppliers, "How am I doing?" and "What did you expect compared to what I gave you?" The answer will assist in improving processes, products, services, and relationships.

Basically, customers want to be their suppliers' first priority. They want (and deserve) perfect products and services delivered on or ahead of schedule at the lowest possible cost. They expect suppliers to be in the improvement mode of operation so that the customers are assured of paying a competitive price.

Perfection is the aspiration; level-improvement is the goal. Whatever today's standard is, tomorrow's customers will require more. It is the responsibility of the supplier to remain on a journey toward perfection; to determine current baselines for important customer requirements such as safety, quality, schedule, and cost; and to determine what process and relationship improvements are necessary to improve those baselines.

Relationships Among Quality, Schedule, and Cost. One of the things that must be done when evaluating and improving processes is to establish process baselines. The baselines for quality, schedule, and cost are so interwoven that it is difficult to measure and improve one of them without considering the other. This is as it should be, since customers want the highest quality products and services on or ahead of schedule and at the lowest possible price.

If you improve the quality of processes and relationships, you can expect other baselines (e.g., quality, schedule, and cost) to improve. While quality, schedule, and cost are measured as separate baselines, long-term improvement is interdependent and process focused.

Customers expect speed of delivery as well as quality. Therefore, objectives of process management are customer satisfaction and retention through the improvement of quality and cycle time. In order to satisfy and retain external customers, suppliers should:

1. Be competitive based on speed as well as quality.

2. Provide real-time information to internal and external customers.

3. Design and streamline processes so that they are free of defects, constraints, and activities that do not add value for the customer.

4. Eliminate procrastination.

5. Change paradigms based on sequential decision making to paradigms that include concurrent decision making, as well as concurrent engineering.

6. Empower workers to dismantle time-wasting bureaucracy.

WHO ARE THE PROCESS OWNERS?

The process owners (the people who actually do the jobs) are the most knowledgeable about the processes by which they accomplish their work. Therefore, if process evaluation and improvement becomes an integral part of daily work, safety improvement, defect prevention, and cycle-time reduction can become a reality. Process owners are those empowered to do work, improve how they do the work, and accept accountability as process owners.

Process Evaluation and Improvement. An essential concept in process management is that all processes have improvement potential. If organizations only focus on current

Figure 2

Area of Difference	Continuous Improvement	Reengineering
Reason for change	Desire to improve baselines	Compelling (rapid process redesign for survival)
Targets	Small improvement in every process; cumulative effects	Aggressive (e.g., 10 times or more, six sigma, etc.)
Approach	Nonstructured	Structured and disciplined
Scope	Evaluation of all steps in all processes	Broad cross-functional processes
Focus	Parts of a system	Relations in system
Level of change	Incremental and continuous	Order of magnitude
Organizational structure	Vertical or horizontal	Flattened, horizontal
Involvement of executives	Important up-front; support throughout	Intensive long-term involvement
Involvement of all employees	Gradual voluntary involvement	Nonvoluntary
Use of terms	Work teams and cross-functional team	Cross-functional teams
Role of information	Incidental	Cornerstone

processes, current problems, and doing the things that are currently done, they may eventually encounter a variety of problems, such as:

- They may continue making a product (e.g., buggy whips) long after the market is gone. These perfect products may have no customers.

- They may do everything in a process perfectly, but they may be doing many things that do not need to be done at all.

- They may be focusing only on quality when speed is also important.

- They may miss opportunities to improve products, services, processes, and relationships.

WHO IMPROVES PROCESSES?

People who know the most about processes and who are most capable of evaluating and improving them are process owners—people who are accountable for process output or results. However, feedback from customers and suppliers contributes a great deal to improvement.

Examples of data a customer could provide include (1) whether the product or service meets the customer's needs/expectations; (2) whether there are any defects or discrepancies; and (3) whether the product or service is delivered on-time or early.

Examples of data suppliers could provide are (1) whether the customer's requirements (e.g., purchase orders) were clear and understandable; and (2) whether customers met lead-time requirements when placing orders.

HOW DO YOU IMPROVE PROCESSES?

Improvement may be gradual and continuous (i.e., kaizen, continuous process improvement), or it may be dramatic process redesign (i.e., process reengineering). The differences between the two are depicted in Figure 2.

Both gradual, continuous improvement and process reengineering should be an integral part of process management and improvement. Chaffey suggests that the objectives for process re-engineering should be designed to facilitate both significant and radical changes in business processes, such as customer care or manufacturing in observable and measurable terms. Process reengineering should demonstrate significant improvement in performance and achieve desired results in the quality, quantity, speed, and costs of processes. Business process reengineering should also involve automation of business processes through employment of innovative technology and knowledge transfer.

In a research article titled *Defining a Knowledge Strategy Framework for Process Aligned organizations: An IBM Case*, McLaughlin and Paton emphasize that innovation and knowledge transfer stand to play important roles in process performance of organizations. However, this is only valid if managers share and promote clear understanding of the impacts of knowledge and innovation on the organizational core processes relative to the improvement of the overall objectives of the organizations.

The following are some of the things people can do to improve processes:

- Use a structured methodology such as the Golden-Pryor Improvement Checklist.

- Eliminate activities that do not add value for the customer. Ask yourself: "Would the customer want to pay for this activity?" If the answer is no, ask yourself: "Why are we doing this? Is it a federal law? A state law?" If the answer is no, ask yourself: "What benefit do we gain by doing this?" At this point, you are coming close to eliminating the activity.

- Eliminate constraints—things that frustrate employees and slow processes.

- Streamline/simplify processes. It is difficult to document and teach people complex processes.

- Once processes are streamlined, computerize them if feasible.

- Provide leadership in a positive direction. Function as a strategist. Envision and invent the future with streamlined processes and relationships.

- Act empowered; be accountable. As individuals and members of teams, function as process owners and consider process management and improvement an integral part of daily work. Don't say, "They won't let us...." Make decisions, not excuses.

- Document and publicize improvements. Success breeds success.

- Continue to monitor and evaluate processes to identify additional opportunities for improvement.

- Ask (and teach others to ask) what, where, why, who, when, and how questions about each step in a process (or job).

Process Questions.

What:

- is there to do?

- is being done?

- should be done?

- can be done?

- constraints keep us from doing it?

Who:

- does this job?

- should do this job?

- knows how to do it?

- should know how to do it?

Where:

- is this job done?

- should it be done?

- can it be done?

When:

- is this job done?

- should it be done?

- can it be done?

When process-improvement efforts fail, it is generally because people have a deficiency in knowledge—they do not know what actions to take. They should be trained on specific improvement methodologies, and they should be held accountable for documenting improvement results.

Improvement team members generally need a model that provides them common knowledge about what they are required to do individually and as a team, such as the Golden Pryor Improvement Checklist in Figure 3.

WHAT MIGHT NOT ADD VALUE?

The concept of value implies worth; value is something that a customer would expect to pay for, such as labor to design, build, and deliver a product or service. Customers want to pay for perfect products and services delivered on or ahead of schedule at the lowest reasonable cost. They only want to pay for activities that add value to products and services, and to processes and relationships that impact the products and services.

WHAT ROLE DOES MEASUREMENT PLAY?

Organizational leaders are accustomed to measuring things that are important to themselves. They also need to measure items that are important to customers. Improving process results does not require sophisticated measurements. It requires systematic identification and elimination of root causes of problems, process constraints, and activities that do not add value. It is as much continuous learning as it is continuous improvement. Improvement results from learning that is fed back and used as the basis for the next decisions.

Quality products and services are the result of quality processes that exist because of quality people who build quality relationships and streamline processes. Specific measurements must be established for individual phases of a process in addition to the final process output. The following can apply in any organization in any industry:

- Quality—first pass yield, scrap, rework, repair.

- Productivity/Use of Time—cycle time, on-time delivery, non-value-added activities, overtime.

- Environmental and Safety—injuries, compliance, ergonomics, discipline problems, incidents of violence.

- People Issues—absenteeism, turnover, morale, grievances, skill levels, stakeholder satisfaction.

- Customer Satisfaction—new and repeat business, customer returns, warranty costs, field service reports/data, involvement.

- Supplier Performance—rating system, quality, capabilities, conformance to requirements.

Figure 3
Golden Pryor Process Improvement Checklist

   I. Determine what work processes you own and list them. Classify them as critical or ancillary.

   II. Describe and flowchart each process.

      A. Choose which process to evaluate first.

         1. Identify and list process and decision steps.

         2. Identify and remove non-value-added steps.

         3. Identify and remove process constraints for each phase of the process.

         4. If flowcharts do not reflect requirements, change the process or change the requirement documents (directives, procedures, etc.)

      B. Using flowcharts, determine the customer and suppliers for each process.

   III. Establish quality measurements. Define quality for the output(s) of each process and identify data sources.

   IV. Establish time measurements (cycle-time, on-time delivery, etc.)

      A. Determine static cycle time (process flow time).

         1. Compute cycle time for sub-processes and total process cycle time.

         2. Identify slack time/queue time.

         3. Establish perfect cycle times (no constraints, bottlenecks, or excess queue time).

         4. Search a second time for non-value-added-activities and eliminate those that still exist. Examples: redundant inspection, unnecessary documentation, unnecessary handling, meetings without agendas.

      B. Identify other measurements relating to time and establish process baselines.

   V. Establish other baselines and measurements.

      A. Safety (e.g., classrooms, discipline problems, acts of violence).

      B. Customer satisfaction (e.g., level of satisfaction with products or services and trends).

      C. Human resources (hours of training, % multiple skills/job rotations, absenteeism, etc.)

   VI. Identify process baselines with greatest improvement potential.

   VII. Use TQM/SPC tools to determine system improvement/problem resolution options.

   VII. Select best improvement option(s) and implement.

   IX. Measure, monitor/track and feedback results to process owners, management, et al. Determine whether process baselines–safety, quality, cycle time–are getting better or worse. Analyze the trends and do root cause analysis.

   X. Continue improvement efforts.

   XI. Publicize improvements.

ESSENTIAL ELEMENTS

This essay focused on process management as it relates to existing processes, not the invention of new processes, products, and services. Process management requires process design (new processes) or definition (existing processes); process documentation; process analysis and control; and process improvement.

Essential elements in process management include: (1) Understanding process thinking, including process ownership; (2) Identifying and satisfying customers' requirements; (3) Establishing process baselines and measurement; (4) Analyzing and improving processes through the use of quality and industrial engineering concepts and tools; and (5) Understanding how to use gradual, continuous process improvement and rapid, dramatic process redesign or reengineering.

Process management is the job of every employee of every organization in every industry. Organizational culture and structure, in conjunction with technological innovation, are the main levers for change and process management in business organizations.

SEE ALSO *Continuous Improvement; Japanese Management; Managing Change; Product-Process Matrix; Trends in Organizational Change*

BIBLIOGRAPHY

Burlton, Roger. *Business Process Management: Profiting From Process.* Indianapolis, IN: Sams Publishing, May 2001.

Chaffey, Dave. *E-Business and E-Commerce Management*, 3rd ed. Prentice-Hall, 2007.

Crosby, Philip. *Quality without Tears.* New York: McGraw-Hill, 1984.

Deming, W. Edwards. *The New Economics.* Cambridge, MA: MIT Center for Advanced Engineering Study, 1993.

———. *Out of the Crisis.* Cambridge, MA: MIT Center for Advanced Engineering Study, 1986.

Garvin, David A. *Managing Quality: The Strategic and Competitive Edge.* New York: Free Press, 1988.

Hammer, Michael, and James Champy. *Reengineering the Corporation: A Manifesto for Business Revolution.* New York: HarperCollins Publishers, 1993.

Harrington, H.J. *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness.* New York: McGraw-Hill, 1991.

———. *The Improvement Process: How America's Leading Companies Improve Quality.* New York: McGraw-Hill, 1987.

Imai, Masaaki. *Kaizen: The Key to Japan's Competitive Success.* New York: McGraw-Hill, 1986.

Ishikawa, Kaoru. *Guide to Quality Control.* Tokyo, Japan: Asian Productivity Organization, 1982.

Juran, Joseph M. *A History of Managing for Quality.* Milwaukee, WI: ASQ Quality Press, 1995.

Juran, Joseph M., and Frank M. Gryna. *Juran's Quality Control Handbook.* New York: McGraw-Hill, 1988.

McLaughlin, S., and Robert A. Paton. Defining a Knowledge Strategy Framework for Process Aligned Organizations: An IBM Case. *Knowledge and Process Management.* 15, no. 2 (2008): 126–139. Available from: http://www3.interscience. wiley.com/cgi-bin/fulltext/118999974/PDFSTART.

Mizuno, Shigeru. *Management for Quality Improvement: The 7 New QC Tools.* Cambridge, MA: Productivity Press, 1979.

Nokes, Sebastian, and Sean Kelly. *The Definitive Guide to Project Management: The Fast Track to Getting the Job Done on Time and Budget,* 2nd ed. Pearson Education Limited. 2007.

Pryor, Mildred Golden, and Brian D. Cullen. "Learn to Use TQM as Part of Everyday Work." *Industrial Management,* May-June 1993, 10–14.

———. *Quality Planning and Analysis: From Product Development Through Use.* New York: McGraw-Hill, 1993.

Pryor, Mildred Golden, and J. Chris White. *Strategic Quality Management.* Dallas, TX: ASQ, Texas Quality EXPO, October 1996.

Pryor, Mildred Golden, J. Chris White, and Leslie A. Toombs. *Strategic Quality Management: A Strategic Systems Approach to Quality.* Houston, TX: Dame Publications, 1998.

Pryor, Mildred Golden, and Leslie A. Toombs. *Total Quality Management.* Commerce, TX: Center for Excellence, 1993.

Pryor, Mildred Golden, and W. Donald Pryor. *Process Reengineering.* Commerce, TX: Center for Excellence, 1994.

Senge, Peter M. *The Fifth Discipline: The Art & Practice of The Learning Organization.* New York: Doubleday/Currency, 1990.

Shingo, Shigeo. *Revolution in Manufacturing: The SMED (Single Minute Exchange of Die) System.* Cambridge, MA: Productivity Press, Inc., 1985.

Smith, Howard, and Peter Fingar. *Business Process Management (BPM): The Third Wave.* Tampa, FL: Meghan-Kiffer Press, 2003.

———. *A Study of the Toyota Production System.* Cambridge, MA: Productivity Press, Inc., 1989.

———. *What Is Total Quality Control?* Englewood Cliffs, NJ: Prentice-Hall, 1985.

PROCUREMENT

SEE *Purchasing and Procurement*

PRODUCT DESIGN

Product design is cross-functional, knowledge-intensive work that has become increasingly important in today's fast-paced, globally competitive environment. It is a key strategic activity in many firms because new products contribute significantly to sales revenue. When firms are able to develop distinctive products, they have opportunities to command premium pricing. Product design is a critical factor in organizational success because it sets the characteristics, features, and performance of the service or good that consumers demand. The objective of product design is to create a good or service with excellent functional utility and sales appeal at an acceptable cost and within a reasonable time. The product should be produced using high-quality, low-cost materials and methods. It should be produced on equipment that is or will be available when production begins. The resulting product should be competitive with or better than similar products on the market in terms of quality, appearance, performance, service life, and price.

THE INCREASING IMPORTANCE OF PRODUCT DESIGN

Product design is more important than ever because in the twenty-first century, customers demand greater product variety and near-constant innovation. It is common for consumers to switch quickly to products with state-of-the-art technology. The impacts of greater product variety and shorter product life cycles have a multiplicative effect on the number of new and derivative products that need to be designed. For example, just a few years ago, a firm may have produced four different products and each product may have had a life cycle of ten years. In this case, the firm must design four new products every ten years. Today, in order to be competitive, this firm may produce eight different products with a life cycle of only five years; this firm must introduce eight new products in five years. That represents sixteen new products in ten years or one product every seven and one-half months. In this fast-paced environment, product design ceases to be an ad hoc, intermittent activity and becomes a regular and routine action. For an organization, delays, problems, and confusion in product design shift from being an annoyance to being life threatening.

PRODUCT DESIGN AND SUPPLY CHAIN MANAGEMENT

Product design can also be an important mechanism for coordinating the activities of key supply chain participants. As organizations outsource the production of subassemblies and components, they also may be asking suppliers to participate in product design. As they outsource design capabilities it is essential that they manage and coordinate the flow of information among the supply chain participants. This can be especially important as firms outsource components to two or more suppliers. Now, there may be important design interfaces among two, three, or more suppliers. These interfaces must be properly managed to ensure cost effective and timely

designs. Clearly, information and communication technologies become important parts of this effort.

A recent development in maintaining supply-chain integrity while pursuing a vigorous strategy of product innovation is an increase in acquisitions that support a program of vertical integration. For example, in 2008 Apple acquired P.A. Semi, a small chip manufacturer that could supply exclusive new chips for Apple's line of iPods and iPhones. Microsoft pursued a similar strategy throughout the 2000s, acquiring software companies for technologies that could be incorporated into existing and developing Microsoft products. Successful companies such as these can turn their high cash-flow into acquisitions that improve the product-design and manufacturing processes.

PRODUCT DESIGN: A KEY TO ORGANIZATIONAL SUCCESS

Product design is an essential activity for firms competing in a global environment. Product design drives organizational success because it directly and significantly impacts nearly all of the critical determinants for success. As the authors of *Product Development* (2008) put it, "The key in new product development is the information that indicates what people want, what features of the product are considered absolutely essential, what price they are willing to pay for it, what features are desirable but can be sacrificed for a lower price, [who are the] current and potential competitors, and [what are the] likely changes in the market size."

In the fast-paced, high-technology business environment of the twenty-first century, customers demand greater product variety and are quick to shift to new, innovative, full-featured products. The sudden success of Apple's iPhone is an excellent case in point. Introduced for the first time in 2007, Apple sold 270,000 iPhones during the first thirty hours of their availability. Over a million iPhones were sold in less than three months, giving the iPhone over a quarter of the U.S. smartphone market. Only a year later, Apple released the iPhone 3G, the next generation of this extremely popular product line, and once again customers lined up early. Apple's corporate strategy is driven by its introduction of such market-changing products as the iPhone—and earlier, the iMac and iPod—and other companies are eager to duplicate this success.

In addition, customers make purchase decisions based on a growing list of factors that are affected by product design. Previously, customers made purchase decisions based primarily on product price and/or quality. While these factors are still important, customers are adding other dimensions such as customizability, order-to-delivery time, product safety, and ease and cost of maintenance. Environmental concerns are expanding to include impacts during production, during the product's operating life, and at the end of its life (recycle-ability). In addition, customers demand greater protection from defective products, which leads to lower product liability losses. Safer and longer-lasting products lead to enhanced warrantee provision, which, in turn, impact customer satisfaction and warrantee repair costs.

Programs and activities are being put in place so organizations can cope with these dimensions. Organizations are embracing concepts such as *mass customization, design for manufacturing and assembly, product disposal, quality function deployment, and time-based competition.* They are using technology such as *rapid prototyping* and *computer-aided design* to examine how products function, how much they may cost to produce, and how they may impact the environment. Firms are searching for and implementing new technologies to determine ways to design better products. They are examining legal and ethical issues in product design as well as the impact of product design on the environment.

MASS CUSTOMIZATION

Mass customization is the low-cost, high-quality, large volume delivery of individually customized products. It is the ability to quickly design and produce customized products on a large scale at a cost comparable to non-customized products. Customization, cost effectiveness is the ability to produce highly differentiated products without increasing costs, significantly. Consumers expect to receive customized products at close to mass-production prices. Customization volume effectiveness is the ability to increase product variety without diminishing production volume. As markets become more and more segmented and aggregate demand remains constant or increases, firms must continue to design and produce high volumes across the same fixed asset base. Customization responsiveness is the ability to reduce the time required to deliver customized products and to reorganize design and production processes quickly in response to customer requests. It would be counter-productive to pursue mass customization if a customized product takes too long to produce. Speed in product design and production is an indispensable criterion for evaluating an organization's mass customization capability.

DESIGN FOR MANUFACTURING AND ASSEMBLY

Improving manufacturability is an important goal for product design. A systems approach to product design that was developed by two researchers from England, Geoffrey Boothroyd and Peter Dewhurst, is called design for manufacturability and assembly (DFMA). It can be a powerful tool to improve product quality and lower manufacturing cost. The

approach focuses on manufacturing issues during product design. DFMA is implemented through computer software that identifies design concepts that would be easy to build by focusing on the economic implications of design decisions. These decisions are critical even though design is a small part of the overall cost of a product because design decisions fix 70 to 90 percent of the manufacturing costs. In application, DFMA has had some startling successes. With the DFMA software, Texas Instruments reduced assembly time for an infrared sighting mechanism from 129 minutes to twenty minutes. IBM sliced assembly time for its printers from thirty minutes to three minutes.

Firms are recognizing that the concept behind DFMA can also be extended beyond cost control to design products that are easy to service and maintain. To do this effectively, service and maintenance issues should be considered at the earliest stages of the design. Also, firms will be required to examine disposal during product design as they become liable for recycling the products they make. It can be easier to recycle products if those factors are part of the product design paradigm.

DISPOSAL AND PRODUCT DESIGN

Disposal is becoming an increasingly important part of product design. The European Union is taking the lead by requiring that most of an automobile is recycled by the year 2010. This requirement has a major impact on product design. The most obvious effect is to change the notion that a consumer is the final owner for a product. With this approach, the product returns to the manufacturer to be recycled and the recycling process should begin in product design. Vehicles should be designed so they can be disassembled and recycled easily. The designers should avoid exotic materials that are difficult to recycle. For example, parts that have plastic and metal fused together should not be used in applications where they are difficult to separate. The designers should determine which parts can be refurbished and reused, and which can be discarded, broken down, and recycled. All this should be done without adding costs or reducing product quality.

QUALITY AND QUALITY FUNCTION DEPLOYMENT

Product design shapes the product's quality. It defines the way that good and service functions. Quality has at least two components. First, the product must be designed to function with a high probability of success, or reliability; that is, it will perform a specific function without failure under given conditions. When product reliability increases, the firm can extend the product's warranty without increasing customer claims for repairs or returns. Warranties for complex and expensive items such as appliances are important selling points for customers. Second, quality improves

when operating or performance characteristics improve even though reliability does not. The goals of product design should be greater performance, greater reliability, and lower total production and operating costs. Quality and costs should not be viewed as a trade-off because improvements in product and process technologies can enhance quality and lower costs.

Quality function deployment is being used by organizations to translate customer wants into working products. Sometimes referred to as the house of quality, quality function deployment (QFD) is a set of planning and communication routines that focus and coordinate actions and skills within an organization. The foundation of the house of quality is the belief that a product should be designed to reflect customers' desires and tastes. The house of quality is a framework that provides the means for interfunctional planning and communications. Through this framework, people facing different problems and responsibilities can discuss various design priorities.

PROTOTYPING

Engineering and operations combine to develop models of products called prototypes. These may be working models, models reduced in scale, or mock-ups of the products. Where traditional prototype development often takes weeks or months, the technology for rapid prototyping has become available. Some companies are using the same technology that creates virtual reality to develop three-dimensional prototypes. Other firms employ lasers to make prototypes by solidifying plastic in only a few minutes; this process can produce prototypes with complex shapes. Prototyping should increase customer satisfaction and improve design stability, product effectiveness, and the predictability of final product cost and performance.

COMPUTER-AIDED DESIGN

Currently, business managers and engineers perceive computer-aided design (CAD) as a tool to assist engineers in designing goods. CAD uses computer technology and a graphic display to represent physical shapes in the same way that engineering drawings have in the past. It is used in the metalworking industry to display component parts, to illustrate size and shape, to show possible relationships to other parts, and to indicate component deformation under specified loads. After the design has been completed, the engineer can examine many different views or sections of the part and finally send it to a plotter to prepare drawings. This capability greatly reduces engineering time and avoids routine mistakes made in analysis and drawing. It significantly increases productivity and reduces design time, which allows faster delivery.

Applications of CAD systems are not limited to producing goods. While it is true that services do not have

physical dimensions, the equipment and facilities used to produce services do. For example, the service stalls in an automotive center or rooms in an emergency medical center have physical characteristics that can be represented by the interactive graphics capabilities of a CAD system.

LEGAL AND ETHICAL ISSUES IN PRODUCT DESIGN

What is the responsibility of an organization and its managers to see that the goods and services they produce do not harm consumers? Legally, it is very clear that organizations are responsible for the design and safe use of their products. Consumers who believe they have been damaged by a poorly designed good or service have legal recourse under both civil and criminal statutes. Often, however, only the most serious and obvious offenses are settled in this way.

More difficult ethical issues in product design result when the evidence is not as clear. For example, what responsibilities does a power tool manufacturer have with respect to product safety? Does a power saw manufacturer have the responsibility to design its product so that it is difficult for a child to operate? Suppose a parent is using a power saw and is called away to the telephone for a few minutes. A ten-year-old may wander over, press the trigger, and be seriously injured. Designing the saw so it has a simple and inexpensive lockout switch that would have to be pressed simultaneously when the trigger is pressed would make it more difficult for the accident to happen. What is the responsibility of the parent? What is the responsibility of the company?

PRODUCT DESIGN AND THE ENVIRONMENT

Organizations consider product design a critical activity to the production of environmentally-friendly products. Organizations increasingly recognize that being good corporate citizens increases sales. Fast-food restaurants have begun recycling programs and redesigned packaging materials and systems in response to customer concerns. In other cases, being a good corporate citizen and protecting a company's renewable resources go well together; there are win-win opportunities where an organization can actually design products and processes that cut costs and increase profits by recapturing pollutants and reducing solid waste.

By the late 2000s many firms had adopted environmentally-friendly and -responsible mission statements. Hewlett-Packard's statement is typical: "Our policy is to design products and services that are environmentally sound and safe throughout their life cycle." This significantly impacts the product-design process, as Apple's statement indicates: "Apple strongly believes that reducing the environmental impact of our business starts with the design of our products. We set high standards—based on our own requirements and those set by programs such as ENERGY STAR—in an effort to create products that offer excellent environmental performance throughout their life cycle." These efforts have spread throughout the corporate community quite rapidly and are a common feature of the product design process in the twenty-first century.

OVERVIEW OF PRODUCT DESIGN PROCESS

Product design time can be reduced by using a team approach and the early involvement of key participants including marketing, research and development, engineering, operations, and suppliers. Early involvement is an approach to managing people and processes. It involves an upstream investment in time that facilitates the identification and solution of downstream problems that would otherwise increase product design and production costs, decrease quality, and delay product introduction.

Time-based competitors are discovering that reducing product design time improves the productivity of product design teams. To reduce time, firms are reorganizing product design from an "over-the-wall" process to a team-based concurrent process. Over-the-wall means to proceed sequentially with the limited exchange of information and ideas. When this approach is used, problems are often discovered late because late-stage participants are excluded from decisions made early in the process. As a result, poor decisions are often made.

Product design is a labor-intensive process that requires the contribution of highly trained specialists. By using teams of specialists, communications are enhanced, wait time between decisions is reduced, and productivity is improved. Participants in this team-based process make better decisions faster because they are building a shared knowledge base that enhances learning and eases decision-making. By sharing development activities, design decisions that involve interdependencies between functional specialists can be made more quickly and more effectively. This reorganized process creates a timely response to customer needs, a more cost-effective product design process, and higher-quality products at an affordable price.

There are several reasons why early involvement and concurrent activities bring about these improvements. First, product design shifts from sequential—with feedback loops that occur whenever a problem is encountered—to concurrent, where problems are recognized early and resolved. The ability to overlap activities reduces product design time. Second, when a team of functional specialists works concurrently on product design, the participants learn from each other and their knowledge base expands. People are better able to anticipate conflicts and can more easily arrive

at solutions. As a result, the time it takes to complete an activity should decline. Third, fewer changes later in the process results in faster and less expensive product design. When problems are discovered late, they take more time and money to solve.

Product design requires the expertise and decision-making skills of all parts of the organization. Marketing, engineering, operations, finance, accounting, and information systems all have important roles. Marketing's role is to evaluate consumer needs, determine potential impact of competitive pressure, and measure the external environment. Engineering's role is to shape the product through design, determine the process by which the product will be made, and consider the interface between the product and the people. Operations' role is to ensure that the product can be produced in full-scale production. Finance's role is to develop plans for raising the capital to support the product in full-scale production and to assist in the evaluation of the product's profit potential. Accounting and information systems provide access to information for decision-making. Cross-functional teamwork and knowledge sharing are thus keys to success.

SEE ALSO *Computer-Aided Design and Manufacturing; Pricing Policy and Strategy; Product Life Cycle and Industry Life Cycle; Product-Process Matrix; Quality and Total Quality Management; Reverse Supply Chain Logistics; Supply Chain Management*

BIBLIOGRAPHY

Corswant, F., and C. Tunälv. "Coordinating Customers and Proactive Suppliers: A Case Study of Supplier Collaboration in Product Development." *Journal of Engineering and Technology Management* 19, no. 3–4 (2002): 249–261.

Gerwin, D., and N.J. Barrowman. "An Evaluation of Research on Integrated Product Development." *Management Science* 48, no. 7 (2002): 938–953.

Giudice, Fabio, Guido La Rosa, and Antonino Risitano. *Product Design for the Environment: A Life Cycle Approach.* Boca Raton, FL: CRC Press, 2006.

Hong, S.K., and M.J. Schniederjans. "Balancing Concurrent Engineering Environmental Factors for Improved Product Development Performance." *International Journal of Production Research* 38, no. 8 (2000): 1779–1800.

Kawasaki, Guy, and Michele Moreno. *Rules For Revolutionaries: The Capitalist Manifesto for Creating and Marketing New Products and Services.* New York: HarperCollins, 1999.

Koufteros, X.A., M. Vonderembse, and J. Jayaram. "Internal and External Integration for Product Development: The Contingency Effects of Uncertainty, Equivocality, and Platform Strategy." *Decisions Sciences* 36, no. 1 (2005): 977–133.

Krause, Frank-Lothar, ed. *The Future of Product Development.* New York: Springer, 2007.

Krishnan, V., and K.T. Ulrich. "Product Development Decisions: A Review of the Literature." *Management Science* 47, no. 1 (2001): 1–21.

McDermott, C.M., and G.C. O'Connor. "Managing Radical Innovation: An Overview of Emergent Strategy Issues."
Journal of Product Innovation Management 19, no. 6 (2002): 424–438.

Meyer, M.H., and A.P. Lehnerd. *The Power of Product Platforms.* New York: The Free Press, 1997.

Mital, Anil, et al. *Product Development: A Structured Approach to Design and Manufacture.* Burlington, MA: Butterworth-Heinemann, 2008.

Reinertsen, D.G. *Managing the Design Factory.* New York: The Free Press, 1997.

Simpson, Timothy W., Zahed Siddique, and Roger Jianxin Jiao, ed. *Product Platform and Product Family Design: Methods and Applications.* New York: Springer, 2006.

Tu, Q., M. Vonderembse, and T.S. Ragu-Nathan. "The Impact of Time-Based Manufacturing Practices on Mass Customization and Value to Customer." *Journal of Operations Management* 19 (2001): 201–217.

Vonderembse, M.A., and G.P. White. *Operations Management: Concepts, Methods, and Strategies.* Danvers, MA: John Wiley & Sons, 2004.

PRODUCT LIFE CYCLE AND INDUSTRY LIFE CYCLE

The life cycle is a basic concept in biology. All living things go through a cycle of birth, growth, maturity, and death. The life-cycle concept is an appropriate description of what happens to products, industries, and businesses over time. When applied to this context, the life cycle contains four stages: introduction, growth, maturity, and decline.

This concept is much more than an interesting analogy of business and biology. In biology, a living organism's position in its life cycle leads to different courses of action concerning the organism's future. An industry's position and a product's position in their life cycles also lead to very different decisions concerning their futures. The life-cycle concept was adopted from biology for use as a strategic planning tool for products, industries, and businesses.

DEFINITIONS

The life cycle can be used to observe the behavior of many concepts in business. In its classic form, it is best applied to products and industries, though it can also be applied to individual businesses. A product is not an individual item but a group of similar products. For example, the Chevrolet Malibu, Ford Taurus, and Honda Accord are a product group of mid-sized sedans. Industry is a much broader classification than product; an industry consists of many similar groups of products. The product groups of mid-size sedan, pickup truck, and sport-utility vehicle all belong to the automobile industry. A business is, of course, a firm operating within one or more industries, such as Ford or General Motors in the automobile industry.

Generally, industries have longer life cycles than products. For example, the large family-sedan appears to be well into the decline stage. After decades of dominance in the automobile industry, only a few large cars, such as Ford's Crown Victoria, are being manufactured. The automobile industry, on the other hand, has lasted more than one hundred years and shows no signs of declining even with concerns about the declining world supply of oil; with alternative-fuel research getting started in earnest, the automobile industry will likely outlast even the oil industry upon which it is currently based.

Businesses may have an even longer life cycle than its original industry if decline is turned into transformation. For example, NCR began as a company producing cash registers, and while that industry still exists, NCR has become a leading technology company within the newer IT industry. Similarly, oil companies such as BP are moving heavily into alternative energy solutions in order to outlast the decline of the oil industry.

The life-cycle concept also describes individual brand products, such as the Ford Taurus. However, individual products in a group of products usually have much shorter life cycles, and they do not always follow the classic shape of the product life cycle. They may be introduced and die, and then be reintroduced again at a latter point. For example, the Chevrolet Nova has had more than one life cycle. Consequently, products are defined as groups of similar products, and industries are defined as a collection of comparable product groups.

The discussion that follows is applicable to industries, products, and individual businesses. The terms product life cycle, industry life cycle, and business life cycle refer to the four stages of introduction, growth, maturity, and decline. To simplify the discussion, the focus will be on the product life cycle with indication as to where the industry and business life cycles differ in important ways.

RATIONALE FOR THE PRODUCT LIFE CYCLE

Since products are not living beings, why do they have life cycles? The reason is that society accepts products at different rates, but all go through similar stages of societal acceptance. This acceptance of innovations by societies is called the diffusion of innovations. As society begins to adopt and accept an innovation, the new product grows, eventually reaching maturity. When there is a better alternative to the product or when public preference changes, the product will enter a decline, possibly ending with its death.

The diffusion-of-innovations concept categorizes society by the speed with which the individual members adopt a new product. It classifies people into the five categories of innovators, early adopters, early majority, late majority, and laggards.

Innovators. The first people in a society to adopt a new product are the innovators. These people are risk takers and may be looking for new products to try. They represent only 2.5 percent of the population. Though these people are the first to try a product, they are not usually opinion leaders. Consequently, they do not pass information about the product to the rest of the population.

Early Adopters. The early adopters have many opinion leaders in their ranks. They are the first people in the neighborhood to try a new product, and many of them willingly pass the information about the product onto other people. Their experiences can determine whether a product will have a long or short life cycle. They represent about 13.5 percent of the population.

Early Majority. Once the early adopters have tried and given their approval to a product, the early majority will begin to follow. Thirty-four percent of the population is in this category. Since they represent such a large percent of the population, the adoption by the early majority causes the new product to enter a period of rapid growth.

Late Majority. After a significant portion of the population has adopted a product, the late majority will consider its use. These people are not risk takers; they typically wait until they see the product approved by others. They also represent about 34 percent of the population. Once they have adopted the product, the innovators, early adopters, early majority, and late majority represent a total of about 84 percent of the population. By this point, the new product will have reached its maturity.

Laggards. The last category of society to adopt a new product is generally fearful about trying new things. Often, they wait until being forced to adopt because the alternate product is no longer being produced. The laggards represent about 16 percent of the population.

NEW PRODUCT DEVELOPMENT

Although product development is not usually recognized as a formal stage in the product life cycle, many ideas for long-term product planning are derived from the concepts that are generated through this preliminary process. Product development is defined as a strategy for company growth by offering modified or new products to current market segments. Additionally, product development focuses on turning product concepts into a physical reality, while ensuring that that the idea can be turned into a workable product through each stage.

In the product development stage, costs begin to accumulate due to the investment in proposed concepts and ideas. Before introduction, a successful product in the

marketplace will go through the following eight distinct stages of new product development: idea generation, idea screening, concept development, marketing strategy, business analysis, product development, test marketing, and commercialization.

Idea generation usually stems from the organization's internal sources (R&D, engineering, marketing). Company employees will brainstorm new ideas to generate viable product concepts. Additionally, a company may also analyze their competition's new product offerings with the intention of differentiating and improving on existing designs.

Ideas are ultimately screened, reducing the number of unrealistic concepts and focusing on realistic, attainable ones. A single idea is developed into a product concept. Concepts are then tested to measure how appealing the product might be to consumers from the anticipated target market. Testing may range from focus groups to random surveys.

After concept testing, a marketing strategy is needed to define how the product will be positioned in the marketplace. Identifying the product's anticipated target market, financial expectations, distribution channels, and pricing strategy are also determined at this time.

Business analysis, including sales forecasting, determines if the product will be profitable to the manufacturer. Many factors are considered when judging the products anticipated profitability. Managers will look at the length of time it takes for the product to be profitable, cost of capital, and other financial considerations when deciding weather to proceed with development. If the concept is approved, a prototype is created from the product concept.

The prototype undergoes rigorous testing to ensure safety and effectiveness of the product. These tests are a good measure for determining whether or not a product is safe and if the designers should move forward with its creation.

Once a successful prototype is developed, companies perform test marketing on the product. Typically, a company will conduct formal research on a product concept to see if the proposed idea has validity with the targeted audience. Again, customer surveys and focus groups are conducted with the intention of testing the product on a sample of the targeted demographic. The testing is then analyzed to measure consumer reaction to the product. Once all the information is available and the company decides to introduce the item, high commercialization costs are incurred.

STAGES OF THE LIFE CYCLE

As stated above, the product life cycle consists of four stages: introduction, growth, maturity, and decline. Figure A illustrates the product life cycle. Determination of a product's stage in its life cycle is not based on age, but on

Figure A
Product Life Cycle
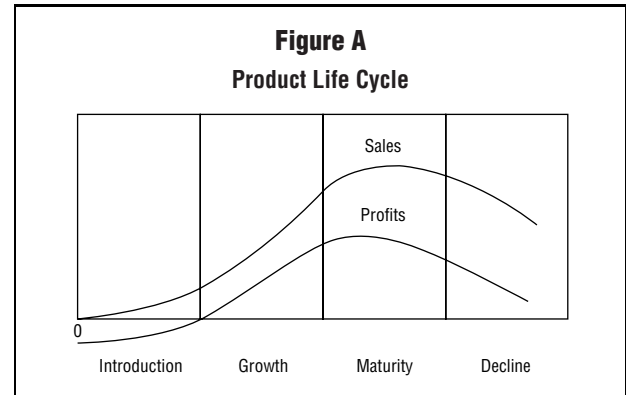
the relationship of sales, costs, profits, and number of competitors. Each of these stages is described below.

Introduction. When a new product is introduced to a market, the innovators may be the only people aware of the new product. If the product is a new product class, the innovators may not know what the product uses are. Recalling that the innovators represent only a small percent of the population, the sales of the new product will be low. However, there is an advantage in this situation in that the new product does not yet have any competition. During the introduction stage of a new product, the developer enjoys a monopoly.

Unfortunately, the product monopoly does not usually translate to immediate profits. The product may have been in development for a long time and considerable development costs are still in the recovery phase. Also, an expensive marketing effort may be needed to introduce the product to the public. With low sales and high expenses, the introduction stage of the life cycle is usually a money loser for the company. However, the hope is for the future of the product, and the company usually is more than willing to incur the losses.

The life cycle of an industry begins in a similar way, with the introduction of an entirely new type of product, such as the automobile or personal computer. The business life cycle begins more simply, involving the start-up of a new enterprise. This can be as small as a sole proprietorship or involve forming a partnership or corporation. Many businesses never make it past the start-up phase; the failure rate of new restaurants is particularly dramatic.

Growth. As the early adopters begin to try the product, sales begin to grow and profits usually start to follow. This is a great time for a company introducing a new product because the company still enjoys a monopoly early in the growth stage. The company is reaping all the sales and profits of the new product. When Chrysler introduced the

idea of the minivan, they were in this enviable position of having the only minivan on the market.

As the early adopters begin influencing the early majority, sales and profits soar. The competition has also been watching from the new product's inception. Unfortunately for the original firm, the competition has also noticed the new product's success. Although they cannot be the first, the competition races to offer their own products and gain a share of a growing market. Chrysler's minivan did not maintain its monopoly for long; soon, the other major automobile manufacturers offered models to compete with Chrysler. Although total sales and profits continue to grow throughout the growth stage, they are divided among many manufacturers.

Maturity. By the end of the growth stage of the life cycle, the market is beginning to become very competitive, and this trend continues into the early period of the maturity stage. Besides many more manufacturers offering their products, the producers continue the product-differentiation process begun in the growth stage. The result is a market saturated with many manufacturers offering many models of the product. These manufacturers produce a multitude of models, from desktop computers to notebooks.

With so many companies now in the market, the competition for customers becomes fierce. Although total sales continue to grow during the first part of the maturity stage, the increased competition causes profits to peak at the end of the growth stage and beginning of the maturity stage. Profits then decline during the remainder of the maturity stage. The declining profits mean that the market is not as attractive to companies as it was in the growth stage.

In the growth stage, even inefficient companies made money. However, only the best companies and their products survive the maturity stage. Manufacturers begin to drop out as they see profits turn to losses. Though there is still competition in the computer industry, for example, companies such as Dell and Apple have emerged as the leaders in the market. During the later part of the maturity stage, even sales begin to dip, putting more pressure on the remaining manufacturers.

Decline. The number of companies abandoning the market continues and accelerates in the decline stage. Not only does the efficiency of the company play a factor in the decline, but also the product category itself now becomes a factor. By this time, the market may perceive the product as "old," and it may no longer be in demand. For example, the public replaced their preference for station wagons with their desire for minivans. Advancing technology may also bypass and replace a product, as when tapes and CDs replaced the vinyl record.

The product will continue to exist as long as a few manufacturers can maintain profitability. The laggards will resist switching to the alternative, and manufacturers who can profitably serve this niche will continue to do so. Eventually, even the laggards will switch, and the last companies producing the product will be forced to withdraw, thereby killing the product group. It should be noted that even these last companies producing a product group are not necessarily in the decline stage of their life cycle. Even companies that started up and burgeoned on one now-extinct product group will likely have diversified during the maturity stage, and they may be in a position to transfer to another product or industry instead of just decline.

PRODUCT STRATEGIES DURING THE PRODUCT LIFE CYCLE

Depending on the stage of the product life cycle, the marketing strategy should vary to meet the changing conditions. The marketing mix consists of the product, promotion, price, and distribution. Each element must change with the product life cycle if the company expects to maximize sales and profits. It is important to note that as products move through each stage of the life cycle, they should be monitored and re-evaluated in terms of reducing both production costs and the time it takes to make a product or service profitable with its new position.

Strategic options for products during the product life cycle are examined below.

Introduction Stage. In the introduction stage, the product's novelty and lack of competition dominate the marketing strategy. The public is not aware of the product and does not know what benefits it offers them.

Product strategy is focused on introducing one model. Since the public is unaware of the product, to offer more models could confuse them as they learn the purpose of the product. This model may offer various options, but there are usually no major variations on the basic idea of the product. The cost of development may also prohibit the company from developing more models for introduction. With no competition yet in the product category, one model is adequate for introduction.

Since the product is new, persuading the market to buy the product is of secondary importance to informing the public that the product exists. It is the innovators who will begin to buy the product, and they need to be informed. With only one company offering the product, those innovators that decide to purchase the product have only one company from which they can purchase it. Consequently, the promotion efforts concentrate on informing the public of the benefits of the product and the company producing it. Persuasion to buy a particular brand is not needed in the introduction stage.

The pricing policy offers the company an opportunity to regain some development costs through the use of a skimming pricing strategy; that is, a very high price for the new product due to the introduction and newness of the product to the company as well as to the marketplace. Though the high price of the new product may deter some potential customers, many innovators and early adopters will pay the high price to own the new product. The first electronic calculators, for example, were quite expensive. If the product is easily copied, however, the developer may want to use a low-price penetration policy to deter future competition.

Since there are few purchasers in the introduction stage, the distribution does not need to be widespread. The innovators are risk takers and desire to purchase something new. Consequently, they may seek out the distributors carrying the new product, and only a few distributors will suffice.

Growth Stage. In the growth stage, the early adopters, followed by the early majority, begin to consume the product in growing numbers. The increasing sales result in the emergence of profits rather than losses.

During the early part of the growth stage, the company can continue its product policy of offering one basic model. However, if the new product group is successful, eventually competitors will offer their own products to compete in the new category. At that point, the original company will need to offer more models. The models should be differentiated from one another so that the company can continue to attract the new customers coming into the market.

Even with competition beginning to offer their products in the new category, the original company still dominates the market. However, as the market leader rather than a monopoly, the company will need to change its promotion policy of informing the public about their new product and new product category.

With an informing policy, the market leader would still receive the majority of new sales. Unfortunately for the original company, the competition will not be using an informative policy. They will be trying to persuade the public as to why their product is better than the market leader's product. Consequently, the market leader should switch to a persuasive promotion policy.

As the competition enters the market, they will probably be offering products at prices lower than the price of the original product. This is a penetration pricing policy designed to take sales away from the market leader. If the original company used a skimming pricing policy, its continued use would surely lead to a rapid loss in sales to the competition unless it is altered. Prices should be lowered so that sales can continue to grow, and the competition kept at bay.

In a growing market, the company's exclusive distribution policy would limit the potential growth for the firm, and sales would go to the competition. Consequently, the company must increase its product distribution to maintain its leadership in the market.

Maturity Stage. Many competitors characterize the maturity stage. With the large number of firms producing products, the competition for customers becomes quite intense, and profits decline. The strategy for firms during the maturity stage becomes one of survival, as many competitors will eventually withdraw from the market.

With many companies offering several models of the product, the number of products on the market becomes tremendous. The original company must continue differentiating their models so that the market is aware of the differences in the company's products and the competitors' products. The customers are going to ask why they should buy a particular company's product; just being first on the market is not going to persuade customers to continue buying a product. Quality, styling, and product features are a few of the means of differentiating the product from the competition.

During the maturity stage, the need to inform the public has long since passed. Now, the promotion strategy focus is on continuing the persuasion tactics started during the growth stage. The purpose of persuasion is to position the product to the market, which involves creating an image for a product. The image should not be an advertiser's creation, but based on the reality of the product.

The differentiation methods of quality, styling, and features are excellent means of positioning a product. For example, a Chevrolet Corvette and Porsche Boxster are both sports cars, but consumers see the different positions of the cars. The company differentiates its products and uses promotion to create the different position image. Each company hopes that its position is preferred by the consumers.

With the intense competition, management keeps the price of the product to its lowest possible level. For example, the competition for entry-level personal computers has now shifted to offering the lowest price. All of the companies in a mature market must now watch costs carefully.

Every aspect from development through production through marketing is designed to offer the lowest cost possible. A cost and a price advantage over competitors in this stage are significant competitive advantages. Consumers are aware of prices and will reward the company with the lower price, all else being equal. The firm that does not have a significant cost advantage risks losing customers and going out of business.

The absence of a company's product in a particular location may result in lost sales during the maturity period. Widespread distribution is essential. If the company's

product is not in a particular location, one or more of the competitors' products are likely to be there. The firm cannot risk losing sales simply because their products were not available.

Decline Stage. During the decline stage, sales and profits begin an even sharper drop, and the number of competitors is reduced even further. With public preference for this product waning, the decline stage continues until the last of the producers cannot make a profit, and the product category dies.

The product strategy now becomes one of reducing the number of models offered. With the public abandoning the product and competition declining, the need for many models is no longer there. The company now focuses its attention on the costs and profitability of the remaining models. Costs, such as research and development and production, are cut to the minimal amount necessary. After the cost cuts, management eliminates those products that are no longer profitable.

The promotion efforts also include an examination of costs. Only the minimal amount of promotion necessary to keep the product selling is done. The remaining people in the market want the product and do not need to be convinced that they should buy the product. They only need to know that the product is still available. Consequently, the promotion effort shifts to reminder promotion.

Products' prices are also kept as low as possible during the decline stage. Since the number of competitors has dropped, it may seem that a company could raise prices. If the remaining customers maintain strong brand loyalty, this policy might be possible. However, the product has fallen out of favor, and customers have other product alternatives. A price increase that could not be justified by cost increases runs the risk of alienating even the few customers left purchasing the product. Consequently, the strategy should be to keep the prices as low as possible.

Cost is also an overriding factor in the distribution of the product during the decline stage. The declining sales may not justify the widespread distribution reached during the maturity stage. Only those areas or markets that are still profitable should be covered, and the unprofitable distribution outlets eliminated. Hopefully for the last companies producing the product, the brand-loyal customers or laggards will seek out the limited locations of the products and continue purchasing it.

Decline-Stage Trap. Just because a product's sales begin to decline does not mean that the product life cycle has reached the decline stage. However, if the company believes that the product is in a decline, the implementation of the decline-stage strategies may lead to the death of the product long before its time.

Before the strategies for declining products are tried, the company should definitely establish that the product is in decline. The company should first follow strategies to boost sales and not resign themselves to the cost-cutting strategies of the decline stage. For example, Arm & Hammer could have easily decided that their baking soda was dying and implemented decline-stage strategies. However, they chose to fight for its life. They differentiated the product by finding new uses—for instance, as a deodorizer and an ingredient in toothpaste. They so successfully repositioned the product that many people now think about baking soda as a deodorizer first and disregard its original use in baking.

INDUSTRY AND BUSINESS LIFE CYCLES.

The previous discussion focused on the product life cycle. Both industries and businesses can be seen to go through an analogous life cycle. For industries, the time frame is generally much longer, since new product groups are developed within the framework of the industry as a whole. Once again, the automobile industry provides a good case in point. While many product groups have come and gone, the automobile industry continues to pioneer new products in order to remain viable and profitable. The SUV was introduced in the 1980s and had a particularly rapid life cycle. Even though much of the American automobile industry's profits throughout the 1990s were based on SUV sales, rapidly rising oil prices in the mid-2000s rapidly advanced this product life cycle. Automobile companies are continuing to introduce new product groups, such as hybrids and electric cars, and to research others, including hydrogen-powered vehicles. These innovations are likely to keep the automobile industry in its mature stage and fend off the inevitable decline for many more years to come.

There is much more diversity and volatility in the life cycle of businesses than for either products or industries. Some businesses, as noted earlier, never make it out of the start-up stage, while others grow and mature extremely quickly. Microsoft is an excellent example of the latter. Formed in 1975 Microsoft grew to dominate the operating-system industry in less than two decades, rapidly surpassing such mature giants as Xerox and IBM in both profits and industry power. Other high-tech companies, such as Dell and Google, underwent similarly rapid development. Some of the Internet businesses introduced prior to the dot-com bust of the late 1990s also had a very rapid rise but experienced decline and death just as quickly.

Borrowed from biology, the life-cycle concept has been adapted and applied to products, industries, and businesses. The product life cycle maintains that products and industries move through the stages of introduction, growth, maturity, and decline. By viewing a product from the perspective of its product-life-cycle position, management

can use the product life cycle as a valuable decision-making tool. As the product moves through its life cycle, the appropriate strategies for its future development vary greatly. Knowledge of the appropriate strategies can help guide management actions. Industry leaders and business owners and managers can similarly benefit from understanding the life cycle and making appropriate strategic moves based on their understanding of this concept.

SEE ALSO *Product Design; Product-Process Matrix; Strategic Planning Tools; Strategy Formulation; Strategy Implementation*

BIBLIOGRAPHY

Grieves, Michael. *Product Lifecycle Management: Driving the Next Generation of Lean Thinking.* New York: McGraw-Hill, 2006.

Hawkins, Del I., Roger J. Best, and Kenneth A. Coney. *Consumer Behavior* 10th ed. Boston, MA: McGraw-Hill, 2008.

Kotler, Philip, and Gary Armstrong. *Principles of Marketing.* 12th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Perreault, William D. *Basic Marketing: A Global-Managerial Approach.* 15th ed. Boston, MA: Irwin McGraw-Hill, 2007.

Stark, John. *Product Lifecycle Management: 21st century Paradigm for Product Realisation.* London: Springer-Verlag, 2005.

Teresko, John. "Making a Pitch for PLM." *Industry Week* 253, no. 8 (2004): 57.

PRODUCT-PROCESS MATRIX

The product-process matrix is a tool for analyzing the relationship between the product life cycle and the technological life cycle. The matrix consists of two dimensions: product structure/product life cycle and process structure/process life cycle. The production process used to manufacture a product moves through a series of stages, much like the stages of products and markets, which begins with a highly flexible, high-cost process and progresses toward increasing standardization, mechanization, and automation, culminating in an inflexible but cost-effective process. The process structure/process life cycle dimension describes the process choice and process structure a while the product structure/product life cycle describes the four stages of the product life cycle and product structure.

A company can be characterized as occupying a particular region on the matrix (see accompanying Figure). This region is determined by the firm's stage in the product life cycle and the firm's choice of production process. At the upper left extreme, firms are characterized as process oriented or focused while the lower right extreme holds firms that are said to be product focused. The decision of where a firm locates on the matrix is determined by whether the production system is organized by grouping resources around the process or the product. Note from the figure that the vertices of the matrix result in four distinct types of operations (described by the appropriate process choice) located on the diagonal of the matrix.

BACKGROUND

The concept of the product-process matrix was introduced by Robert H. Hayes and Steven C. Wheelwright in two classic management articles published in *Harvard Business Review* in 1979: "Link Manufacturing Process and Product Life Cycles" and "The Dynamics of Process-Product

Product-Process Matrix

Process structure Process life cycle stage ↓	Product structure Product life cycle stage →	Low volume Unique (one of a kind)	Low volume Multiple products	Higher volume Standardized product	Very high volume Commodity product
	(Project)				
Jumbled flow (job shop)		Job shop			
Disconnected line flow (batch)			Batch		
Connected line flow (assembly line)				Assembly line	
Continuous flow (continuous)					Continuous

Life Cycles." The authors used this matrix to examine market-manufacturing congruence issues and to facilitate the understanding of the strategic options available to a company. The matrix has remained more or less unchanged, though some later writers insert "the project" as an additional stage in the extreme upper-left corner of the matrix.

PROCESS CHOICES

The first aspect of the process structure/process life cycle dimension of the matrix is the process choice, which is either job shop, batch, assembly line, or continuous flow. (As noted above, some authors include project at the upper-left). The process choice has important implications for production choice by managers. The matrix is designed not only to describe production choices but to guide managers in making manufacturing decisions.

Project. Projects include large-scale, one-time, unique products such as civil-engineering contracts, aerospace programs, construction, etc. They are typically customer-specific and often too large to be moved, such that practicality dictates that project is the process of choice.

Job Shop. If a manufacturer had broken a large cog on an outdated (i.e., replacement parts are no longer available) but still useful machine, he or she would take the broken cog to a machine shop where they would manufacture a new one from scratch. This machine shop (along with tool and die manufacturers) is probably the primary example of manufacturing job shops. A job shop is the producer of unique products; usually this product is of an individual nature and requires that the job shop interpret the customer's design and specifications, which requires a relatively high level of skill and experience. Once the design is specified, one or a small number of skilled employees are assigned to the task and are frequently responsible for deciding how best to carry it out. Generally, resources for processing have limited availability with temporary in-process storage capability needed while jobs wait for subsequent processing. If the product is not a one-time requirement, it is at least characterized by irregular demand with long periods of time between orders. Efficiency is difficult since every output must be treated differently.

In a job shop, the outputs differ significantly in form, structure, materials, and/or processing required. Each unique job travels from one functional area to another according to its own unique routing, requiring different operations, using different inputs, and requiring varying amounts of time. This causes the flow of the product through the shop to be jumbled, following no repetitive pattern.

Job shops and batch operations (upper-left quadrant of the matrix) are usually organized around the function

of the individual machines. In other words, machinery is grouped according to the purpose it serves or the capabilities it possesses. For example, in a machine shop, hydraulic presses would be grouped in one area of the shop, lathes would be grouped into another area of the shop, screw machines in another area, heat or chemical treatment in still another, and so on (also contributing to the jumbled flow). This is labeled a *process layout.*

In addition to machine shops and tool and die manufacturers, job shops are also appropriate for use in service operations, since the product is customized and frequently requires different operations. Service examples include law offices, medical practices, automobile repair, tailor shops, and so forth.

Batch. Firms utilizing batch processes provide similar items on a repeat basis, usually in larger volumes than that associated with job shops. Products are sometimes accumulated until a lot can be processed together. When the most effective manufacturing route has been determined, the higher volume and repetition of requirements can make more efficient use of capacity and result in significantly lower costs.

Since the volume is higher than that of the job shop, many processes can be utilized in repetition, creating a much smoother flow of work-in-process throughout the shop. While the flow is smoother, the work-in-process still moves around to the various machine groupings throughout the shop in a somewhat jumbled fashion. This is described as a disconnected line flow or intermittent flow.

Examples of batch processing operations include printing and machine shops that have contracts for higher volumes of a product. Services utilizing batches could be some offices (processing orders in batches), some operations within hospitals, classes within universities (how many classes have only one pupil?), and food preparation.

Assembly Line. When product demand is high enough, the appropriate process is the assembly line. Often, this process (along with continuous; both are in the lower-right quadrant of the matrix) is referred to as mass production. Laborers generally perform the same operations for each production run in a standard and hopefully uninterrupted flow. The assembly line treats all outputs as basically the same. Firms characterized by this process are generally heavily automated, utilizing special-purpose equipment. Frequently, some form of conveyor system connects the various pieces of equipment used. There is usually a fixed set of inputs and outputs, constant throughput time, and a relatively continuous flow of work. Because the product is standardized, the process can be also, following the same path from one operation to the next. Routing, scheduling, and control are facilitated since each individual unit of

output does not have to be monitored and controlled. This also means that the manager's span of control can increase and less skilled workers can be utilized.

The product created by the assembly-line process is discrete; that is, it can be visually counted (as opposed to continuous processes which produce a product that is not naturally divisible). Almost everyone can think of an example of assembly-line manufacturing (automobile manufacturing is probably the most obvious). Examples of assembly lines in services are car washes, class registration in universities, and many fast-food operations.

Because the work-in-process equipment is organized and sequenced according to the steps involved to produce the product and is frequently connected by some sort of conveyor system, it is characterized as flowing in a line. Even though it may not be a straight line (some firms utilize a U-shaped assembly line) we say that it has a connected line flow. Also, firms in the lower-right quadrant (line and continuous) are classified as having a *product layout.*

Continuous manufacturing involves lot-less production wherein the product flows continuously rather than being divided. A basic material is passed through successive operations (i.e., refining or processing) and eventually emerges as one or more products. This process is used to produce highly standardized outputs in extremely large volumes. The product range is usually so narrow and highly standardized that it can be characterized as a commodity.

Considerable capital investment is required, so demand for continuous process products must be extremely high. Starting and stopping the process can be prohibitively expensive. As a result, the processes usually run twenty-four hours a day with minimum downtime (hence, continuous flow). This also allows the firm to spread their enormous fixed cost over as large a base as possible.

The routing of the process is typically fixed. As the material is processed it usually is transferred automatically from one part of the process to the next, frequently with self-monitoring and adjusting. Labor requirements are low and usually involve only monitoring and maintaining the machinery.

Typical examples of industries utilizing the continuous process include gas, chemicals, electricity, ores, rubber, petroleum, cement, paper, and wood. Food manufacture is also a heavy user of continuous processing; especially water, milk, wheat, flour, sugar and spirits.

USING THE MATRIX

The product-process matrix can facilitate the understanding of the strategic options available to a company, particularly with regard to its manufacturing function. A firm may be characterized as occupying a particular region in the matrix, determined by the stages of the product life cycle and its choice of production process(es) for each individual product. By incorporating this dimension into its strategic planning process, the firm encourages more creative thinking about organizational competence and competitive advantage. Also, use of the matrix provides a natural way to involve manufacturing managers in the planning process so they can relate their opportunities and decisions more effectively with those of marketing and of the corporation itself, all the while leading to more informed predictions about changes in industry and the firm's appropriate strategic responses.

Each process choice on the matrix has a unique set of characteristics. Those in the upper-left quadrant of the matrix (job shop and batch) share a number of characteristics, as do those in the lower-right quadrant (assembly line and continuous). Upper-left firms employ highly skilled craftsmen (machinists, printers, tool and die makers, musical instrument craftsmen) and professionals (lawyers, doctors, CPAs, consultants). Hence upper-left firms can be characterized as labor intensive. Since upper-left firms tend to utilize general-purpose equipment, are seldom at 100 percent capacity, and employ workers with a wide range of skills, they can be very flexible. However, there is a difficult trade-off between efficiency and flexibility of operations. Most job shops tend to emphasize flexibility over efficiency. Since efficiency is not a strong point of upper-left firms, neither is low-cost production. Also, the low volume of production does not allow upper-left firms to spread their fixed costs over a wide enough base to provide for reduced costs. Finally, upper-left firms are also more likely to serve local markets.

Lower-right firms require production facilities that are highly specialized, capital intensive, and interrelated (therefore, inflexible). Labor requirements are generally unskilled or semi-skilled at most. Much of the labor requirement deals with merely monitoring and maintaining equipment. Lower-right firms are also more likely to serve national markets and can be vertically integrated.

Hayes and Wheelwright relate three areas affected by the use of the product-process matrix: distinctive competence, management, and organization.

Distinctive Competence. Distinctive competence is defined as the resources, skills, and organizational characteristics that give a firm a comparative advantage over its competitors. Simply put, a distinctive competence is the characteristic of a given product that causes the buyer to purchase it rather than the similar product of a competitor. It is generally accepted that the distinctive competencies are cost/price, quality, flexibility, and service/time. By using the product-process matrix as a framework, a firm can be more precise about its distinctive competence and can concentrate its attention on a restricted set of process decisions and

alternatives and a restricted set of marketing alternatives. In our discussion, we have seen that the broad range of worker skills and the employment of general-purpose equipment give upper-left firms a large degree of flexibility while the highly specialized, high-volume environment of lower-right firms yields very little in the way of flexibility. Therefore, flexibility would be a highly appropriate distinctive competence for an upper-left firm. This is especially true when dealing with the need for flexibility of the product/service produced. Lower-right firms find it very difficult to sidetrack a high-volume operation because of an engineering change in the product. An entire line would have to be shut down while tooling or machinery is altered and large volumes of possibly obsolete work-in-process are accounted for. Upper-left firms, however, would have none of these problems with which to contend. It must be noted though that lower-right firms may possess an advantage regarding flexibility of volume.

Quality may be defined a number ways. If we define quality as reliability, then lower-right firms could claim this as a distinctive competence. Lower-right firms would have the high volume necessary to quickly find and eliminate bugs in their product, yielding more reliability to the end user. However, if we define quality as quality of design (that is, "bells and whistles"—things that embody status, such as leather seats in an automobile or a handcrafted musical instrument), then quality would be seen as a possible distinctive competence of upper-right firms.

Service may also be defined in more ways than one. If one defines service as face-to-face interaction and personal attention, then upper-left firms could claim service as a distinctive competence. If service is defined as the ability to provide the product in a very short period of time (e.g., overnight), then service as a distinctive competence would belong to lower-right firms.

Finally, remember that high volume, economies of scale, and low cost are characteristics of firms in the lower-right quadrant of the matrix. Upper-left firms produce low volumes (sometimes only one) and cannot take advantage of economies of scale. (Imagine, for instance, what you would have to pay for a handcrafted musical instrument.) Therefore, it is obvious that price or cost competitiveness is within the domain of lower-right firms.

Management. In general, the economics of production processes favor positions along the diagonal of the product-process matrix. That is, firms operating on or close to the diagonal are expected to outperform firms choosing extreme off-diagonal positions. Hayes and Wheelwright provide the example of a firm positioned in the upper-right corner of the matrix. This would appear to be a commodity produced by a job shop, an option that is economically unfeasible. A firm positioned in the lower-left corner would represent a unique one-time product produced by a continuous process, again not a feasible option. Both examples are too far off the diagonal. Firms that find themselves too far off the diagonal invite trouble by impairing their ability to compete effectively. While firms operating in the near vicinity, but not exactly on the diagonal, can be niche players, positions farther away from the diagonal are difficult to justify. Rolls Royce makes automobiles in a job shop environment but they understand the implications involved. Companies off the diagonal must be aware of traps it can fall into and implications presented by their position.

Also, a firm's choice of product-process position places them to the right or left of competitors along the horizontal dimension of the matrix and above or below its competitors along the vertical dimension of the matrix. The strategic implications are obvious. Of course, a firm's position on the matrix may change over time, so the firm must be aware of the implications and maintain the capability to deal with them appropriately. The matrix can provide powerful insights into the consequences of any planned product or process change.

Use of the product-process matrix can also help a firm define its product. Hayes and Wheelwright relate the example of a specialized manufacturer of printed circuit boards who produced a low-volume, customized product using a highly connected assembly-line process. Obviously, this would place them in the lower-left corner of the matrix; not a desirable place to be. This knowledge forced the company to realize that what they were offering was not really circuit boards after all, but design capability. So, in essence, they were mass-producing designs rather than the boards themselves. Hence, they were not far off the diagonal at all.

Organization. Firms organize different operating units so that they can specialize on separate portions of the total manufacturing task while still maintaining overall coordination. Most firms will select two or more processes for the products or services they produce. For example, a firm may use a batch process to make components for products, which are constructed on assembly lines. This would be especially true if the work content for component production or the volume needed was not sufficient for the creation of a dedicated line process. Also, firms may need separate facilities for different products or parts, or they may simply separate their production within the same facility. It may even be that a firm can produce the similar products through two different process options. For example, Fender Musical Instruments not only mass produces electric guitars (assembly line) but also offers customized versions of the same product through the Fender Custom Shop (job shop). Again, the matrix provides a valuable framework for diagnostic use in these situations.

OTHER USES OF THE PRODUCT-PROCESS MATRIX

Additional uses of the matrix include:

- Analyzing the product entry and exit.

- Determining the appropriate mix of manufacturing facilities, identifying the key manufacturing objectives for each plant, and monitoring progress on those objectives at the corporate level.

- Reviewing investment decisions for plants and equipment in terms of their consistency with product and process plans.

- Determining the direction and timing of major changes in a company's production processes.

- Evaluating product and market opportunities in light of the company's manufacturing capabilities.

- Selecting an appropriate process and product structure for entry into a new market.

EMPIRICAL ANALYSIS OF THE MATRIX

In 1996, Safizadeh et al. conducted an empirical analysis of the product-process matrix to determine whether firms link their process choices to product customization and other competitive priorities as hypothesized by Hayes and Wheelwright's model. Their analysis of data from over 100 U.S. manufacturing plants showed a strong correlation between process choice, product customization, and competitive priorities.

More recent research by Sohel Ahmad and Roger G. Schroeder, published in 2002, found the proposed relationship between product structure and process structure to be significant but not strong, with less than half of the 128 plants studied operating near the diagonal of the matrix. They proposed that a third dimension be added to the product-process matrix to measure how proactively firms adopt and implement innovative initiatives.

In 2006, Lummus, Vokurka, and Duclos noted that because of changes in manufacturing technology and practice, the Hayes and Wheelwright model may no longer be suitable for describing the environment in some rapidly-changing industries, such as electric tools.

SEE ALSO *Operations Strategy; Process Management*

BIBLIOGRAPHY

Ahmad, Sohel, and Roger G. Schroeder. "Refining the Product-Process Matrix." *International Journal of Operations and Production Management* 22, no. 1 (2002): 103–124.

Anupindi, Ravi, Sunil Chopra, Sudhakar D. Deshmukh, Jan A. Van Mieghem, and Eitan Zemel. *Managing Process Business Flows.* 3rd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2008.

"The Dynamics of Process-Product Life Cycles." *Harvard Business Review,* March-April 1979, 27–136.

Finch, Byron. *Operations Now.* 2nd ed. Boston: McGraw-Hill Irwin, 2006.

Hayes, Robert, and Steven C. Wheelwright. "Link Manufacturing Process and Product Life Cycles." *Harvard Business Review,* January-February 1979, 133–140.

Lummus, Rhonda R., Robert J. Vokurka, and Leslie K. Duclos. "The produce-process matrix revisited: integrating supply chain trade-offs." *SAM Advanced Management Journal*, 22 March 2006. Available from: http://goliath.ecnext.com/coms2/summary_0199-5796417_ITM.

Penlesky, Richard J. and Mark D. Treleven. "The Product-Process Matrix Brought to Life." *Decision Sciences: The Journal of Innovative Education,* vol. 3, no. 2 (2005).

Safizadeh, M. Hossein et al. "An empirical analysis of the product-process matrix." *Management Science,* 42, no. 11 (1996).

PRODUCTION PLANNING AND SCHEDULING

Production planning is the function of establishing an overall level of output, called the production plan. The process also includes any other activities needed to satisfy current planned levels of sales, while meeting the firm's general objectives regarding profit, productivity, lead times, and customer satisfaction, as expressed in the overall business plan. The managerial objective of production planning is to develop an integrated game plan where the operations portion is the production plan. This production plan, then, should link the firm's strategic goals to operations (the production function) as well as coordinating operations with sales objectives, resource availability, and financial budgets.

THE PRODUCTION-PLANNING PROCESS

The production-planning process requires the comparison of sales requirements and production capabilities and the inclusion of budgets, pro forma financial statements, and supporting plans for materials and workforce requirements, as well as the production plan itself. A primary purpose of the production plan is to establish production rates that will achieve management's objective of satisfying customer demand. Demand satisfaction could be accomplished through the maintaining, raising, or lowering of inventories or backlogs, while keeping the workforce relatively stable. If the firm has implemented a just-in-time philosophy, the firm would utilize a chase strategy, which would mean satisfying customer demand while keeping inventories at a minimum level.

The term *production planning* is really too limiting, since the intent is not to purely produce a plan for the operations function. Because the plan affects many firm functions, it is normally prepared with information from marketing and coordinated with the functions of manufacturing, engineering, finance, materials, and so on. Another term, *sales and operations planning,* has recently come into use, more accurately representing the concern with coordinating several critical activities within the firm.

Production planning establishes the basic objectives for work in each of the major functions. It should be based on the best tradeoffs for the firm as a whole, weighing sales and marketing objectives, manufacturing cost, scheduling and inventory objectives, and the firm's financial objectives. All these must be integrated with the strategic view of where the company wants to go.

The production-planning process typically begins with an updated sales forecast covering the next six to eighteen months. Any desired increase or decrease in inventory or backlog levels can be added or subtracted, resulting in the production plan. However, the production plan is not a forecast of demand. It is planned production, stated on an aggregate basis. An effective production-planning process will typically utilize explicit time fences for when the aggregate plan can be changed (increased or decreased). Also, there may be constraints on the degree of change (amount of increase or decrease).

The production plan also provides direct communication and consistent dialogue between the operations function and upper management, as well as between operations and the firm's other functions. As such, the production plan must necessarily be stated in terms that are meaningful to all within the firm, not just the operations executive. Some firms state the production plan as the dollar value of total input (monthly, quarterly, etc.). Other firms may break the total output down by individual factories or major product lines. Still other firms state the plan in terms of total units for each product line. The key here is that the plan be stated in some homogeneous unit, commonly understood by all, that is also consistent with that used in other plans.

PRODUCTION SCHEDULING

The production schedule is derived from the production plan; it is a plan that authorized the operations function to produce a certain quantity of an item within a specified time frame. In a large firm, the production schedule is drawn in the production planning department, whereas, within a small firm, a production schedule could originate with a lone production scheduler or even a line supervisor.

Production scheduling has three primary goals or objectives. The first involves due dates and avoiding late completion of jobs. The second goal involves throughput times; the firm wants to minimize the time a job spends in the system, from the opening of a shop order until it is closed or completed. The third goal concerns the utilization of work centers. Firms usually want to fully utilize costly equipment and personnel.

Often, there is conflict among the three objectives. Excess capacity makes for better due-date performance and reduces throughput time but wreaks havoc on utilization. Releasing extra jobs to the shop can increase the utilization rate and perhaps improve due-date performance but tends to increase throughput time.

There are fundamental differences between production scheduling and production planning. While planning models often utilize aggregate data, cover multiple stages in a medium-range time frame, in an effort to minimize total costs, scheduling models use detailed information, usually for a single stage or facility over a short-term horizon, in an effort to complete jobs in a timely manner. Despite these differences, planning and scheduling often have to be incorporated into a single framework, share information, and interact extensively with one another. They also may interact with other models such as forecasting models or facility location models.

DEVELOPMENTS

Recent research on scheduling methods has resulted in a major shift in direction. Many production planning and scheduling processes were originally developed for job shops, but many job shops have been configured to become lines. Innovations such as computer-integrated manufacturing (CIM) and just-in-time (JIT) production have led to new processes that can capture the benefits of repetitive manufacturing and continuous flow manufacturing. The authors of the 2005 book *Manufacturing Planning and Control for Supply Chain Management* have noted that "Fundamental changes are occurring in the relationships between firms and their suppliers" and that "just-in-time manufacturing and just-in-time purchasing are growing in importance." This trend appears to be continuing, as noted in 2008's *Operations Research and Management Science Handbook*: "managerial focus has shifted to just-in-time (JIT)."

Much of the new scheduling research concerns new concepts and techniques for repetitive manufacturing-type operations. In addition, many of today's firms cannot plan and schedule only within the walls of their own factory as most are an entity with an overall supply chain. Supply chain management requires the coordination and integration of operations in all stages of the chain. If successive stages in a supply belong to the same firm, then these successive stages can be incorporated into a single planning and scheduling model. If not, constant interaction and information sharing are required to optimize the overall supply chain.

SEE ALSO *Aggregate Planning; Computer-Integrated Manufacturing; Lean Manufacturing and Just-in-Time Production; Operations Management; Operations Scheduling; Product-Process Matrix; Supply Chain Management*

BIBLIOGRAPHY

Hurtubise, Stephanie, Claude Olivier, and Ali Gharbi. "Planning Tools for Managing the Supply Chain." *Computers & Industrial Engineering* 46 (2004): 763–779.

Kreipl, Stephan, and Michael Pinedo. "Planning and Scheduling in Supply Chains: An Overview of Issues in Practice." *Production and Operations Management* 13, no. 1 (2004): 77–92.

Monk, Ellen F., Bret Wagner and Joseph Brady. *Concepts in Enterprise Resource Planning*. 3rd ed. Boston: Thompson Course Technology, 2008.

Ravindran, A. Ravi, ed. *Operations Research and Management Science Handbook*. Boca Raton, FL: CRC Press, 2008.

Vollmann, Thomas E., William L. Berry, Clay D. Whybark, and F. Robert Jacobs. *Manufacturing Planning and Control for Supply Chain Management*. 5th ed. New York: Irwin McGraw-Hill, 2005.

PRODUCTIVITY CONCEPTS AND MEASURES

Productivity is an overall measure of the ability to produce a good or service. More specifically, productivity is the measure of how specified resources are managed to accomplish timely objectives as stated in terms of quantity and quality. Productivity may also be defined as an index that measures output (goods and services) relative to the input (labor, materials, energy, etc., used to produce the output). There are two major ways to increase productivity: increase the numerator (output) or decrease the denominator (input). A similar effect would be seen if both input and output increased with output increasing faster than input; or if both input and output decreased with input decreasing faster than output. Productivity can be expressed as:

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Organizations can use this formula in many areas: labor productivity, machine productivity, capital productivity, energy productivity, and so on. A productivity ratio can be computed for a single operation, a department, a facility, an organization, or even an entire country.

CONCEPTUAL ASPECTS OF PRODUCTIVITY

Productivity is an objective concept, which can be measured, ideally against a universal standard. As such, organizations can monitor productivity for strategic reasons such as corporate planning, organization improvement, or comparison to competitors. It can also be used for tactical reasons such as project control or controlling performance to budget.

Productivity is also a scientific concept, and hence can be logically defined and empirically observed. It can also be measured in quantitative terms, which qualifies it as a variable. Therefore, it can be defined and measured in absolute or relative terms. However, an absolute definition of productivity is not very useful; it is much more useful as a concept dealing with relative productivity or as a productivity factor.

Productivity is useful as a relative measure of actual output of production compared to the actual input of resources, measured across time or against common entities. As output increases for a level of input, or as the amount of input decreases for a constant level of output, an increase in productivity occurs. Therefore, a "productivity measure" describes how well the resources of an organization are being used to produce input.

Productivity is often confused with efficiency. Efficiency is generally seen as the ratio of the time needed to perform a task to some predetermined standard time. However, doing unnecessary work efficiently is not exactly being productive. It would be more correct to interpret productivity as a measure of effectiveness (doing the right thing efficiently), which is outcome-oriented rather than output-oriented.

EXPRESSIONS OF PRODUCTIVITY

Productivity is usually expressed in one of three forms: partial-factor productivity, multifactor productivity, and total-factor productivity.

Partial-Factor Productivity. The standard definition of productivity is actually what is known as a partial-factor measure of productivity, in the sense that it only considers a single input in the ratio. The formula then for partial-factor productivity would be the ratio of total output to a single input or:

$$\text{Productivity} = \frac{\text{Total output}}{\text{Single input}}$$

Managers generally utilize partial-factor productivity measures because the data is readily available. Also, since the total of multifactor measures provides an aggregate perspective, partial-factor productivity measures are easier to relate to specific processes. Labor-based hours (generally, readily available information) is a frequently used input variable in the equation. When this is the case, it would seem that productivity could be increased by substituting machinery for labor. However, that may not necessarily be a

wise decision. Labor-based measures do not include mechanization and automation in the input; thus when automation replaces labor, misinterpretation may occur.

Other partial-factor measure options could appear as output/labor, output/machine, output/capital, or output/energy. Terms applied to some other partial factor measures include capital productivity (using machine hours or dollars invested), energy productivity (using kilowatt hours), and materials productivity (using inventory dollars).

Multifactor Productivity. A multifactor productivity measure utilizes more than a single factor, for example, both labor and capital. Hence, multifactor productivity is the ratio of total output to a subset of inputs:

$$\text{Multifactor productivity} = \frac{\text{Total output}}{\text{Subset of inputs}}$$

A subset of inputs might consist of only labor and materials or it could include capital. Examples include:

$$\frac{\text{Output}}{\text{Labor} + \text{Machine}}$$

or

$$\frac{\text{Output}}{\text{Labor} + \text{Capital} + \text{Energy}}$$

or

$$\frac{\text{Quantity of production at standard price}}{\text{Labor cost} + \text{Materials cost} + \text{Overhead}}$$

Obviously, the different factors must be measured in the same units, for example dollars or standard hours.

Total-Factor Productivity. A broader gauge of productivity, total-factor productivity is measured by combining the effects of all the resources used in the production of goods and services (labor, capital, raw material, energy, etc.) and dividing it into the output. As such the formula would appear as:

$$\text{Total productivity} = \frac{\text{Total output}}{\text{Total input}}$$

or

$$\text{Total productivity} = \frac{\text{Goods or services produced}}{\text{All inputs used to produce them}}$$

One example: a ratio computed by adding (1) standard hours of labor actually produced plus (2) the standard machine hours actually produced in a given time period divided by the actual hours available for both labor and machines in the time period.

Total output must be expressed in the same unit of measure and total input must be expressed in the same unit of measure. However, total output and total input need not be expressed in the same unit of measure. Resources are often converted to dollars or standard hours so that a single figure can be used as an aggregate measure of total input or output. For example, total output could be expressed as the number of units produced, and total input could be expressed in dollars, such as tons of steel produced per dollar input. Other varieties of the measure may appear as dollar value of good or service produced per dollar of input, or standard hours of output per actual hours of input.

Total productivity ratios reflect simultaneous changes in outputs and inputs. As such, total productivity ratios provide the most inclusive type of index for measuring productivity and may be preferred in making comparisons of productivity. However, they do not show the interaction between each input and output separately and are thus too broad to be used as a tool for improving specific areas.

Total-factor productivity is a measure favored by the Japanese, whereas labor productivity is the measure favored by the United States. As such, the individual "productivity" of the American employee tends to be the best in the world, in that an American employee can purchase more eggs per one hour of work than anyone else in the world. But as a measure of national productivity, the Japanese have, in the past, tended to be better performers.

PRODUCTIVITY MEASURES

It has been said that the challenge of productivity has become a challenge of measurement. Productivity is difficult to measure and can only be measured indirectly, that is, by measuring other variables and then calculating productivity from them. This difficulty in measurement stems from the fact that inputs and outputs are not only difficult to define but are also difficult to quantify.

Any productivity measurement system should produce some sort of overall index of productivity. A smart measurement program combines productivity measurements into an overall rating of performance. This type of system should be flexible in order to accommodate changes in goals and policies over time. It should also have the ability to aggregate the measurement systems of different units into a single system and be able to compare productivity across different units.

The ways in which input and output are measured can provide different productivity measures. Disadvantages of productivity measures have been the distortion of the measure by fixed expenses and also the inability of productivity measures to consider quality changes (e.g., output per hour might increase, but it may cause the defect rate to skyrocket). It is easier to conceive of outputs as tangible units such as number of items produced, but other factors such as quality should be considered.

Experts have cited a need for a measurement program that gives an equal weight to quality as well as quantity (productivity). If quality is included in the ratio, output may have to be defined as something like the number of defect-free units of production or the number of units that meet customer expectations or requirements.

The determination of when productivity measures are appropriate performance measures depends on two criteria. The first is the independence of the transformation process from other processes within the organization. Second is the correspondence between the inputs and outputs in the productivity measurement process.

USE OF PRODUCTIVITY MEASURES

Productivity is a required tool in evaluating and monitoring the performance of an organization, especially a business organization. When directed at specific issues and problems, productivity measures can be very powerful. In essence, productivity measures are the yardsticks of effective resource use.

Managers are concerned with productivity as it relates to making improvements in their firm. Proper use of productivity measures can give the manager an indication of how to improve productivity: either increase the numerator of the measure, decrease the denominator, or both.

Managers are also concerned with how productivity measures relate to competitiveness. If two firms have the same level of output, but one requires less input thanks to a higher level of productivity, that firm will be able to charge a lower price and increase its market share or charge the same price as the competitor and enjoy a larger profit margin.

Within a time period, productivity measures can be used to compare the firm's performance against industry-wide data, compare its performance with similar firms and competitors, compare performance among different departments within the firm, or compare the performance of the firm or individual departments within the firm with the measures obtained at an earlier time (i.e., is performance improving or decreasing over time?).

Productivity measures can also be used to evaluate the performance of an entire industry or the productivity of a country as a whole. These are aggregate measures determined by combining productivity measures of various companies, industries, or segments of the economy.

PRODUCTIVITY INDEX

Since productivity is a relative measure, for it to be meaningful or useful it must be compared to something. For example, businesses can compare their productivity values to that of similar firms, other departments within the same firm, or against past productivity data for the same firm or department (or even one machine). This allows firms to measure productivity improvement over time, or measure the impact of certain decisions such as the introduction on new processes, equipment, and worker motivation techniques.

In order to have a value for comparison purposes, organizations compute their productivity index. A productivity index is the ratio of productivity measured in some time period to the productivity measured in a base period. For example, if the base period's productivity is calculated to be 1.75 and the following period's productivity is calculated to 1.93, the resulting productivity index would be 1.93/1.75 = 1.10. This would indicate that the firm's productivity had increased 10 percent. If the following period's productivity measurement fell to 1.66 the productivity index of 1.66/1.75 = 0.95 it would indicate that the organization's productivity has fallen to 95 percent of the productivity of the base period. By tracking productivity indexes over time, managers can evaluate the success, or lack thereof, of projects and decisions.

FACTORS AFFECTING PRODUCTIVITY

There is quite a variety of factors that can affect productivity, both positively and negatively. These include:

1. Capital investments in production
2. Capital investments in technology
3. Capital investments in equipment
4. Capital investments in facilities
5. Economies of scale
6. Workforce knowledge and skill resulting from training and experience
7. Technological changes
8. Work methods
9. Procedures
10. Systems
11. Quality of products
12. Quality of processes
13. Quality of management
14. Legislative and regulatory environment
15. General levels of education
16. Social environment
17. Geographic factors

The first 12 factors are highly controllable at the company or project level. Numbers 13 and 14 are marginally controllable, at best. Numbers 15 and 16 are controllable only at the national level, and 17 is uncontrollable.

IMPROVING PRODUCTIVITY

Productivity improvement can be achieved in a number of ways. If the level of output is increased faster than that of input, productivity will increase. Conversely, productivity will be increased if the level of input is decreased faster than that of output. Also, an organization may realize a productivity increase from producing more output with the same level of input. Finally, producing more output with a reduced level of input will result in increased productivity.

Any of these scenarios may be realized through improved methods, investment in machinery and technology, improved quality, and improvement techniques and philosophies such as just-in-time, total quality management, lean production, supply chain management principles, and theory of constraints.

A firm or department may undertake a number of key steps toward improving productivity:

- Develop productivity measures for all operations; measurement is the first step in managing and controlling an organization.

- Look at the system as a whole in deciding which operations are most critical, it is overall productivity that is important.

- Develop methods for achieving productivity improvement, such as soliciting ideas from workers (perhaps organizing teams of workers, engineers, and managers), studying how other firms have increased productivity, and reexamining the way work is done.

- Establish reasonable goals for improvement.

- Make it clear that management supports and encourages productivity improvement. Consider incentives to reward workers for contributions.

- Measure improvements and publicize them.

- Don't confuse productivity with efficiency. Efficiency is a narrower concept that pertains to getting the most out of a given set of resources; productivity is a broader concept that pertains to use of overall resources. For example, an efficiency perspective on mowing the lawn given a hand mower would focus on the best way to use the hand mower; a productivity perspective would include the possibility of using a power mower.

As a cautionary word, organizations must be careful not to focus solely on productivity as the driver for the organ-ization. Organizations must consider overall competitive ability. Firm success is categorized by quality, cycle time, reasonable lead time, innovation, and a host of other factors directed at improving customer service and satisfaction.

PRODUCTIVITY AT THE NATIONAL LEVEL

Since productivity is one of the basic variables governing economic production activity some mention of national productivity concerns would be appropriate. As a matter of fact, productivity may be the most important variable governing economic production activity. It is the fundamental controllable factor in wealth production. Since other economic variables depend on it, increasing productivity tends to have a beneficial multiplying effect on other economic variables. This is generally true at every level of economic aggregation.

During the 1970s and 1980s, productivity growth in the United States lagged behind that of other leading industrial countries. Although U.S. productivity was still the world's highest, the fact that it was losing ground to other nations—most notably Japan, Korea, the United Kingdom, and West Germany—caused concern among government officials and business leaders. The United States reversed this trend beginning in the mid-1990s with a shift from a reliance on manufacturing and agriculture to the "new economy" focus on service and high-technology. Since then, the United States has witnessed a sustained productivity growth from the late-1990s through the mid-2000s.

Although economists and business analysts disagree about the specific causes of this reversal, most point to successful investments in information and communication technology as well as increased automation and productivity-enhancing organizational innovations. The contribution of technology to U.S. productivity is nothing new. It has been estimated that technology was responsible for at least half of the growth in productivity in the United States between 1948 and 1966. Technology continues to be seen as the key to sustaining increases in productivity.

Improving productivity is of national importance because, for a society to increase its standard of living, it must first increase productivity. Overall productivity for individual countries is calculated by dividing output, as measured by Gross Domestic Product (GDP) or Gross National Product (GNP), by the country's total population. Thus, productivity is measured as the dollar value per capita outputs. An increase in this measure of productivity means that each person in the country, on average, produced more goods and services. Also if productivity increases, then profits increase. The resulting profits can then be used to pay for wage increases

(inherent in inflation) without having to raise prices. In this way, productivity gains actually help curb inflation.

SEE ALSO *Economies of Scale and Economies of Scope; Effectiveness and Efficiency; Experience and Learning Curves; Financial Issues for Managers; Financial Ratios*

BIBLIOGRAPHY
Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. "Americans Do I.T. Better: U.S. Multinationals and the Productivity Miracle." Available from: emlab.berkeley.edu/users/webfac/gorodnichenko/e237_s08/bloom.pdf.

Coelli, Timothy J., D.S. Prasada Rao, Christopher O'Donnell, and George Battese. *An Introduction to Efficiency and Productivity Analysis.* 2nd ed. New York: Springer 2005.

The eManager: Value Chain Management in an eCommerce World. Dublin, Ireland: Blackhall Publishing, 2001.

Lynch, Lisa M. "Organizational innovation and U.S. productivity." *Vox* 6 December 2007. Available from: http://www.voxeu.org/index.php?q=node/775.

Stevenson, William J. *Operations Management.* 8th ed. Boston, MA: Irwin McGraw-Hill, 2006.

Vora, Jay A. "Productivity and Performance Measures: Who Uses Them." *Production and Inventory Management Journal* 33, no. 1 (1992): 46–49.

PROFIT SHARING

Profit sharing is an organizational incentive plan whereby companies distribute a portion of their profits to their employees in addition to prevailing wages. Profit sharing can generate benefits to the company by fostering greater employee cooperation, reducing labor turnover, raising productivity, cutting costs, and providing retirement security. Profit sharing gives employees a direct stake in the profitability of a company, creating an atmosphere in which employees want the business to succeed as much as management does.

HISTORY

Profit sharing was quite common in primitive fishing and farming economies; in fact, it still persists among fisherman in many parts of the world. Albert Gallatin, Secretary of the Treasury under Presidents Jefferson and Madison, introduced profit sharing into his New Geneva, Pennsylvania, glassworks in the 1790s. Profit-sharing plans as we know them today were developed in the nineteenth century, when companies such as General Foods and Pillsbury distributed a percentage of their profits to their employees as a bonus. The first deferred profit-sharing plan was developed in 1916 by Harris Trust and Savings Bank of Chicago. Profit sharing was also instrumental during World War II, enabling wartime employers to provide additional compensation to their employees without actually raising their wages.

FORMS OF PROFIT SHARING

There are three basic types of profit-sharing plans: cash plans, deferred plans, and combination plans. Cash plans distribute cash or stock to employees at the end of the year. The main drawback of this plan is that employee profit-sharing bonuses are taxed as ordinary income. Even if the distribution takes the form of stock or some other payment, it becomes taxable as soon as the employee receives it.

Deferred plans direct profit shares into a trust fund on behalf of individual employees and distribute them at a later date, often at retirement. The Internal Revenue Service (IRS) allows immediate taxation to be avoided in this plan. The deferred profit-sharing plan is a type of defined-contribution plan. A separate account is established for every employee. The accounts increase as contributions are made to them, earning interest or capital gains. Qualified deferred profit-sharing plans give employees a variety of investment choices for their accounts; these choices are common when outside firms manage the accounts. These plans are often used in conjunction with a 401(k) plan, a common retirement plan for U.S. employers. Combination plans pay part of the profit share out directly in cash and defer the remainder into a trust fund.

VESTING REQUIREMENTS

It is becoming less common for companies to manage their own accounts, due to the fiduciary responsibilities and liabilities involved with them. Instead, companies typically contract the responsibility to financial management firms. The amount of future benefits depends on the performance of the account. The balance of the account will include the employer's contributions from profits, any interest earned, any capital gains or losses, and possibly any forfeiture from other plan participants, which may occur when participants leave the company before they are vested (that is, eligible to receive the funds in their accounts); the funds in their accounts are then distributed to the other employees' accounts.

The time required to become fully vested varies from company to company. Immediate vesting means employees are entitled to the funds in their accounts as soon as their employer makes the contribution. Some companies utilize partially vested schedules, entitling employees to, say, 20 percent of the account before gradually becoming fully vested over a period of time. Establishing a vesting schedule is one way to limit access to the account. Another way is to create strict rules as to when payments can be made from employees' accounts, such as at retirement, death, disability, or termination of employment.

CONTRIBUTION LIMITS

The IRS limits the amount that employers may contribute to their profit-sharing plans. In 2002, the federal

government increased the maximum profit-sharing contribution from 15 percent to 25 percent, with a specific dollar-amount cap that may vary by year; as of 2008, the 25 percent contribution is capped at $46,000.

Individual companies may determine the amount of their contributions in one of two ways. One is a set formula written into the plan document. Formulas are commonly based on the company's pre-tax net profits, earnings growth, or another measure of profitability. Some companies determine a certain amount to contribute each year, settled on by the board of directors.

Many companies incorporate profit-sharing plans when economic times are hard and they are unable to provide guaranteed wage increases. Chrysler Corporation, for example, developed a profit-sharing plan for its union and non-union employees in the economic recession of 1988. The plan was incorporated into the union contract in exchange for wage concessions made by its workers. Although harsh economic times made contributions small, by 1994 (when the economy had recovered) Chrysler was paying an average bonus of $4,300 per person to 81,000 employees, for a total of about $348 million.

Many companies are also encouraged to develop profit-sharing programs because they provide significant tax advantages, which can benefit higher-paid as well as lower-paid employees. IRS regulations allow the deductibility of the employer's profit-sharing contributions as a business expense and also allow the deferral of this money into a trust without any tax liabilities until the money is received (usually at retirement, disability, death, severance of employment, or under withdrawal provisions), at which point the employee is usually in a lower tax bracket.

The Employee Retirement Income Security Act of 1974 (ERISA) is the primary legislation regulating the standards for pension plans and other employee-benefit plans. The intent of the ERISA was to protect employee rights under plans such as corporate pensions, deferred profit sharing, stock-bonus plans, and welfare. ERISA does not mandate companies to establish a profit-sharing plan, nor does it require any minimum benefit levels. ERISA did, however, establish guidelines for participation, vesting, funding, fiduciary standards, reporting/disclosing, and plan-termination insurance.

ADVANTAGES AND DISADVANTAGES

Profit sharing has become one of a new breed of incentives called *total system incentives.* These incentives link all of the employees of a company to the pursuit of organizational goals. A common misconception of profit sharing is that it is more suited for smaller companies where employees can more easily see the connection between their efficiency and company contributions. In actuality,

profit sharing is being successfully utilized in large and small companies, labor-intensive and capital-intensive industries, mass production and job-shop situations, and industries with volatile profits as well as those with stable profits. Profit sharing can reward employee performance, seniority, and thrift, depending on the design of the plan.

Although the concept has experienced a tremendous growth rate, profit-sharing plans do not always work. Roughly 2 percent of deferred plans are terminated annually—some as a result of mergers, others because companies are liquidated or sold. The majority of terminations tend to occur after consecutive years of losses, when investment performance is poor, or when ineffective communication has resulted in lack of employee understanding, appreciation, or interest. Profit sharing may also entail some disadvantages for a company. Such plans may limit the company's ability to reward the performance of individual employees, for example, since the pay for all employees moves up or down according to a formula. At smaller companies, tying employee compensation to often uncertain profits may result in drastic income swings from one year to the next. Finally, some critics claim that profit sharing may encourage employees to focus only on increasing profitability, perhaps at the expense of quality or other goals.

BIBLIOGRAPHY

Allen, Everett T. Jr., et al. *Pension Planning: Pensions, Profit Sharing, and Other Deferred Compensation Plans.* 9th ed. New York: McGraw Hill/Irwin, 2002.

Blencoe, Gregory J. "Utilizing Profit Sharing to Motivate Employees: The Logic Behind Sharing a Piece of the Pie." *Business Credit.* September 2000.

Girard, Bryan. "Is There an ESOP in Your Company's Future? An Employee Stock Ownership Plan Could Enhance Your Company's Bottom Line." *Strategic Finance* May 2002.

Metzger, Bert L. *How to Motivate with Profit Sharing.* Evanston, IL: Profit Sharing Research Foundation, 1978.

Profit Sharing/401(k) Council of America. "50th Annual Survey of Profit Sharing and 401(k) Plans." *PSCA.org,* 4 September 2007. Available from: http://guest.cvent.com/EVENTS/Info/Summary.aspx?e=4a234333-4fa7-4c57-bf3f-604c19d62ddf.

PROJECT MANAGEMENT

Project management is the application of relevant logic and tools to planning, directing, and controlling a temporary endeavor. Almost all companies encounter the need for project management at some point. The need may arise for a new physical plant, an expansion of office space, or a move to a new location. Reengineering may suggest a change in processes, with an accompanying equipment

Figure 1
Work Breakdown Structure
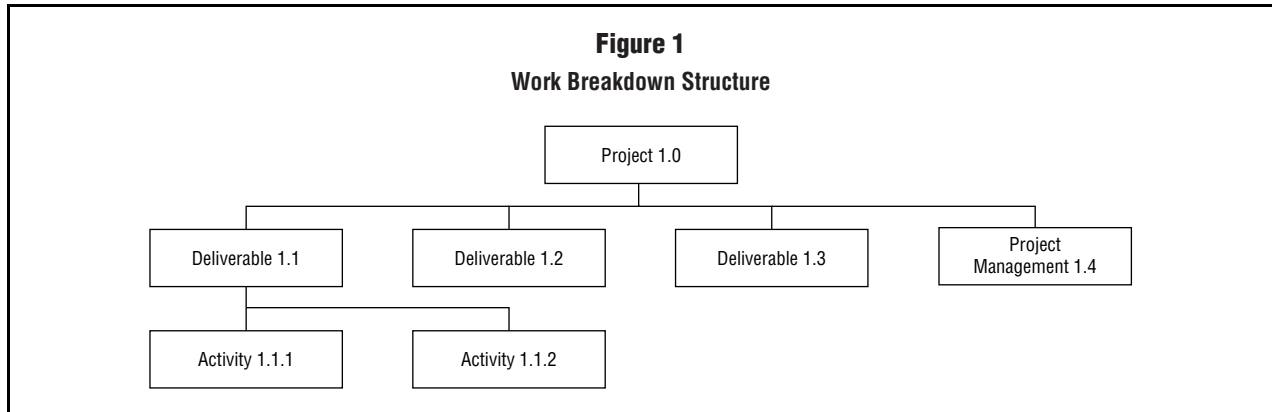
rearrangement and retraining to ensure the effectiveness of the change. The present-day speed of technology change often forces companies to adopt new hardware and software to stay current. Softer issues, such as the implementation of quality programs, also are within the project management purview. While some organizations specialize in projects, others may require project management skills only occasionally to effect a change, either physical or sociological in nature, from the norm.

DEFINING A PROJECT

A project is typically defined as a set of interrelated activities having a specific beginning and ending, and leading to a specific objective. Probably the most important concept in this definition is that a project is intended as a temporary endeavor, unlike ongoing, steady state operations. Secondary is the uniqueness of the output.

To ensure that a project is temporary, it is necessary to define the ending explicitly. The outputs of the project, or deliverables, may be tangible (a new heating system) or intangible (a retrained workgroup), but in either case should be defined in measurable terms (completed installation or documented level of expertise). While the reason for undertaking the project may have been to reduce utility costs by 10 percent or to increase productivity by 20 percent, achieving such goals may be outside the scope of the project.

Each project requires specific definition of its goals. In a training project example, the project manager may be given responsibility for identifying and implementing a training system that will enhance productivity by 15 percent; in this case, the project is not complete until the 15 percent goal is reached. If the initial training program enhances productivity by only 12 percent, the project manager is obligated to provide additional training, or the project may be terminated as a failure. Note that a 12 percent increase in productivity was something to celebrate, but did not meet the hurdle rate of acceptability. If instead the project is to implement a previously

identified training program, known to achieve excellent results, then the project is finished when the trainees achieve the test scores known to correlate with a specified level of improvement in productivity. At this point, the project manager has achieved the deliverable, as measured in specific terms; the project is a success. Whether or not the desired improvement in productivity follows is outside the scope of the project.

Obviously, it behooves the project manager to have a well-defined scope for the project. The more nebulous the assignment, the more the project is subject to "scope-creep," or the tendency for the project to acquire additional duties. A "statement of work" document or charter, outlining the relevant specifications of deliverables, helps to keep a project clearly defined. Once the work is completely specified, the requisite activities can be identified and assigned.

The work breakdown structure (WBS) is one of the tools used by project managers to ensure that all activities have been included in planning. By numbering the project "1.0." the implication is that this is the first project for the company; subsequent projects would be numbered sequentially. In the illustrated example, the deliverables are specified on the second layer of the WBS, along with an overhead allocation for the project management team. Under each deliverable is an increasingly specified description of the activities involved in achieving the deliverable. Alternatively, the second line may be functional headings (finance, marketing, operations) or time periods (January, February, March). The objective of the WBS is to clarify that all activities have been addressed and assigned.

While the definition of a project also tends to include the word *unique,* this may be true only in a narrowly defined sense. A company that builds a new branch location (first project) has a template for the construction of a second branch location (second project). In the marketing field, subsequent product rollouts can learn

Figure 2
Project Performance Measures
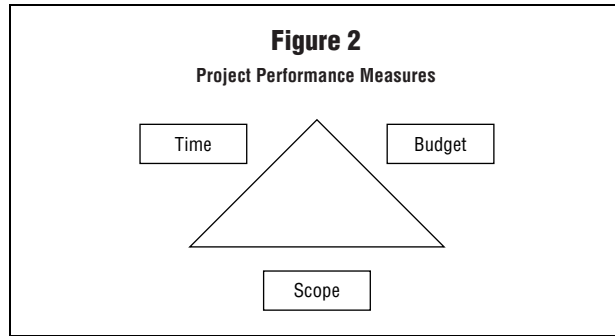
from the initial product introduction. To the extent that the project is repetitive, the planning process, WBS, and cost estimates can provide a valuable template for future projects.

PROJECT SCHEDULING

Scheduling is an important part of the planning of any project. Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are tools widely used in project scheduling. Both are based on network diagrams applicable for both the planning and control aspects of production. Visual display of the network enhances the communication and highlights the interdependency of the various activities required for project completion. Perhaps the greatest contribution of these tools is the identification of sequentially time-critical activities that require the closest monitoring.

It is first necessary to develop a list of all the activities required, as listed in the work breakdown structure. Activities require both time and the use of resources. Typically, the list of activities is compiled with duration estimates and immediate predecessors. Some expertise is required in the planning stage. The concept of concurrent engineering makes the planning stage even more important, as enhanced expertise is needed to address which stages of the project can overlap, and how far this overlap can extend.

Both PERT and CPM rely heavily on time estimates, as derived from local experts, to determine the overall project time. These two project management tools, frequently used together, can assist the project manager in establishing contract dates for project completion, in estimating the risks and costs of contingencies, and in monitoring project progress. Many commercial software packages exist to support the project manager in tracking both costs and time incurred to date throughout the project duration.

Using CPM to Schedule and Control a Project. CPM uses the concept of the critical path to estimate project-completion time. The critical path is the longest path through the system, defining the minimum completion time for the overall project. This generally depends on which activities must be done in sequence so that there is no way to shorten the overall time. Note that this critical path is not dependent on the number of activities, but is rather dependent on the total time for a specific sequence of activities.

The managerial importance of this critical path is that any delay to the activities on this path will delay the project completion time. It is important to monitor this critical set of activities to prevent the missed due-date of the project. Other paths tend to require less monitoring, as these sets of activities have slack, or a cushion, in which activities may be accelerated or delayed without penalty. Total slack for a given path is defined as the difference in the critical path time and the time for the given path.

Slack for the individual activities is calculated by taking the difference between the late-start and early-start times (or, alternatively, between the late-finish and early-finish times) for each activity. If the difference is zero, then there is no slack; the activity is totally defined as to its time-position in the project and must therefore be a critical path activity. For other activities, the slack defines the flexibility in start times, but only assuming that no other activity on the path is delayed.

CPM was designed to address time-cost tradeoffs, such as the use of additional resources to speed the overall process. The project manager should perform contingency planning early in the project to identify potential problems and solutions and the costs associated with employing extra resources. Cost-benefit analysis should be used to compare the missed due-date penalty, the availability and cost of resources, and the effect of these resources on the required quality of the output.

Using PERT to Schedule and Control a Project. In repetitive projects, or in projects employing well-known processes, the duration of a given activity may be estimated with relative confidence. In less-familiar territory, however, it may be more appropriate to forecast a range of possible times for activity duration. The estimated time and or standard deviation for each activity (E) are calculated from the formula for the flexible beta distribution. With a reasonably large number of activities, summing the means tends to approximate a normal distribution, and statistical estimates of probability can be applied.

The mean is calculated as [($a + 4m + b$)÷6], an average heavily weighted toward the most likely time, m. The standard deviation for an activity is [($b − a$) ÷ 6], or one-sixth of the range. Managers with a basic understanding of statistics may relate this to the concept of the standard deviation in the normal distribution. Since ±3 standard deviations comprise almost the entire area under the normal curve, then

there is an intuitive comparison between a beta standard deviation and the normal standard deviation.

From a managerial viewpoint, it should be reiterated that there is only a 50/50 chance of completing the project within the sum of the activity-time estimates on the critical path (T). This perspective is not emphasized in the CPM analysis, but is likely relevant in that context also. Adding a buffer to the promised due date (where $C > T$) enhances the probability that the project will be completed as promised.

There may be competitive advantages to bidding a project on the basis of a nearer-term completion date (where $C < T$), but managers can assess the risks involved using PERT analysis. By using PERT, managers can allocate the resources on a more informed basis.

PROJECT PERFORMANCE MEASURES

The traditional measures for judging project success are: scope, time, and budget. This is frequently depicted as a triangle.

Increasing any of the triangle's sides inherently changes at least one of the other sides. Thus, increasing the scope of the project will necessarily increase either the time required to complete the project or the budget allocated to the project. Unfortunately, the expanded scope can cause both time and budget to escalate simultaneously, as constrained resources come into conflict. Some project contracts have penalty clauses that elicit hefty payments if the project completion is past the contract date. Similarly, when the scope is decreased, the requisite time and budget may be reduced; resources may be assigned elsewhere.

The triangle analogy breaks down when the time factor is reduced, i.e., the project completion date is moved up. An unexpected deadline change may necessitate the use of overtime resources. Overtime hours strain the budget, and may still be insufficient to complete the project within the specified time. Managers attempting to respond to deadline changes should note the relative costs

Figure 3

Performance Measures When Scope is Increased (A)

of time-intensive expenses (such as weekly rental of equipment) and of resource-intensive expenses (wages).

The schedule and budget are developed subsequent to the work breakdown structure, so that all activities and resources are identified. The budget is typically developed by estimating expenses at the bottom layer of the WBS, then rolling up the expenses to a project total. The numbering system in the WBS can be tailored to form a chart of accounts for tracking expenses associated with each activity. The project management heading is appropriate under any of these alternatives to ensure that staff salaries/wages are suitably allocated to the project. Earned value analysis incorporates both on-time and within-budget concepts of tracking the costs incurred to date on a project.

While customer satisfaction is sometimes added as a fourth factor in the list of project performance measures, this complicates the evaluation. If the project manager brings in the project according to scope specifications, on time, within budget, then customer dissatisfaction may be due to the customer's inability to define the scope in terms that would achieve the objective. Customer service in the project management context should include adequate discussion of alternative outcomes at the scope development stage.

ROLES IN THE PROJECT MANAGEMENT ENVIRONMENT

Who is the customer of a project? Generally, the customer is the entity to which the deliverables are actually delivered. In an externally contracted project, the customer is easily identified. In an in-house project, the customer is the executive authorizing both the initiation of the project and the money allocated to it. In either case, the customer is the one with the right to complain when the performance measures of scope, time, and budget are not met.

Ideally, a project will have a sponsor, an intermediary between the customer and the project manager. This individual can help to define the scope for optimal delivery of results, to allocate appropriate funding, to resolve conflicts during the execution of the project.

The project champion is the source of the idea for the project. While the champion is frequently an individual, the idea may originate with the board of directors or the safety committee in a company. The project champion, however, may not be the ideal choice for project manager.

The project manager is in charge of the work to be accomplished. This is not to say that the manager actually does the work, but rather that he/she is the coordinator of all relevant activities through delegation. In many cases, this manager may not possess expertise in the field, but rather possesses the skills to oversee a large number of diverse tasks and to identify the best-qualified employees to carry out the
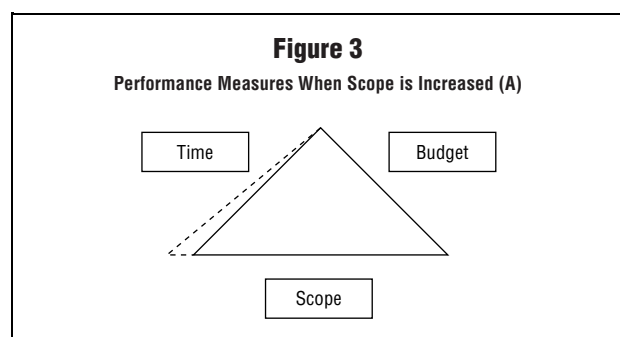
tasks. The manager should exercise judgment in assigning tasks; seasoned professionals will expect to accomplish the tasks according to their knowledge and experience, while others may require much definition and direction. In some cases, the project manager's ability to accomplish the job depends on negotiating and persuasive skills.

The authority of the project manager depends heavily on the organizational structure. In the "projectized" organization, resources are assigned exclusively to the project, then returned to a pool and assigned to a new project. The manager has near absolute authority and responsibility. In the functional organization (finance, marketing, operations, etc.), the project manager must negotiate with the functional manager for resources obtained from the department. Individuals tend to feel a greater responsibility to the functional manager. In this organization, the project manager has responsibility for the project, but relatively little authority without interference by the sponsor. The matrix organization is a managerial attempt to compromise these extremes by transferring some extent of authority from the functional manager to the project manager; thus, there are both strong-form and weak-form matrix organizations.

The project manager should be a master of many skills. Organization, negotiation, and teambuilding are desirable, while technical expertise may be less important. An expert whose intense focus on technical detail excludes the broader aspects of the project can undermine projects. Communication skills are of prime importance, as written and oral reports are mandatory. In addition, clarity of the initial assignment can reduce the amount of conflict management required in later stages of the project.

Surrounding the project manager is a team with the goal of supporting the planning, directing, and controlling functions. Typically, a full-time (or nearly full-time) team member is assigned responsibility for traditional office functions, such as communication coordination. This member may also be in charge of fielding reports and recording the responses for comparison to the baseline schedule. Other members exercise delegated authority in project oversight, up to and including direct responsibility for sub-projects within the larger project context.

PROJECT INTEGRATION MANAGEMENT

Management of project integration includes the process of synthesis and response to change. The overall project employs five basic processes: *initiating, planning, executing, controlling, and closing.*

The initiating process incorporates development of the idea for the project and justification based on a feasibility study. It is at this stage that the boundaries of the project should be defined. To return to the earlier training example, the responsibility for identifying a specific training program should be determined.

Project planning addresses the specific timeframe and budget for the project. Activities are identified and assigned. Planning is considered a most important process because without excellent planning the ensuing activities are unlikely to succeed. Executing involves carrying out the assigned activities, while controlling monitors the activity for scope, time, and budget concerns.

Perhaps the most ignored process of projects in general is the closing process. Toward the end of a project, enthusiasm can wane, and it is the responsibility of the project manager to maintain active collaboration until the end of the project. Phased-out employees should be evaluated and returned to the pool/function from which they were recruited. A series of meetings should be held to review the degree to which the performance measures were met, from both the defined scope and the satisfaction of the customer. If these are not in agreement, then the reasons should be documented. Areas of success and failure are both important to note, as these can be the basis for company-wide learning. Even dissimilar projects can provide some learning opportunities, as the company understands, for instance, its tendency to underestimate costs or scheduling requirements.

While these processes, initiated through closing, appear to be linear in nature, they instead define a feedback system. The specifics of the planning process may indicate that the initiating idea was flawed. Execution may encounter problems with planning. Controlling may indicate a return to planning, or even to the earlier initiating idea process. And closing may determine that the entire project was doomed from the outset. Failure to recognize the iterative nature of these processes can be costly, as a project may be adjusted or abandoned at early stages to prevent loss.

Within the company, the project life-cycle stages of the project should be identified. Generically, these may be identified as definition, design, test, implementation, and retirement stages, or some variation on this theme. Interestingly, each of these stages employs each of the processes described above. For example, in the definition life-cycle stage, there is an initiation process, progressing to a feasibility study. As the definition stage reaches its conclusion, it "delivers" the project to the design stage, but only if the mini-project of definition has been successful. Many projects have lingered when a rational analysis would suggest that revision or abandonment would be less costly. The iterative nature of project management logic suggests a stringent review at frequent stages to ensure that both the project itself and the environment to which the project was to respond are in agreement. Management of the

integration of project stages is especially important in a rapidly changing environment.

RISK MANAGEMENT

One of the fundamental skills of project management is understanding, managing, and preparing for risk. Risk management may be the activity that best defines project management. This umbrella concept addresses the risks in all aspects of managing a project.

The four basic stages to risk-management planning are:

- Risk Identification
- Risks Quantification
- Risk Response
- Risk Monitoring and Control

To identify risks, managers must consider the traditional performance measures. Was the scope well defined? If the customer assumed that a specific aspect was included, then the contracting firm's reputation may be damaged when the aspect was not specified in the charter. Were the costs estimated correctly? Underestimating can undermine profits, while overestimating can lose an opportunity for business or in-house improvement. Were the time estimates reasonable? Past-due penalties can be significant. Other risks can include the insolvency of the customer and/or a subcontractor, or the lack of in-house expertise to accomplish the tasks involved in the project. Weather, economic changes, and governmental regulations can change the feasibility of any project. Above all is the risk that the project is not sufficient to respond to changes in the environmental circumstances that triggered the project's initiation, especially in a project of long duration.

To quantify risk, two dimensions need to be taken into account: (1) the potential impact of the risk; and (2) the probability of the risk occurring. The potential impact is a stronger factor. If the probability of a risk is high but the impact is low, then the risk is considered a medium one, while a high-impact risk with a low probability is a high priority. As project management expert Neville Turbit notes, "A remote chance of a catastrophe warrants more attention than a high chance of a hiccup."

There are several different strategies available for planning risk response. One is to avoid the risk by doing something to remove it or to mitigate the risk by taking actions to lessen the impact or the probability of the risk occurring. Another is to transfer the risk by making someone else—a vendor perhaps—responsible for a particularly risky part of the project. Finally, the project manager may decide to accept the risk based on a cost-benefit analysis of the potential impact and the costs associated with avoiding, mitigating, or transferring the risk.

The final step in risk management is to monitor risks continually throughout the project in order to note any change in the status or a potential risk. Risk managers accomplish this by holding regular risk reviews that identify changes in risk probability or impact, risks that have passed, and new risks that have arisen since the project began.

Managing a project, and its associated risks, requires a structured approach to solving a problem with a temporary, unique solution. Project planning is a most important stage, setting the stage on which the rest of the project must play out. The project manager should be heavily involved in this planning process to ensure his/her understanding of scope, time, and cost, the primary performance measures by which project success is measured. Monitoring of the activities enhances the probability that the project will stay on track for all of these measures. Each stage and process of project management should address the minimization of risk to the firm, in terms of both money and reputation.

SEE ALSO *Operations Scheduling; Process Management; Product-Process Matrix; Production Planning and Scheduling*

BIBLIOGRAPHY
Gido, Jack, and James P. Clements. *Successful Project Management.* 4th ed. Cincinnati, OH: South-Western College Publishing, 2008.

Kerzner, Harold. *Project Management: A Systems Approach to Planning, Scheduling, and Controlling.* 9th ed. Hoboken, NJ: John Wiley & Sons, Inc., 2005.

Lewis, James P. *Fundamentals of Project Management.* 3rd ed. New York: AMACOM, 2006.

Mantel, Samuel J., Jr., Jack R. Meredith, Scott M. Shafer, and Margaret M. Sutton. *Project Management in Practice.* 3rd ed. New York: John Wiley & Sons, Inc., 2007.

PMI Standards Committee. *A Guide to the Project Management Body of Knowledge.* 3rd ed. Upper Darby, PA: Project Management Institute, 2004.

Tate, Karen, and Cynthia Stackpole. *The Advanced Project Management Memory Jogger.* Salem, NH: GOAL/QPC, 2007.

Taylor, Bernard W., III. *Introduction to Management Science.* Englewood Cliffs, NJ: Prentice-Hall, 2004.

Turbitt, Neville. "Basics of Managing Risks." *The Project Perfect White Paper Collection.* Available from: http://www.projectperfect.com.au/downloads/Info/info_risk_mgmt.pdf.

PURCHASING AND PROCUREMENT

Purchasing and procurement is the term denoting the function of and the responsibility for procuring materials, supplies, and services. Recently, the term "supply management" has increasingly come to describe this process. Employees who serve in this function are known as

buyers, purchasing agents, or supply managers. Depending on the size of the organization, buyers may further be ranked as senior buyers or junior buyers. Once seen as a purely clerical function, purchasing and procurement is today a central managerial function and a key to the competitive success of any firm.

DEVELOPMENT

Prior to 1900, there were few separate and distinct purchasing departments in U.S. business. Most pre-twentieth-century purchasing departments existed in the railroad industry. Early in the twentieth century, several books on purchasing were published, while discussion of purchasing practices and concerns were tailored to specific industries in technical trade publications. Early buyers were responsible for ensuring a reasonable purchase price and maintaining operations (avoiding shutdowns due to stockouts).

The shortages of materials and alterations in global markets caused by both World War I and World War II brought more attention to the purchasing profession, but until the 1960s, purchasing agents were still seen as order-placing clerical personnel serving in a staff-support position.

In the late 1960s and early 1970s purchasing personnel became more integrated with a materials system. As materials became a part of strategic planning, the importance of the purchasing department increased. In the 1970s the oil embargo and the shortage of almost all basic raw materials brought much of business world's focus to the purchasing arena. In the 1980s, the advent of just-in-time production—with its emphasis on inventory control and supplier quality, quantity, timing, and dependability—made purchasing a cornerstone of competitive strategy.

By the 1990s the term "supply chain management" had replaced the terms "purchasing," "transportation," and "operations," and purchasing had assumed a position in organizational development and management. In other words, purchasing had become responsible for acquiring the right materials, services, and technology from the right source, at the right time, in the right quantity. Only in small firms is purchasing still viewed as a clerical position. When one notes that, on average, purchasing accounts for over half of most organizations' total monetary expenditures, it is no wonder that purchasing is marked as an increasingly pivotal position.

THE ROLE OF PURCHASING

There are two basic types of purchasing: purchasing for resale and purchasing for consumption or transformation. The former is generally associated with retailers and wholesalers. The latter is defined as industrial purchasing.

Purchasing can also be seen as either strategic or transactional—"direct" and "indirect" are terms that can also be used to distinguish the two types. Strategic (direct) buying involves the establishment of mutually beneficial long-term relationships between buyers and suppliers. Usually strategic buying involves purchase of materials that are crucial to the support of the firm's distinctive competence. This could include raw material and components normally used in the production process. Transactional (indirect) buying involves repetitive purchases, from the same vendor, probably through a blanket purchase order. These orders could include products and services not listed on the bill of materials, such as MRO goods (maintenance, repair, and operating supplies), but are used indirectly in producing the item.

The purchasing department is responsible for determining the organization's requirements, selecting an optimal source of supply, ensuring a fair and reasonable price (for both the purchasing organization and the supplier), and establishing and maintaining mutually beneficial relationships with the most desirable suppliers. In other words, purchasing departments determine what to buy, where to buy it, how much to pay, and ensure its availability by managing the contract and maintaining strong relationships with suppliers.

In more specific terms, today's purchasing departments are responsible for the following:

- Coordinating purchase needs with user departments
- Identifying potential suppliers
- Conducting market studies for material purchases
- Proposal analysis
- Supplier selection
- Issuing purchase orders
- Meeting with sales representatives
- Negotiating
- Contract administration
- Resolving purchasing-related problems
- Maintenance of purchasing records

IMPORTANCE OF PURCHASING

While purchasing is of some importance to nearly all firms, the relative importance of purchasing in a particular firm is determined by four factors:

1. Availability of materials
2. Absolute dollar volume of purchases
3. Percent of product cost represented by materials
4. Types of materials purchased

Purchasing must concern itself with whether or not the materials used by the firm are readily available in a competitive market or whether some are bought in volatile markets that are subject to shortages and price instability. If the latter condition prevails, creative analysis by top-level purchasing professionals is required.

If a firm spends a large percentage of its available capital on materials, the sheer magnitude of expense means that efficient purchasing can produce a significant savings. Even small unit savings add up quickly when purchased in large volumes. When a firm's materials costs are 40 percent or more of its product cost (or its total operating budget), small reductions in material costs can increase profit margins significantly. In this situation, efficient purchasing and purchasing management can make or break a business.

Perhaps the most important of the four factors is the amount of control purchasing and supply personnel actually have over materials availability, quality, costs, and services. Large companies tend to use a wide range of materials, yielding a greater chance that price and service arrangements can be influenced significantly by creative purchasing performance. Some firms, on the other hand, use a fairly small number of standard production and supply materials, from which even the most seasoned purchasing personnel produce little profit, despite creative management, pricing, and supplier selection activities.

SUPPLY MANAGERS

Even in firms where materials costs are not a large percentage of overall expenditures, purchasing functions entail a significant amount of responsibility. In recent decades, the role of purchasing has grown in importance, and purchasing departments are being charged with even more responsibilities. Newer responsibilities for purchasing personnel, in addition to all purchasing functions, include participation in the development of material and service requirements and related specifications, conducting material and value-analysis studies, inbound transportation, and even management of recovery activities such as surplus and scrap salvage, as well as its implications for environmental management.

In the 1970s and 1980s purchasing fell under the rubric of "materials management." Many corporations and individual facilities employed executives who held the title "materials manager," responsible for purchasing and supply management, inventory management, receiving, stores, warehousing, materials handling, production planning, scheduling and control, and traffic/transportation. Today, the term materials management has expanded to include all activities from raw material procurement to final delivery to the customer, to management of returns; hence, the newer title supply chain management.

As purchasing personnel became even more central to the firm's operations they became known as "supply managers." As supply managers, they are active in the strategic-planning process, including such activities as securing partnering arrangements and strategic alliances with suppliers; identification of threats and opportunities in the supply environment; strategic, long-term acquisition plans; and monitoring continuous improvement in the supply chain.

Strategic purchasing often enables firms to foster close working relationships with a limited number of suppliers, promotes open communication among supply chain partners, and develops a long-term strategic relationship orientation for achievement of mutual goals. This implies that strategic purchasing plays a synergistic role in fostering value-enhancing relationships and knowledge exchange between the firm and its suppliers, thereby creating value. In addition, supply managers are heavily involved in cross-functional teams charged with determining supplier qualification and selection, as well ensuring early supplier involvement in product design and specification development.

A comprehensive list of objectives for supply managers includes:

- To support the firm's operations with an uninterrupted flow of materials and services

- To buy competitively and wisely (achieve the best combination of price, quality, and service)

- To minimize inventory investment and loss

- To develop reliable and effective supply sources

- To develop and maintain healthy relations with active suppliers and the supplier community

- To achieve maximum integration with other departments, while achieving and maintaining effective working relationships with them

- To take advantage of standardization and simplification

- To keep up with market trends

- To train, develop, and motivate professionally competent personnel

- To avoid duplication, waste, and obsolescence

- To analyze and report on long-range availability and costs of major purchased items

- To continually search for new and alternative ideas, products, and materials to improve efficiency and profitability

- To administer the purchasing and supply management function proactively, ethically, and efficiently

DETERMINING REQUIREMENTS

In progressive firms, purchasing has a hand in new product development. As a part of a product development team, purchasing representatives have the opportunity to help determine the optimal materials to be used in a new product, propose alternative or substitute materials, and assist in making the final decision based on cost and material availability. Purchasing representatives may also participate in a make-or-buy analysis at this point. The design stage is the point at which the vast majority of the cost of making an item can be reduced or controlled.

Whether or not purchasing had an impact on a product's design, the purchasing agent's input may certainly be needed when defining the materials-purchase specifications. Specifications are detailed explanations of what the firm intends to buy in order to get its product to market.

Generally specified is the product itself, the material from which it is to be made, the process for making it, minimum levels of quality, tolerances (a range in which a specified characteristic is acceptable, e.g., an outer diameter must be a certain size ±25 millimeters), inspection and test standards, and a specific function the product must perform.

If the product requires a standardized component, the specifications are easily communicated by specifying a trade or brand name. However, a custom part can complicate the situation considerably; if incorrectly manufactured, such a product can severely damage a relationship, resulting in unnecessary costs and possible legal action. It is the buyer's responsibility to adequately communicate the specifications to the supplier so that there is no misunderstanding.

SUPPLY SOURCING

Part of the sourcing decision involves determining whether to purchase a part from an outside supplier or produce the part internally. This is typically known as a make-or-buy decision. If the buyer chooses to purchase the part externally, then he must find qualified suppliers who are willing to make and sell the product to his or her firm under the specified conditions.

Buyers have a number of places to go to locate sources of supply, some obvious and some indirect. The most obvious sources would include the Yellow Pages, other purchasing departments, and direct marketing. Purchasing departments typically have a number of trade publications to which they subscribe, such as *Purchasing, Iron Age,* and *Purchasing World,* which are filled with advertisements for a multitude of suppliers. Also, being a subscriber usually puts the buyer's name on a mailing list so that flyers, postcards, and other varieties of direct marketing find their way into the purchasing department's hands.

Other sources of supply include manufacturer directories and trade registers. The best known of these is *Thomas's Register of American Manufacturers,* frequently referred to simply as the *Thomas Register.* With 125,000 trade and brand names, 151,000 U.S. and Canadian company listings, and 6,000 catalogs, as well as online company listings, over 1 million downloadable CAD drawings of mechanical and electric parts, and over 500,000 downloadable CAD drawings of architectural and building parts, it is an invaluable tool for buyers. Practically every purchasing department has access to this source, either through the thirty-four-volume book series or CD-ROMs.

Suppliers also may be found at trade exhibits, in supplier catalogs, or via recommendations from other knowledgeable sources, such as salesmen and engineers. Probably the most important and frequently used source will soon be the World Wide Web; countless firms maintain Web pages and are listed in online catalogs and directories.

Many firms find themselves in a situation where a suitable supplier cannot be found. In this situation, the firm is forced to develop a supplier. Supplier development

Figure 1
Determining Requirements
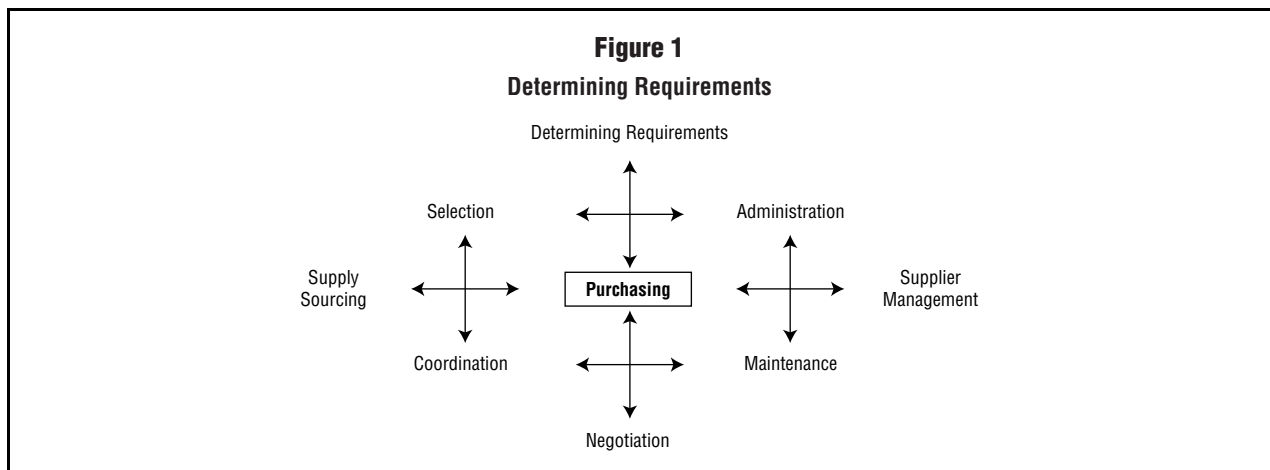
is sometimes referred to as "reverse marketing," which entails finding the supplier with the most potential for success and providing the resources necessary for the supplier to manufacture the needed product. This could include training in production processes, quality, and management assistance, as well as providing temporary personnel, tooling, and even financing.

BIDDING AND NEGOTIATION

When the product being purchased is fairly standard and readily available, most firms choose to utilize the competitive bidding process of supplier selection. This involves little or no negotiation. A request for bids is sent to a limited number of qualified suppliers asking for a price quote for the product, given the terms and conditions of the contract. The contract generally goes to the lowest bidder. For government bid requests, the contract legally must go to the lowest bidder qualified to fulfill the contract.

When competitive bidding is not the appropriate mechanism for reaching the purchasing department's objectives, the buyer turns to the process of negotiation. This does not indicate a second-choice alternative, since the negotiation process is more likely to lead to a complete understanding of all issues involved between the supplier and the purchasing firm. This improved understanding can greatly reduce the number and impact of unseen problems that may arise later.

A number of circumstances dictate the use of negotiation. When a thorough analysis is required to solve a difficult make-or-buy decision, or when the risks and costs involved cannot be accurately predetermined, negotiation should be used. Also, when a buyer is contracting for a portion of the seller's production capacity rather than a product, negotiation is typically appropriate.

Other circumstances where negotiation is favored include: when early supplier involvement is employed, when tooling and setup costs represent a large percentage of the supplier's costs, when production is interrupted frequently for change orders, or when a long time is required to produce the purchased products.

If successful negotiation is to occur, the buyer must have a reasonable knowledge of what is being purchased, the process involved, and any factors that may affect cost, quality, delivery, and service. A thorough cost and/or price analysis is essential. The negotiating buyer must also know the strengths and weaknesses of the negotiating supplier, as well as his own. Also, in light of today's global marketplace, strong cultural awareness is a must. Through proper preparation and some negotiating skill, the purchasing agent should be able to secure a contract that fulfills his or her company's needs and is adequately beneficial to the supplier as well.

SUPPLIER MANAGEMENT

After locating proper suppliers and securing contracts, it then falls to the purchasing function to monitor and control the suppliers' performance until the contracts are fulfilled—and beyond, if further business is to be conducted. All purchasing organizations need some vehicle for assessing supplier performance. Many firms have formal supplier-evaluation programs that effectively monitor supplier performance in a number of areas, including quality, quantity delivery, on-time delivery, early delivery (just-in-time users do not like early deliveries), cost, and intangibles.

For some firms, consistent supplier performance results in certification. Supplier certification generally implies (or in some cases formally asserts) that the supplier has been a part of a formal education program, has demonstrated commitment to quality and delivery, and has proven consistency in his processes. Frequently, organizations are able to take delivery from certified suppliers and completely bypass the receiving inspection process.

The buyer is also responsible for maintaining a congenial relationship with the firm's suppliers. If the buyer is an unreasonable negotiator and does not allow the supplier to make an adequate profit, future dealings may be endangered. The supplier may refuse to deal with the buyer in the future, or the supplier may greatly increase the price of a product the buyer could not obtain elsewhere. Also, relations can become strained when the buyer consistently asks for favored treatment such as expediting or constantly changing a particular order's delivery schedule.

INTERNET DEVELOPMENTS

The rise of e-commerce brought on by the Internet has drastically changed the way purchasing is done, leading to the rapid rise of "e-purchasing," also known as "e-procurement." Rapid communication enhances both the competitive bidding process and negotiation, and the establishment of online systems improves purchase order placement, order tracking, and follow-up ordering. Recent developments in electronic data interchange (EDI), which allows firms to standardize electronic transmission of data between computers, have been a driving force in the rise of e-procurement, resulting in corporate extranets linking suppliers and customers. By the twenty-first century, EDIs had almost completely taken over business-to-business data transfers, greatly improving the purchasing process. The Internet has also facilitated reverse auctions, where buying firms specify a requirement and then receive bids from suppliers, with the lowest bid winning.

There are many advantages to e-procurement. These include getting the right product, from the right supplier, at the right time, for the right price, and in the right quantity. Perhaps the biggest advantage is that

e-procurement procedures can provide real-time information to vendors about the status of a customer's needs. Many firms have vendor agreements that include automatic shipping of materials when the customer's stock level reaches a certain point. One disadvantage of e-procurement for purchasers is that vendors have more information about the customer than they would normally have, potentially allowing them to take advantage of the customer's position in the marketplace.

The use of e-procurement is one of the characteristics of a world-class purchasing organization, and in the twenty-first century, it is becoming increasingly difficult for purchasers to remain competitive without using e-procurement practices. The use of e-procurement technologies in some firms has resulted in reduced prices for goods and services, shortened order-processing and fulfillment cycles, reduced administrative burdens and costs, improved control over off-contract spending, and better inventory control. Because of the widespread use of e-procurement, and the diffusion of its benefits throughout the global market, firms must use e-procurement to remain competitive. This has only further increased the importance of well-organized supply management, making purchasing an integral part of any firm's strategic operations.

SEE ALSO *Distribution and Distribution Requirements Planning; Electronic Data Interchange and Electronic Funds Transfer; Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management; Supply Chain Management*

BIBLIOGRAPHY

Burt, David N., and Donald W. Dobler. *World Class Supply Management.* 8th ed. Boston, MA: McGraw-Hill Irwin, 2009.

Caridi, Maria, Sergio Cavalieri, Giorgio Diazzi, and Cristina Pirovano. "Assessing the Impact of e-Procurement Strategies Through the Use of Business Process Modeling and Simulation Techniques." *Production Planning and Control* 15, no. 7 (2004): 647–661.

Chang, Yoon, Harris Markatsoris, and Howard Richards. "Design and Implementation of an e-Procurement System." *Production Planning & Control* 15, no. 7 (2004): 634–646.

Chen, Injazz J., Antony Paulraj, and Augustine A. Lado. "Strategic Purchasing, Supply Management, and Firm Performance." *Journal of Operations Management* 22 (2004): 505–523.

Jacobs, F. Robert, and Richard B Chase. *Operations & Supply Management* 12th ed. Boston: McGraw-Hill, 2008.

Mehra, Satish, and R. Anthony Inman. "Purchasing Management and Business Competitiveness in the Coming Decade." *Production Planning and Control* 15, no. 7 (2004): 710–718.

"Procurement Head Reveals Keys to Achieve World-Class Status." *Supplier Selection & Management Report* 5, no. 2 (2005): 1–4.

Thomas' Register of American Manufacturers. New York: Thomas Publishing, annual. Available from: http://www.thomasnet.com/.

Wisner, Joel D., G. Keong Leong, and Keah-Choon Tan. *Principles of Supply Chain Management: A Balanced Approach.* Mason, OH: Thomson South-Western, 2005.

Q

QUALITY GURUS

Quality management is the practice of managing the whole production process to produce an excellent (quality) product or service. Quality management focuses on the customer and meeting the customer's needs, and everyone in the firm is responsible for the quality of the product. The basic quality management principles are: quality, teamwork, and proactive management. Quality management is not a single doctrine derived from a particular individual or idea—it is a collection of ideas—but there is a core group of contributors known as the Quality Gurus. These are Dr. W. Edwards Deming, Dr. Joseph Juran, Philip Crosby, Shigeo Shingo, Dr. Genichi Taguchi, Dr. Kaoru Ishikawa, Armand V. Feigenbaum, and Dr. H. James Harrington. The Quality Gurus have all had a significant impact on the world through their contributions to improving not only businesses, but all organizations including state and national governments, military organizations, educational institutions, healthcare organizations, and many others.

DR. W. EDWARDS DEMING

Dr. W. Edwards Deming (1900–1993) is probably the most widely-recognized and influential of the Quality Gurus. Deming was trained as a mathematical physicist, and he utilized mathematical concepts and tools (statistical process control) to reduce variation and prevent defects. However, one of his greatest contributions might have been in recognizing the importance of organizational culture and employee attitudes in creating a successful organization. In many ways, his philosophies paralleled the development of the resource-based view of organizations that emphasized that employee knowledge and skills and organizational culture are very difficult to imitate or replicate, and they can serve as a basis of sustainable competitive advantage.

Deming is best known for reminding management that most problems are systemic and that it is management's responsibility to improve the systems so that workers (management and non-management) can do their jobs more effectively. Deming argued that higher quality leads to higher productivity, which, in turn, leads to long-term competitive strength. The theory is that improvements in quality lead to lower costs and higher productivity because they result in less rework, fewer mistakes, fewer delays, and better use of time and materials. With better quality and lower prices, a firm can achieve a greater market share and thus stay in business, providing more and more jobs.

In emphasizing management's responsibility, Deming noted that workers are responsible for 10 to 20 percent of the quality problems in a factory, and that the remaining 80 to 90 percent is under management's control. Workers are responsible for communicating to management the information they possess regarding the system. Deming's approach requires an organization-wide cultural transformation. He advocated a statistical analysis of the manufacturing process and emphasized cooperation of workers and management to achieve high-quality products. Deming's quality methods centered on systematically tallying product defects, analyzing their causes, correcting the causes, and recording the effects of the corrections on subsequent product quality as defects were prevented. He taught that it is less costly in the long run to get things done right the first time than to fix them later.

The Rise of Deming's Influence. Deming worked in the 1930s with Walter A. Shewhart at Bell Telephone Company. Shewhart was a statistician who developed the theory that product control could best be managed by statistics. He developed a statistical chart for the control of product variables. Deming developed a process, based on Shewhart's, using statistical control techniques that alerted managers of the need to intervene in the production process.

He then utilized these techniques during World War II while working on government war production. In 1947 Douglas MacArthur and the U.S. State Department sent Deming to Japan to help the war-devastated Japanese manufacturing plants. He introduced these "statistical process control" methods in a series of lectures on statistical methods to Japanese businessmen and engineers. The Japanese were an attentive audience and utilized Deming's ideas readily. They found him charming and considerate and listened to his ideas. His concept of employees working toward quality fit well into their personal ideas. His philosophy went beyond statistical quality control and encouraged building quality into the product at all stages.

Deming's System of Profound Knowledge. One of Deming's essential theories is his System of Profound Knowledge, which includes appreciation for a system, knowledge about variation (statistics), theory of knowledge, and psychology (of individuals, groups, society, and change). Although the Fourteen Points are probably the most widely known of Dr. Deming's theories, he actually taught them as a part of his System of Profound Knowledge. His knowledge system consists of four interrelated parts:

1. Theory of Optimization
2. Theory of Variation
3. Theory of Knowledge
4. Theory of Psychology

The objective of an organization is the optimization of the total system and not the optimization of the individual subsystems. The total system consists of all constituents—customers, employees, suppliers, shareholders, the community, and the environment. A company's long-term objective is to create a win-win situation for all of its constituents.

Subsystem optimization works against this objective and can lead to a suboptimal total system. According to Deming, it is poor management, for example, to purchase materials or service at the lowest price or to minimize the cost of manufacturing if it is at the expense of the system. Inexpensive materials may be of such inferior quality that they will cause excessive costs in adjustment and repair during manufacturing and assembly.

Deming's philosophy focuses on improving the product and service uncertainty and variability in design and manufacturing processes. Deming believed that variation is a major cause of poor quality. In mechanical assemblies, for example, variations from specifications for part dimensions lead to inconsistent performance and premature wear and failure. Likewise, inconsistencies in service frustrate customers and hurt companies' reputations. Deming taught Statistical Process Control and used control charts to demonstrate variation in processes and how to determine if a process is in statistical control.

There is a variation in every process. Even with the same inputs, a production process can produce different results because it contains many sources of variation; for example, the materials may not always be exactly the same; the tools wear out over time and they are subjected to vibration heat or cold; or the operators may make mistakes. Variation due to any of these individual sources appears at random; however, their combined effect is stable and usually can be predicted statistically. These factors that are present as a natural part of a process are referred to as common (or system) causes of variation.

Common causes are due to the inherent design and structure of the system. It is management's responsibility to reduce or eliminate common causes. Special causes are external to the system, and it is the responsibility of operating personnel to eliminate such causes. Common causes of variation generally account for about 80 to 90 percent of the observed variation in a production process. The remaining 10 to 20 percent are the result of special causes of variation, often called assignable causes. Factors such as bad material from a supplier, a poorly trained operator or excessive tool wear are examples of special causes. If no operators are trained, that is a system problem, not a special cause. The system has to be changed.

Deming emphasized that knowledge is not possible without theory, and experience alone does not establish a theory. Experience only describes—it cannot be tested or validated—and alone is no help for management. Theory, on the other hand, shows a cause-and-effect relationship that can be used for prediction. There is a lesson here for the widespread benchmarking practices: copying only an example of success, without understanding it in theory, may not lead to success, but could lead to disaster.

Psychology helps people better understand interactions between people and circumstances, interactions between leaders and employees, and any system of management. Consequently, managing people requires knowledge of psychology. Also required is knowledge of what motivates people. Job satisfaction and the motivation to excel are intrinsic. Reward and recognition are extrinsic.

Management needs to create the right mix of intrinsic and extrinsic factors to motivate employees.

Deming's Main Ideas. Deming is probably best known for his fourteen points for management, but he is also known for the *Seven Deadly Diseases* and the *Deming Cycle*.

The fourteen points can be summarized as follows:

1. Create a plan; publish the aims and purposes of the organization.
2. Learn and adopt the new philosophy of quality.
3. Understand the purpose of inspection; stop depending on inspection.
4. Stop awarding business based on price alone.
5. Improve the system constantly.
6. Institute training.
7. Teach and institute leadership.
8. Drive out fear, create trust, and create a climate for innovation.
9. Optimize the efforts of teams, groups, and staff areas.
10. Eliminate exhortations and targets for the work force; provide methods of achievement.
11. Eliminate numerical quotas for the work force.
12. Remove barriers that rob people of pride for workmanship.
13. Encourage education and self improvement for everyone.
14. Take action to accomplish the transformation; make it everyone's job.

The Seven Deadly Diseases are:

1. Lack of constancy of purpose to plan products and services.
2. Emphasis on short-term profits.
3. Personal review systems for managers and management by objectives.
4. Job hopping by managers.
5. Using only visible data in decision making.
6. Excessive medial costs.
7. Excessive costs of liability driven up by lawyers that work on contingency.

The Deming Cycle, also known as the Deming Plan-Do-Check-Act (PDCA) Cycle, was originally invented by Shewhart and popularized by Deming. This approach is a cyclic process for planning and testing improvement activities prior to full-scale implementation and/or prior to

Figure 1
Deming's PDCA Cycle
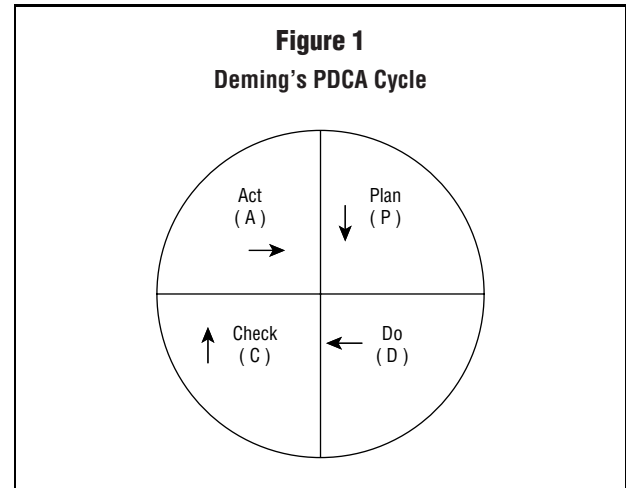
formalizing the improvement. When an improvement idea is identified, it is often wise to test it on a small scale prior to full implementation to validate its benefit. Additionally, by introducing a change on a small scale, employees have time to accept it and are more likely to support it. The Deming PDCA Cycle provides opportunities for continuous evaluation and improvement.

The steps in the Deming PDCA or PDSA Cycle as shown in Figure 1 are as follows:

1. Plan a change or test (P).
2. Do it (D). Carry out the change or test, preferably on a small scale.
3. Check it (C). Observe the effects of the change or test. Study it (S).
4. Act on what was learned (A).
5. Repeat Step 1, with new knowledge.
6. Repeat Step 2, and onward. Continuously evaluate and improve.

DR. JOSEPH JURAN

Dr. Joseph Juran (1904–2008), whose teaching and consulting career spanned more than seventy years, was also one of the foremost experts on quality in the world. A quality professional from the beginning of his career, Juran joined the inspection branch of the Hawthorne Co. of Western Electric (a Bell manufacturing company) in 1924, after completing his B.S. in Electrical Engineering. In 1934, he became a quality manager. He worked with the U.S. government during World War II and afterward became a quality consultant. In 1952, Dr. Juran was invited to Japan. Dr. Deming helped arrange the meeting that led to this invitation and his many years of work with Japanese companies.

Juran founded the Juran Center for Quality Improvement at the University of Minnesota and the Juran Institute. His third book, *Juran's Quality Control Handbook,* published in 1951, was translated into Japanese. Other books include *Juran on Planning for Quality* (1988), *Juran on Leadership for Quality* (1989), *Juran on Quality by Design* (1992), *Quality Planning and Analysis* (1993), and *A History of Managing for Quality* (1995). *Architect of Quality* (2004) is his autobiography.

SELECTED JURAN QUALITY THEORIES

Juran's concepts can be used to establish a traditional quality system, as well as to support Strategic Quality Management. Among other things, Juran's philosophy includes the Quality Trilogy and the Quality Planning Roadmap.

Juran's Quality Trilogy. The Quality Trilogy emphasizes the roles of quality planning, quality control, and quality improvement. Quality planning's purpose is to provide operators with the ability to produce goods and services that can meet customers' needs. In the quality planning stage, an organization must determine who the customers are and what they need, develop the product or service features that meet customers' needs, develop processes that are able to deliver those products and services, and transfer the plans to the operating forces. If quality planning is deficient, then chronic waste occurs.

Quality control is used to prevent things from getting worse. Quality control is the inspection part of the Quality Trilogy where operators compare actual performance with plans and resolve the differences. Chronic waste should be considered an opportunity for quality improvement, the third element of the Trilogy. Quality improvement encompasses improvement of fitness-for-use and error reduction, seeks a new level of performance that is superior to any previous level, and is attained by applying breakthrough thinking.

While up-front quality planning is what organizations should be doing, it is normal for organizations to focus their first quality efforts on quality control. In this aspect of the Quality Trilogy, activities include inspection to determine percent defective (or first pass yield) and deviations from quality standards. Activities can then focus on another part of the trilogy, quality improvement, and make it an integral part of daily work for individuals and teams.

Quality planning must be integrated into every aspect of the organization's work, such as strategic plans; product, service and process designs; operations; and delivery to the customer. The Quality Trilogy is depicted below in Figure 2.

Juran's Quality Planning Road Map. Juran's Quality Planning Road Map can be used by individuals and teams throughout the world as a checklist for understanding customer requirements, establishing measurements based on customer needs, optimizing product design, and developing a process that is capable of meeting customer requirements.

Juran's Quality Trilogy and Quality Roadmap are not enough. An infrastructure for Quality must be developed, and teams must work on improvement projects. The infrastructure should include a quality steering team with top management leading the effort, quality should become an integral part of the strategic plan, and all people should be involved. As people identify areas with improvement potential, they should team together to improve processes and produce quality products and services.

Under the "Big Q" concept, all people and departments are responsible for quality. In the old era under the concept of "little q," the quality department was responsible for quality. Big "Q" allows workers to regain pride in workmanship by assuming responsibility for quality.

PHILIP CROSBY (1926–2001)

Philip Bayard Crosby (1926–2001) first began formulating his early concepts concerning quality after going to work for Crosley Corp. in Richmond, Indiana, as a junior electronic test technician. He joined the American Society for Quality, and then in 1955 went to work for Bendix Corp. as a reliability technician and quality engineer. He investigated defects found by the test people and inspectors. In 1957 he became a senior quality engineer with Martin Marietta Co. in Orlando, Florida. During his eight years with Martin Marietta, Crosby developed his "Zero Defects" concepts, began writing articles for various journals, and started his speaking career.

In 1965 International Telephone and Telegraph (ITT) hired Crosby as vice president in charge of corporate quality. During his fourteen years with ITT, Crosby worked with many of the world's largest industrial and service companies, implementing his pragmatic management philosophy, and found that it worked.

After a number of years in industry, Crosby established the Crosby Quality College in Winter Park, Florida. He is well known as an author and consultant and has written many articles and books. He is probably best known for his book *Quality is Free* (1979) and concepts such as his *Absolutes of Quality Management, Zero Defects, Quality Management Maturity Grid, 14 Quality Improvement Steps, Cost of Quality,* and *Cost of Nonconformance.*

Other books he has written include *Quality Without Tears* (1984) and *Completeness* (1994).

Attention to customer requirements and preventing defects is evident in Crosby's definitions of quality and "non-quality" as follows: "Quality is conformance to requirements; non-quality is nonconformance."

Crosby's Cost of Quality. In his book *Quality Is Free,* Crosby makes the point that it costs money to achieve quality, but it costs more money when quality is not achieved. When an organization designs and builds an item right the first time (or provides a service without errors), quality is free. It does not cost anything above what would have already been spent. When an organization has to rework or scrap an item because of poor quality, it costs more. Crosby discusses Cost of Quality and Cost of Nonconformance or Cost of Nonquality. The intention is to spend more money on preventing defects and less on inspection and rework.

Crosby's Four Absolutes of Quality. Crosby espoused his basic theories about quality in four Absolutes of Quality Management as follows:

1. Quality means conformance to requirements, not goodness.

2. The system for causing quality is prevention, not appraisal.

3. The performance standard must be zero defects, not "that's close enough."

4. The measurement of quality is the price of nonconformance, not indexes.

To support his Four Absolutes of Quality Management, Crosby developed the Quality Management Maturity Grid and Fourteen Steps of Quality Improvement. Crosby sees the Quality Management Maturity Grid as a first step in moving an organization towards quality management. After a company has located its position on the grid, it implements a quality improvement system based on Crosby's Fourteen Steps of Quality Improvement.

Crosby's Absolutes of Quality Management are further delineated in his Fourteen Steps of Quality Improvement as shown below:

Step 1. Management Commitment

Step 2. Quality Improvement Teams

Step 3. Quality Measurement

Step 4. Cost of Quality Evaluation

Step 5. Quality Awareness

Step 6. Corrective Action

Step 7. Zero-Defects Planning

Step 8. Supervisory Training

Step 9. Zero Defects

Step 10. Goal Setting

Step 11. Error Cause Removal

Step 12. Recognition

Step 13. Quality Councils

Step 14. Do It All Over Again

SHIGEO SHINGO

One of the world's leading experts on improving the manufacturing process, Shigeo Shingo (1919–1990) created, with Taiichi Ohno, many of the features of just-in-time (JIT) manufacturing methods, systems, and processes, which constitute the Toyota Production System. He has written many books including *A Study of the Toyota Production System From an Industrial Engineering Viewpoint* (1989), *Revolution in Manufacturing: The SMED (Single Minute Exchange of Die) System* (1985), and *Zero Quality Control: Source Inspection and the Poka Yoke System* (1986).

Shingo's greatness seems to be based on his ability to understand exactly why products are manufactured the way they are, and then transform that understanding into a workable system for low-cost, high quality production. Established in 1988, the Shingo Prize is the premier manufacturing award in the United States, Canada, and Mexico. In partnership with the National Association of Manufacturers, Utah State University administers the Shingo Prize for Excellence in Manufacturing, which promotes world class manufacturing and recognizes companies that excel in productivity and process improvement, quality enhancement, and customer satisfaction.

Rather than focusing on theory, Shingo focused on practical concepts that made an immediate difference. Specific concepts attributed to Shingo are:

- Poka Yoke requires stopping processes as soon as a defect occurs, identifying the source of the defect, and preventing it from happening again.

- Mistake Proofing is a component of Poka Yoke. Literally, this means making it impossible to make mistakes (i.e., preventing errors at the source).

- SMED (Single Minute Exchange of Die) is a system for quick changeovers between products. The intent is to simplify materials, machinery, processes and skills in order to dramatically reduce changeover times from hours to minutes. As a result products could be produced in small batches or even single units with minimal disruption.

- Just-in-Time (JIT) Production is about supplying customers with what they want when they want it. The aim of JIT is to minimize inventories by producing only what is required when it is required. Orders are "pulled" through the system when triggered by customer orders, not pushed through the system in order to achieve economies of scale with the production of larger batches.

DR. GENICHI TAGUCHI

Dr. Genichi Taguchi (b. 1924) is a Japanese engineer and statistician who defined what product specification means and how this can be translated into cost-effective production. He worked in the Japanese Ministry of Public Health and Welfare, Institute of Statistical Mathematics, Ministry of Education. He also worked with the Electrical Communications Laboratory of the Nippon Telephone and Telegraph Co. to increase the productivity of the R&D activities.

In the mid-1950s Taguchi was Indian Statistical Institute visiting professor, where he met Walter Shewhart. He was a visiting research associate at Princeton University in 1962, the same year he received his Ph.D. from Kyushu University. He was a professor at Tokyo's Aoyama Gakuin University and Director of the Japanese Academy of Quality.

Taguchi was awarded the Deming Application prize (1960), the Deming awards for literature on quality (1951, 1953, and 1984), and the Willard F. Rockwell Medal by the International Technologies Institute (1986).

Taguchi's contributions are in robust design in the area of product development. The Taguchi Loss Function, the Taguchi Method (Design of Experiments), and other methodologies have made major contributions in the reduction of variation and greatly improved engineering quality and productivity. By consciously considering the noise factors (environmental variation during the product's usage, manufacturing variation, and component deterioration) and the cost of failure in the field, Taguchi methodologies help ensure customer satisfaction.

Robust Design focuses on improving the fundamental function of the product or process, thus facilitating flexible designs and concurrent engineering. Taguchi product development includes three stages: (1) system design (the non-statistical stage for engineering, marketing, customer, and other knowledge); (2) parameter stage (determining how the product should perform against defined parameters; and (3) tolerance design (finding the balance between manufacturing cost and loss).

DR. KAORU ISHIKAWA

Dr. Kaoru Ishikawa (1915–1989) was a professor of engineering at the University of Tokyo and a student of

Dr. W. Edwards Deming. Ishikawa was active in the quality movement in Japan, and was a member of the Union of Japanese Scientists and Engineers. He was awarded the Deming Prize, the Nihon Keizai Press Prize, and the Industrial Standardization Prize for his writings on quality control, and the Grant Award from the American Society for Quality Control for his educational program on quality control.

Ishikawa's book, *Guide to Quality Control* (1982), is considered a classic because of its in-depth explanations of quality tools and related statistics. The tool for which he is best known is the cause and effect diagram. Ishikawa is considered the Father of the Quality Circle Movement. Letters of praise from representatives of companies for which he was a consultant were published in his book *What Is Total Quality Control?* (1985). Those companies include IBM, Ford, Bridgestone, Komatsu Manufacturing, and Cummins Engine Co.

Ishikawa believed that quality improvement initiatives must be organization-wide in order to be successful and sustainable over the long term. He promoted the use of Quality Circles to: (1) support improvement; (2) respect human relations in the workplace; (3) increase job satisfaction; and (4) more fully recognize employee capabilities and utilize their ideas. Quality Circles are effective when management understands statistical techniques and acts on recommendations from members of the Quality Circles.

FEIGENBAUM AND HARRINGTON

Armand Feigenbaum (b. 1922) was still a doctoral student at the Massachusetts Institute of Technology when he completed *Quality Control: Principles, Practice, and Administration* (1951), a work that led to the creation of Total Quality Management (TQM), one of the most influential management doctrines today. A revised and updated version of this classic work was issued in 1991 as *Total Quality Control*, at a time when the influence of TQM was spreading rapidly. He continues to be an influential management consultant.

Dr. H. James Harrington is an author and consultant in the area of process improvement. He has been a prolific author and major voice in the development of quality management practices. His books include *The Improvement Process, Business Process Improvement, Total Improvement Management, ISO 9000 and Beyond, Area Activity Analysis, The Creativity Toolkit, Statistical Analysis Simplified, The Quality/Profit Connection,* and *High Performance Benchmarking.*

SEE ALSO *Quality and Total Quality Management*

BIBLIOGRAPHY
Crosby, Philip. *Completeness.* New York: Penguin Books, 1994.
———. *Quality is Free.* New York: McGraw-Hill, 1979.

———. *Quality & Me: Lessons from an Evolving Life.* San Francisco: Jossey-Bass, 1999.

———. *Quality without Tears.* New York: McGraw-Hill, 1984.

Deming, W. Edwards. *The New Economics.* Cambridge, MA: MIT Center for Advanced Engineering Study, 1993.

———. *Out of the Crisis.* Cambridge, MA: MIT Center for Advanced Engineering Study, 1986.

———. *Quality, Productivity, and Competitive Position.* Cambridge, MA: MIT Center for Advanced Engineering Study, 1982.

Feigenbaum, Armand V. *Total Quality Control.* New York: McGraw-Hill, 1991.

Gitlow, Howard S., Alan J. Oppenheim, Rosa Oppenheim, and David M. Levine. *Quality Management.* New York: McGraw-Hill/Irwin, 2005.

Harrington, H. James. *Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness.* New York: McGraw-Hill, 1991.

———. *High Performance Benchmarking.* New York: McGraw-Hill, 1996.

———. *The Improvement Process: How America's Leading Companies Improve Quality.* New York: McGraw-Hill, 1987.

Ishikawa, Kaoru. *Guide to Quality Control.* Tokyo, Japan: Asian Productivity Organization, 1982.

———. *What Is Total Quality Control?* Englewood Cliffs, NJ: Prentice-Hall, 1985.

Juran, Joseph M. *Architect of Quality.* New York: McGraw-Hill, 2004.

———. "A Call to Action—The Summit: Carlson School of Management, University of Minnesota, Minneapolis, Minnesota." *Measuring Business Excellence* 6, no. 3 (2002): 4–9.

———. "A Close Shave." *Quality Progress* 37, no. 5 (May 2004): 41–44.

———. *A History of Managing for Quality.* Milwaukee, WI: ASQ Quality Press, 1995.

———. *Juran on Leadership for Quality.* London, England: Collier Macmillan, 1989.

———. *Juran on Planning for Quality.* London, England: Collier Macmillan, 1988.

———. *Juran on Quality by Design.* New York: Maxwell Macmillan International, 1992.

Juran, Joseph M., and Frank M. Gryna. *Juran's Quality Control Handbook.* New York: McGraw-Hill, 1988.

———. *Quality Planning and Analysis: From Product Development through Use.* New York: McGraw-Hill, 1993.

Pryor, Mildred Golden, J. Chris White, and Leslie A. Toombs. *Strategic Quality Management: A Strategic, Systems Approach to Continuous Improvement.* Thomson Learning Custom Publishing, 1998.

Shewhart, Walter A. *Economic Control of Quality Manufactured Product.* New York: Van Nostrand, 1931.

Shingo, Shigeo. *Revolution in Manufacturing: The SMED (Single Minute Exchange of Die) System.* Cambridge, MA: Productivity Press, Inc., 1985.

———. *A Study of the Toyota Production System.* Cambridge, MA: Productivity Press, Inc., 1989.

———. *Zero Quality Control: Source Inspection and the Poka Yoke System.* Cambridge, MA: Productivity Press, Inc., 1986.

Stimson, William A. "A Deming Inspired Management Code of Ethics." *Quality Progress* 38, no. 2 (2005): 67–75.

QUALITY AND TOTAL QUALITY MANAGEMENT

Although quality and quality management does not have a formal definition, most agree that it is an integration of all functions of a business to achieve high quality of products through continuous improvement efforts of all employees. Quality revolves around the concept of meeting or exceeding customer expectation applied to the product and service. Achieving high quality is an ever changing, or continuous, process. As such, quality management emphasizes the ideas of working constantly toward improved quality. It involves every aspect of the company: processes, environment, and people. The whole workforce from the CEO to the line worker must be involved in a shared commitment to improving quality. Quality and total quality management (TQM for short) can be defined as directing (managing) the whole (total) production process to produce an excellent (quality) product or service.

Quality management differs from other management techniques in the attitude of management toward the product and toward the worker. Older management methods focused on the volume of production and the cost of the product. Quality was controlled by using a detection method (post production inspection), problems were solved by management and management's role was defined as planning, assigning work, controlling the production. In contrast, quality management is focused on the customer and meeting the customer's needs. Quality is controlled by prevention, i.e., quality is built in at every stage. Teams solve problems and everyone is responsible for the quality of the product. Management's role is to delegate, coach, facilitate, and mentor. The major quality management principles are: quality, teamwork, and proactive management philosophies for process improvement.

The U.S. Department of Defense's Definition of Total Quality

Total Quality (TQ) consists of continuous improvement activities involving everyone in the organization—managers and workers—in a totally integrated effort toward improving performance at every level. This improved performance is directed toward satisfying such cross-functional goals as quality, cost, schedule, missing, need, and suitability. TQ integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach focused on continued process improvement. The activities are ultimately focused on increasing customer/user satisfaction.

ORIGINS AND CONTRIBUTIONS

Quality management is not derived from a single idea or person. It is a collection of ideas and has been called by various names and acronyms: TQM, total quality management; CQI, continuous quality improvement; SQC, statistical quality control; TQC, total quality control, etc. However each of these ideas encompasses the underlying idea of productivity initiatives that increase profit by improving the product.

Though most writers trace the quality movement's origins to W. Edwards Deming, Joseph M. Juran, and Philip B. Crosby, the roots of quality can be traced even further back, to Frederick Taylor in the 1920s. Taylor is the "father of scientific management." As manufacturing left the single craftsman's workshop, companies needed to develop a quality control department. As manufacturing moved into big plants, between the 1920s and the 1950s, the terms and processes of *quality engineering* and *reliability engineering* developed. During this time productivity was emphasized and quality was checked at the end of the line. As industrial plants became larger, post-production checks became more difficult and statistical methods began to be used to control quality. This was called *reliability engineering* because it moved quality control toward building quality into the design and production of the product. Taylor was the pioneer of these methods.

The ideas of W. Edwards Deming, Joseph M. Juran, and Philip B. Crosby had the biggest impact on the development of the quality management movement. The individual contributions of these and several other "quality gurus" are fully detailed in the article on "Quality Gurus." Therefore, only a brief outline will be provided here.

Deming relied heavily on "statistical process control" methods, though his philosophy went beyond statistical quality control and encouraged building quality into the product at all stages. He put forward the concept of the quality chain reaction: as quality improves, costs go down and productivity goes up; this leads to more jobs, greater market share, and long-term survival. He stressed worker pride and satisfaction and considered it management's job to improve the process, not the worker. Quality circles, a central Deming theme, are based on the importance of employees meeting regularly in groups to comprehensively discuss product quality.

Deming's ideas were encapsulated in several important doctrines, including his fourteen points for management, the *Deming Cycle*, and the *Seven Deadly Diseases.* The Deming Cycle involves five steps: consumer research and planning of the product (plan), producing the product (do), checking the product (check), marketing the product (act), and analyzing how the product is received (analyze.) The Seven Deadly Diseases are:
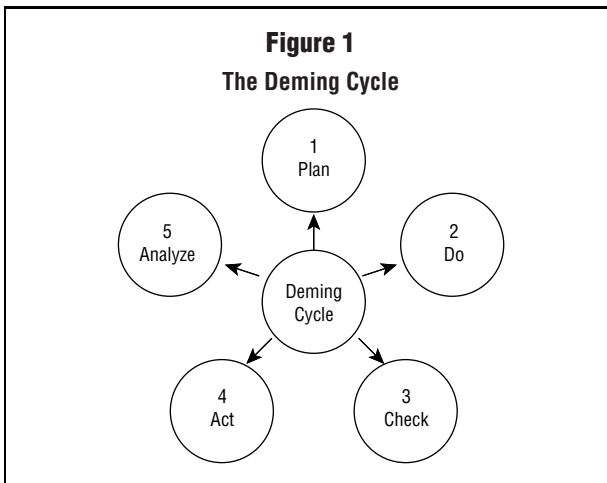
Figure 1
The Deming Cycle

1. Lack of constancy of purpose to plan products and services

2. Emphasis on short-term profits

3. Personal review systems for managers and management by objectives

4. Job-hopping by managers

5. Using only visible data in decision making

6. Excessive medial costs

7. Excessive costs of liability driven up by lawyers who work on contingency

Joseph M. Juran was another influential quality guru. Like Deming, Juran emphasized planning, organizing, and controlling. However he emphasized customer satisfaction more than Deming did and focused on management and technical methods rather than worker satisfaction. Juran developed basic steps that companies must take, however he believed there was a point of diminishing return, a point at which quality goes beyond the consumer needs. For example, if the consumer trades his car in after 50,000 miles, the car need only be built to perform trouble-free for 60,000 miles. Building a better car would drive up costs without delivering the expected product. This is called the *Pareto Principle,* or the Juran 80/20 rule: 80 percent of the trouble comes from 20 percent of the problems. The rule is named for Vilfredo Pareto, an economist, but it was Juran that applied the idea to management. It can be expressed as: "concentrate on the 'vital few' sources of problems; don't be distracted by less important problems."

Like Deming, Juran developed a number of reinforcing doctrines, including Juran's trilogy—quality planning, quality control, and quality improvement—and his ten steps to quality improvement:

1. Build awareness of opportunities to improve.

2. Set goals.

3. Organize to reach goals.

4. Provide training.

5. Carry out projects to solve problems.

6. Report progress.

7. Give recognition.

8. Communicate results.

9. Keep score.

10. Maintain momentum by making annual improvement part of the systems and processes of the company.

Philip Crosby, author of *Quality Is Free*, was the third major quality guru. Crosby emphasized meeting customer requirements by focusing on prevention rather than correction. He claimed that poor quality costs about 20 percent of the revenue; a cost that could be avoided by using good quality practices. Crosby's method does not dwell on statistical process control and problem-solving techniques that the Deming method uses. He stated that quality is free because prevention will always be lower than the costs of detection, correction, and failure.

Looking at the history of quality management, we see several stages of development. The first was *quality control,* which involved setting up product specifications and then inspecting the product before it leaves the plant. The second state is *quality assurance,* which involved identifying the quality characteristics and procedures for quantitatively evaluating and controlling them. The next phase is the true *total quality control,* a term actually coined by Feingenbaum in 1983. At this stage the quality became a total organization effort. It effected production, profit, human interaction and customer satisfaction. The fourth stage is *total quality management.* In TQM the customer is the center and quality is an organization-wide effort.

QUALITY IN JAPAN AND THE UNITED STATES

Firms in the United States were slow to see the advantages of quality management. In the decades that followed World War II, demand was so high that U.S. manufacturers had no trouble selling everything they made. This situation drove U.S. industry to emphasize increasing production, which resulted in less quality control. U.S. manufacturers became complacent, thinking that they could sell any product and that the consumer did not want or demand quality. The situation in Japan after World War II was just the opposite. The war had left the country devastated, and it needed to rebuild its means of production. In addition, Japanese manufacturers needed to

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Figure 2

Chronology

1931	Walter A. Shewhart of Bell Laboratories publishes Economic Control of Quality of Manufactured Products and introduces statistical quality control.
1950	W. Edwards Deming addressed Japanese scientists, engineers, and corporate executive on subject of quality.
1951	First Deming Prize awarded by the Union of Japanese Scientists and Engineers (JUSE).
1952	Joseph M. Juran publishes the Quality Control Handbook.
1970	Philip Crosby introduces the concept of zero defects.
1979	Crosby publishes Quality is Free.
1980	Ford Motor Company invites Deming to speak to executives.
1981	Bob Galvin, Motorola's chairman starts quality improvement, which leads to the six sigmas.
1982	Deming publishes Quality, Productivity, and Competitive Position.
1984	Crosby publishes Quality without Tears: The Art of Hassle-Free Management.
1987	Congress creates the Malcolm Baldrige National Quality Award.
1992	First European Quality Awards named, which is sponsored by the Foundation for Quality Management with support from the European Organization for Quality and the European Commission.

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counteract the reputation they had that products "made in Japan" were of low quality.

Japan began focusing on serious quality efforts. Japanese teams went abroad to visit foreign countries to learn how other countries managed quality, and they invited foreign experts, including Deming and Juran, to lecture in Japan on quality management. It took twenty years of concerted effort to revamp Japan's industrial system. The strategies used involved high-level managers as leaders. All levels and functions were trained in managing for quality, continuous progress was undertaken, quality circles were used, and the entire workforce was enlisted. By the early 1980s Japanese products, particularly automobiles and electronic products, were superior in quality to U.S. products. U.S. companies lost markets in the United States and in the western world to the Japanese and went in search of the *Japanese secret.* They found the concept of quality management.

One of the first companies in the United States to grasp and utilize quality management was Motorola. In 1981 Bob Galvin, Motorola's chairman, called for an across-the-board improvement of 10:1 in five years. To accomplish this they needed a breakthrough technique. This breakthrough is detailed in the Six Sigma process:

• Faith that the improvement target could be achieved

• Total customer satisfaction

• Powerful new tools, especially design of experiments

- Cycle-time reduction

- Designing for ease of manufacturing

- Manufacturing innovations

- True partnerships with key suppliers

- Training for all employees

Within five years Motorola had achieved their goal. In 1988 they were awarded the Malcolm Baldridge National Quality Award for their impressive Six Sigma process. Keki R. Bhote nurtured the Six Sigma project for eleven years at Motorola and then went on to consult with other companies.

In the early 1980s when Donald Petersen was CEO of Ford, Ford executives were investigating the secret of the Japanese success. They discovered W. Edwards Deming's holistic blend of statistics and management. Deming's ideas came to Detroit. Ford was in serious trouble because of Japanese competition. Deming introduced the statistical methods needed to improve processes. These are the foundation of what became known as Six Sigma, a statistical measure that refers to 3.4 defects per million. Besides this scientific method of improving quality, Deming emphasized that all employees needed to work toward quality. He advocated teamwork and cross-department collaboration, close work with suppliers and employee training. Other companies that adopted the Deming quality methods were General Motors, Florida Power & Light, and Procter and Gamble.

IMPLEMENTING TQM

Although different authorities on total quality management emphasize different techniques and use different terminology, all share three common ideas: quality, teamwork and process improvement. Although many books have been written to guide U.S. companies through TQM, one of the major writers was Joseph Jablonski. In *Implementing TQM,* he identified three characteristics: (1) participative management; (2) continuous process improvement; and (3) utilization of teams.

Participative management is the opposite of the hierarchical management style of the early twentieth century businesses. It involves all employees in the management process and decision making by having managers set policies and make key decisions based upon the advice and ideas of subordinates. This method provides management with more information from the front line and motivates the workers as they have some control of the decisions. Continuous process improvement is one of Deming's major ideas and involves small steps toward the ultimate goal. This involves patience on the part of management. Teamwork refers to cross-functional teams of workers that share in problem solving.

In *Implementing TQM,* Jablonski lists six attributes necessary for success: (1) customer focus; (2) process focus; (3) prevention versus inspection; (4) employee empowerment and compensation; (5) fact-based decision making; and (6) receptiveness to feedback.

U.S. companies have long relied upon company organization by functions. TQM emphasizes a decentralized structure to encourage leadership and creativity. The purpose of this change in structure is to change the behavior of the employees. This is a major change for most U.S. companies. However, successful companies have more functional integration and fewer layers of hierarchy.

QUALITY FAILURES

Not all attempts at quality improvement have been successful. Frequently cited reasons for failure are poor leadership, team-mania (setting up teams before management or employees have been trained in team work), and lack of integration of quality efforts into the whole organization. Obstacles and barriers to success have been researched by Robert J. Masters. He lists eight common problems that lead to failure:

1. Lack of management commitment. Management must commit time and resources and clearly communicate the importance and goals to all personnel.

2. Inability to change the organizational culture. Change takes time and effort. In order for the culture to change, the employees need to want change and be willing to participate. This requires reasons that management must convey. The change will only occur if the employees trust the management. It cannot occur from a state of fear.

3. Improper planning. Planning must involve all parts of the organization and be communicated clearly to employees.

4. Lack of training. The most effective training comes from senior management. Informal training needs to occur on a continual basis.

5. Organizational structure problems and isolated individuals or departments. Multi-functional teams will help break down some of these barriers. Restructuring is another method.

6. Ineffective measurement and lack of data. Effective decisions require that the employees have access to the necessary data.

7. Inadequate attention to internal and external customers.

8. Inadequate empowerment, lack of teamwork. Teams require training. Their recommendations should be followed whenever possible. Individuals need to be empowered to make decisions.

QUALITY INTO THE 2000s

Since its initial introduction, TQM has gained wide acceptance in the United States. Quality management principles have had a remarkable influence on every sector of American business and are spreading to non-profit organizations and universities.

Beginning in the 1980s, many U.S. companies implemented total quality management systems in order to be competitive in the global market place. Successes lead them to be interested in hiring managers and engineers with some TQM training. This prompted universities to start teaching quality methods. To help universities in this, the University Challenge program was developed by a group of companies that had implemented TQM successfully. Their goal was to encourage universities to commit to integrating TQM in their own operations and courses. Initially eight universities with both business and engineering schools were chosen. Milliken worked with North Carolina State University and Georgia Institute of Technology. IBM worked with Massachusetts Institute of Technology and Rochester Institute of Technology. Motorola worked with Purdue University. Procter & Gamble Company worked with University of Wisconsin at Madison and Tuskegee University. Xerox worked with Carnegie Mellon.

Work on quality management concepts and tools has continued into the twenty-first century. Works such as *Process Improvement and Quality Management in the Retail Industry, Quality Management In Construction,* and *Quality Management in Health Care* have appeared in recent years to apply quality management techniques to areas such as retail, construction, healthcare, software development, and more. While quality may no longer be the hot new management idea that it was in the 1980s, the quality revolution has succeeded, making quality management techniques a permanent part of the global business world.

SEE ALSO *Continuous Improvement; Japanese Management; Management Awards; Participative Management; Quality Gurus; Teams and Teamwork*

BIBLIOGRAPHY

Besterfield, D., C. Besterfield-Michna, G.H. Besterfield., and M. Besterfield-Sacre. *Total Quality Management.* 3rd ed. Upper Saddle River, NY: Prentice-Hall, 2002.

Bou, J.C., and I. Beltran. "Total Quality Management, High-Commitment Human Resource Strategy and Firm Performance: An Empirical Study." *Total Quality Management* 16, no. 1 (2005): 71–86.

Creech, B. *The Five Pillars of TQM.* New York: Truman Talley Books/Dutton, 1995.

Davids, M. "W. Edwards Deming (1900–1993) Quality Controller." *Journal of Business Strategy* 20, no. 5 (1999): 31–32.

Deming, W.E. *Out of the Crisis.* Cambridge, MA: MIT Press, 1986.

Gallear, D., and A. Ghobadian. "An Empirical Investigation of the Channels That Facilitate a Total Quality Culture." *Total Quality Management* 15, no. 8 (2004): 1043–1967.

George, Stephen, Chris Thomas, and Arnold Weimerskirch. *Process Improvement and Quality Management in the Retail Industry* Hoboken, NJ: Wiley, 2006.

Goetsch, D.L., and S.B. Davis. *Total Quality Handbook.* Upper Saddle River, NJ: Prentice Hall, 2001.

Hoyer, R.W., and B.Y. Hoyer. "What Is Quality? Learn How Each of the Eight Well-Known Gurus Answers This Question." *Quality Progress* 34, no. 7 (2001): 52–62.

Jablonski, Joseph R. *Implementing TQM.* 2nd ed. Albuquerque: Technical Management Consortium, 1992.

Juran, J. M. *Juran on Leadership for Quality.* New York: Free Press, 1989.

———. *Juran on Planning for Quality.* New York: Free Press, 1988.

Lighter, Donald. *Quality Management in Health Care.* 2nd ed. Jones and Bartlett, 2004.

Masters, Robert J. "Overcoming the Barriers to TQM's Success." *Quality Progress* 29, no. 5 (1996): 53–55.

Mouradian, G. *The Quality Revolution.* New York: University of Press of America, 2002.

Port, O. "The Kings of Quality." *Business Week,* 30 Aug 2004.

Ross, J.E., and S. Perry. *Total Quality Management: Text, Cases and Readings.* 3rd ed. Boca Raton, FL: St. Lucie Press, 1999.

Russell, Roberta S., and Bernard W. Taylor. *Operations Management: Quality and Competitiveness in a Global Environment* 5th ed. Hoboken, NJ: Wiley, 2006.

Saad, G.H., and S. Siha. "Managing Quality: Critical Links and a Contingency Model." *International Journal of Operations & Production Management* 20, no. 10 (2000): 1146–1163.

Strach, P., and A. Everett. "Is There Anything Left to Learn from Japanese Companies?" *SAM Advanced Management Journal* 69, no. 3 (2004): 4–13.

Thorpe, Brian and Peter Sumner. *Quality Management in Construction.* Burlington, VT: Gower, 2004.

Waddock, S., and C. Bodwell. "Managing Responsibility: What Can Be Learned from the Quality Movement." *California Management Review* 47, no. 1 (2004): 25–37.

Washbush, J.B. "Deming: A New Philosophy or Another Voice?" *Management Decision* 40, no. 10 (2002): 1029–1036.

QUALITY OF WORK LIFE

In the fast-paced, high-technology world of the twenty-first century, the work environment is significantly different than it was a generation ago. Many employees these days feel they are working harder, faster, and longer hours than ever before, and work-related stress levels are notably higher than in past decades. Job-related employee stress can lead to lack of commitment to the corporation, poor productivity, and even leaving the company, all of which are of serious concern to management. Because of laptops, cell phones, and personal digital assistants (PDAs), employees bring work home with them on a regular basis and find it harder to escape from work concerns. It is also

Table 1

Work-Life Programs

1. Alternate Work Arrangements
   a. Telecommuting
   b. Flextime
   c. Alternate Work Scheules
2. On-site Childcare
3. Exercise Facilities
4. Relaxed Dress Codes
5. Mentoring Programs

now very rare for a person to stay with a single company his or her entire working life, and it is not uncommon for a person to change careers up to ten times in his or her lifetime. Because employees are often willing to leave a company for better opportunities, companies feel the pressure to find ways of luring and retaining qualified employees. These factors have all forced employers to pay more attention to the quality of work life.

More and more companies are starting to realize that a happy employee is a productive employee, and they have started to look for ways to improve the work environment. Many have implemented various work-life programs to help employees, including alternate work arrangements, on-site childcare, exercise facilities, relaxed dress codes, and more. Quality-of-work-life programs go beyond work/life programs by focusing attention less on employee needs outside of work and realizing that job stress and the quality of life at work bears more directly on worker satisfaction. Open communications, mentoring programs, and fostering more amicable relationships among workers are some of the ways employers are improving the quality of work life.

WORK-RELATED STRESS

As employers try to address employee turnover and job satisfaction issues, they must first determine what the issues are. Several companies have convened focus groups and conducted employee-satisfaction surveys to find out how their employees feel and to determine what they can do to make their employees happy.

Workplace stress has increased in intensity and societal concern over the past three decades. Beginning in the 1990s, mental health professionals began noting the disturbing rise of work-related stress. Even with the unprecedented prosperity of the late 1990s, work-related stress rose continuously during that decade and continued to increase in the twenty-first century. In 2007 the American Psychological Association (APA) reported that one-third of Americans are living with extreme stress, with work cited as the most common source of stress (74%).

Employees are also calling in "sick" in increasing numbers, largely because of stress.

The increasing incidence of work-related stress has wide-ranging effects, including absenteeism, impaired teamwork, workplace violence, decreased efficiency, and burnout. A 2005 survey (reported in the *Silicon Valley/ San Jose Business Journal*) found that only 38 percent of the employees who called in sick were actually suffering from a physical illness. The other 62 percent of these workers who failed to show up were dealing with stress, family issues, morale issues, and motivational issues.

One of the more stressful professions today is in the Information Technology (IT) field. Not long ago, IT professionals were extremely well respected and in demand. As technology advanced rapidly, there was a high demand for programmers and engineers. Most had their choice of high-paying jobs as technology companies competed to recruit the best of these employees. This is not the case today. In June 2004, Meta Group, Inc. surveyed 650 companies and found that nearly 75 percent of the companies acknowledged morale problems among their IT staffs. This number was up from the year before, which showed that two-thirds cited poor worker morale as an issue. Perhaps this is because the U.S. technology sector experienced widespread layoffs during the third quarter of 2004. In general, when layoffs happen the remaining employees are forced to pick up the workload of those who were laid off. This leads to added responsibility and longer work hours, often without additional compensation. This in turn leads to stress, burnout, and resentment. Other causes of employee dissatisfaction include low wages, lack of challenges, insufficient resources, unrealistic expectations, pressure to produce, willfully blind management, unreasonable policies and procedures, difficulty balancing family and work, and increased health benefit costs.

ADDRESSING QUALITY OF WORK LIFE ISSUES

There are a number of independent organizations that conduct employee surveys to gather this information and offer recommendations for reducing work-related stress and improving the quality of work life. One such organization is the Families and Work Institute (FWI; www.familiesandwork.org), a nonprofit research center "that provides data to inform decision-making on the changing workforce and workplace, changing family, and changing community." Founded in 1989, FWI is known for ahead-of-the-curve, non-partisan research into emerging work-life issues; for solutions-oriented studies addressing topics of vital importance to all sectors of society; and for fostering connections among workplaces, families, and communities.

The FWI's National Study of the Changing Workforce (NSCW) periodically surveys a nationally representative sample of employed workers; it is designed to collect and compile information on the work and personal/family lives of the U.S. workforce. The study is widely used by policymakers, employers, the media, and all those interested in the widespread impacts of the changing conditions of work and home life.

The 2002 NSCW showed a slight increase from 1992 in the number of companies that offer work-life supports on the job—both specific benefit entitlements and less formal policies and practices. Despite this, the survey showed a large increase in the number of employees with families who felt there was interference between their jobs and their family lives, than employees 25 years ago. The NSCW also found "the importance of supportive work-life policies and practices, such as flexible work arrangements, is clear—when they are available, employees exhibit more positive work outcomes, such as job satisfaction, commitment to employer, and retention, as well as more positive life outcomes, such as less interference between job and family life, less negative spillover from job to home, greater life satisfaction, and better mental health."

ALTERNATE WORK ARRANGEMENTS

Many employers have found it beneficial to allow alternate work arrangements for their employees. This is one way to improve employee productivity and morale. There are three alternate arrangements that are widely used today: telecommuting, flextime, and alternate work schedules.

Telecommuting describes the work situation in which the employee works outside of the office, usually at home or at a location closer to home. In general, when one telecommutes, he or she communicates with the office via telephone and e-mail, and may go into the office periodically to touch base with the employer and to attend meetings. Advancements in technology have made this possible for many people to telecommute. The telecommuting employee may be able to access files on the office's network from remote locations. And with conference call, videoconferencing, and WebEx capabilities, the employee can *attend* meetings from other locations. With WebEx technology, meeting attendees can sit at their own computers and view the meeting organizer's computer desktop via the Internet. As the meeting organizer opens applications and moves the mouse on his or her computer, the remote attendees can see those same applications and movements as if they were running them on their own computers.

Flextime is another name for flexible work hours. Although most employees with flextime do work a full eight-hour day, they can start and end the workday at a time agreeable both to the employer and to the employee, rather than the traditional 8:00 a.m. to 5:00 p.m. work day. Most employers require their employees to be in the office during "core hours," such as 10:00 a.m. to 2:00 p.m. but do not mandate the start and end times.

Alternate work schedules, like flexible schedules, involve working outside of the traditional 8 to 5 workday. However, alternate schedules have a fixed start and end time, whereas flextime allows the employee to vary the start and end as long as they are there during the core hours. An alternate schedule may be 6:00 a.m. to 3:00 p.m. or 11:00 a.m. to 8:00 p.m. five days a week, or it may be four ten-hour days, or any other *different* schedule.

The advantages of these alternate work arrangements to the employee include flexible work hours, shorter or no commute, and a comfortable working environment. The advantages to the employer include less need for office space, increased productivity, lower use of sick leave, and improved employee morale. The benefits of not commuting were dramatically demonstrated when gas prices began spiking into the $4 per gallon range in mid-2008, driving up commuting costs significantly without a corresponding increase in wages.

While there are many advantages to these alternatives, there are also several disadvantages that the employer must consider. These include problems maintaining adequate staffing coverage, difficulty scheduling meetings, lack of interpersonal dynamics, and concerns about safety and security (for flextime and alternate schedule employees who come in early or leave late). Whatever the disadvantages, alternate work arrangements are becoming more and more popular as companies realize that they can keep costs down—and employees happier—by offering options for telecommuting, flextime, and alternate work schedules. One study showed that the number of telecommuting jobs is rising sharply in the United States. In 2004, it was estimated that 44.4 million workers were telecommuting at least once a week; this is 7.5 percent higher than in 2003.

THE FUTURE OF QUALITY OF WORK LIFE

Although the difficult economic times of the mid-2000s often led employees to mute their concerns over quality of work life issues, employees in the future will likely be looking for corporations that have a new work environment, one that encourages each employee to work toward improvement in the product or service; gives employees the responsibility and authority to make decisions; provides timely feedback; and rewards employees based upon

the quality of the product and efforts. Team effort will assume central importance, especially for self-directed work teams. Employees will choose employers who have aims and values that match theirs and who value balance in their employees' lives. Employees want to learn and advance, so opportunities for professional growth will attract employees.

To improve the quality of work life and eliminate job stress, employers can also make efforts to be more aware of the workload and job demands. Employers need to examine employee training, communication, reward systems, coworker relationships, and work environment. Employees often are able to give employers the best advice on reducing work stress.

SEE ALSO *Employee Assistance Programs; Human Resource Management; Safety in the Workplace; Stress*

BIBLIOGRAPHY
Bond, James T., et al. "The 2002 National Study of the Changing Workforce." Families and Work Institute, 2002. Available from: http://www.familiesandwork.org/summary/nscw2002.pdf.

Caproni, P.J. "Work/Life Balance: You Can't Get There from Here." *Journal of Applied Behavioral Science,* March 1997, 46–56.

Cole, J. "Building Heart and Soul: Increased Employer Concern for Employees." *HR Focus,* September 1998, 9.

Herman, R.E., and J.L. Gioia. "Making Work Meaningful: Secrets of the Future-Focus Corporation." *Futurist,* December 1998, 24.

Jackson, Lee Anna. "When the Love is Gone: How to Reignite Passion for the Job." *Black Enterprise,* January 2005, 54

King, Julia. "Going Down Fast: Slashed Resources and Impossible Demands Have Caused IT Morale to Disintegrate." *Computerworld,* 8 November 2004, 51

Manley, Will. "The Manley Arts: Labor, Work, and Happiness." *Booklist,* 1 November 2002, 454

McManus, Kevin. "Should I Stay or Should I Go?" *IIE (Institute of Industrial Engineers, Inc.) Solutions,* July 2002, 17.

"U.S. Telework Scene—Stats and Facts." Available from: http://www.ivc.ca/studies/us.html.

"Work/Life Balance a Key to Productivity." *Employee Benefit Plan Review,* September 1998, 30–31.

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RADIO FREQUENCY IDENTIFICATION

SEE *Bar Coding and Radio Frequency Identification*

REINFORCEMENT THEORY

Reinforcement theory is the process of shaping behavior by controlling the consequences of the behavior. In reinforcement theory, a combination of rewards and/or punishments is used to reinforce desired behavior or extinguish unwanted behavior. Any behavior that elicits a consequence is called *operant behavior,* because the individual operates on his or her environment. Reinforcement theory concentrates on the relationship between the operant behavior and the associated consequences, and is sometimes referred to as operant conditioning.

BACKGROUND AND DEVELOPMENT OF REINFORCEMENT THEORY

Behavioral theories of learning and motivation focus on the effect that the consequences of past behavior have on future behavior. This is in contrast to classical conditioning, which focuses on responses that are triggered by stimuli in an almost automatic fashion. Reinforcement theory suggests that individuals can choose from several responses to a given stimulus, and that individuals will generally select the response that has been associated with positive outcomes in the past. E.L. Thorndike articulated this idea

in 1911, in what has come to be known as the *law of effect.* The law of effect basically states that, all other things being equal, responses to stimuli that are followed by satisfaction will be strengthened, but responses that are followed by discomfort will be weakened.

B.F. Skinner was a key contributor to the development of modern ideas about reinforcement theory. Skinner argued that the internal needs and drives of individuals can be ignored because people learn to exhibit certain behaviors based on what happens to them as a result of their behavior. This school of thought has been termed the behaviorist, or radical behaviorist, school.

REINFORCEMENT, PUNISHMENT, AND EXTINCTION

The most important principle of reinforcement theory is, of course, reinforcement. Generally speaking, there are two types of reinforcement: positive and negative. Positive reinforcement results when the occurrence of a valued behavioral consequence has the effect of strengthening the probability of the behavior being repeated. The specific behavioral consequence is called a reinforcer. An example of positive reinforcement might be a salesperson that exerts extra effort to meet a sales quota (behavior) and is then rewarded with a bonus (positive reinforcer). The administration of the positive reinforcer should make it more likely that the salesperson will continue to exert the necessary effort in the future.

Negative reinforcement results when an undesirable behavioral consequence is withheld, with the effect of strengthening the probability of the behavior being repeated. Negative reinforcement is often confused with punishment,

but they are not the same. Punishment attempts to decrease the probability of specific behaviors; negative reinforcement attempts to increase desired behavior. Thus, both positive and negative reinforcement have the effect of increasing the probability that a particular behavior will be learned and repeated. An example of negative reinforcement might be a salesperson that exerts effort to increase sales in his or her sales territory (behavior), which is followed by a decision not to reassign the salesperson to an undesirable sales route (negative reinforcer). The administration of the negative reinforcer should make it more likely that the salesperson will continue to exert the necessary effort in the future.

As mentioned above, punishment attempts to decrease the probability of specific behaviors being exhibited. Punishment is the administration of an undesirable behavioral consequence in order to reduce the occurrence of the unwanted behavior. Punishment is one of the more commonly used reinforcement-theory strategies, but many learning experts suggest that it should be used only if positive and negative reinforcement cannot be used or have previously failed, because of the potentially negative side effects of punishment. An example of punishment might be demoting an employee who does not meet performance goals or suspending an employee without pay for violating work rules.

Extinction is similar to punishment in that its purpose is to reduce unwanted behavior. The process of extinction begins when a valued behavioral consequence is withheld in order to decrease the probability that a learned behavior will continue. Over time, this is likely to result in the ceasing of that behavior. Extinction may alternately serve to reduce a wanted behavior, such as when a positive reinforcer is no longer offered when a desirable behavior occurs. For example, if employees are continually praised for the promptness in which they complete their work for several months, but receive no praise in subsequent months for such behavior, their desirable behaviors may diminish. Thus, to avoid unwanted extinction, managers may have to continue to offer positive behavioral consequences.

SCHEDULES OF REINFORCEMENT

The timing of the behavioral consequences that follow a given behavior is called the reinforcement schedule. Basically, there are two broad types of reinforcement schedules: continuous and intermittent. If a behavior is reinforced each time it occurs, it is called continuous reinforcement. Research suggests that continuous reinforcement is the fastest way to establish new behaviors or to eliminate undesired behaviors. However, this type of reinforcement is generally not practical in an organizational setting. Therefore, intermittent schedules are usually employed. Intermittent reinforcement means that each instance of a desired behavior is not reinforced.

There are at least four types of intermittent reinforcement schedules: fixed interval, fixed ratio, variable interval, and variable ratio.

Fixed interval schedules of reinforcement occur when desired behaviors are reinforced after set periods of time. The simplest example of a fixed interval schedule is a weekly paycheck. A fixed interval schedule of reinforcement does not appear to be a particularly strong way to elicit desired behavior, and behavior learned in this way may be subject to rapid extinction. The fixed ratio schedule of reinforcement applies the reinforcer after a set number of occurrences of the desired behaviors. One organizational example of this schedule is a sales commission based on number of units sold. Like the fixed interval schedule, the fixed ratio schedule may not produce consistent, long-lasting, behavioral change.

Variable interval reinforcement schedules are employed when desired behaviors are reinforced after varying periods of time. Examples of variable interval schedules would be special recognition for successful performance and promotions to higher-level positions. This reinforcement schedule appears to elicit desired behavioral change that is resistant to extinction.

Finally, the variable ratio reinforcement schedule applies the reinforcer after a number of desired behaviors have occurred, with the number changing from situation to situation. The most common example of this reinforcement schedule is the slot machine in a casino, in which a different and unknown number of desired behaviors (i.e., feeding a quarter into the machine) is required before the reward (i.e., a jackpot) is realized. Organizational examples of variable ratio schedules are bonuses or special awards that are applied after varying numbers of desired behaviors occur. Variable ratio schedules appear to produce desired behavioral change that is consistent and very resistant to extinction.

REINFORCEMENT THEORY APPLIED TO ORGANIZATIONAL SETTINGS

Probably the best-known application of the principles of reinforcement theory to organizational settings is called behavioral modification, or behavioral contingency management. Typically, a behavioral modification program consists of four steps:

1. Specifying the desired behavior as objectively as possible

2. Measuring the current incidence of desired behavior

3. Providing behavioral consequences that reinforce desired behavior

4. Determining the effectiveness of the program by systematically assessing behavioral change

Reinforcement theory is an important explanation of how people learn behavior. It is often applied to organizational settings in the context of a behavioral modification program. Although the assumptions of the theory are often criticized by academic psychologists, extended discussions of behavior modification theory in recent textbooks on organizational management—such as *Management of Organizational Behavior* (2007) and *Organizational Behavior and Management* (2007)—indicate that this theory continues to offer important insights to managers and organizational leaders.

However, Pinder's updated edition of *Work Motivation in Organizational Behavior* (2008) asserts that the recent scientific literature on behavior in the workplace shows that behavior is affected by many factors (such as frustration and violence, power, love, and sex, etc.) which are not typically treated in standard texts on work motivation and organizational management.

SEE ALSO *Leadership Styles and Bases of Power; Motivation and Motivation Theory; Operant Conditioning*

BIBLIOGRAPHY

Hersey, Paul, Kenneth H. Blanchard, and Dewey E. Johnson. *Management of Organizational Behavior*, 9th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Ivancevich, John M., Robert Konopaske, and Michael T. Matteson. *Organizational Behavior and Management.* 8th ed. Boston: Irwin/McGraw-Hill, 2007.

Pinder, Craig C. *Work Motivation in Organizational Behavior*, 2nd ed. New York: Psychology Press, 2008.

Porter, Lyman W., Gregory Bigley, and Richard M. Steers. *Motivation and Work Behavior.* 7th ed. New York: McGraw-Hill/Irwin, 2003.

Skinner, B.F. *Science and Human Behavior.* New York: Macmillan, 1953.

Thorndike, E.L. *Animal Intelligence: Experimental Studies.* New York: Macmillan, 1911.

REQUEST FOR PROPOSAL (RFP)

A request for proposal (RFP) is a purchasing and procurement instrument that enables buying organizations to solicit high-quality products and services from the market at the most favorable prices; this is done by selecting potential suppliers through competitive bidding. Organizations issue RFPs with the ultimate objective of eliminating lengthy price negotiations for the supply of goods and services. RFPs are designed to achieve special partnerships or contractual relationships between buying parties and supplying agencies by spreading mutual benefits and the value addition of competitive advantage.

BENEFITS OF AN RFP

Typical RFPs have open specifications that leave the preference of response formats and structures to the absolute choice of suppliers, so that the stated requirements can be met by many suppliers. Indeed, open specifications provide suppliers with the opportunity to express their distinctive characteristics through their creative and innovative standards. Buying organizations can then use this information to gauge the individual capabilities of each supplier.

RFPs enable both small-scale and large-scale organizations to access markets and purchase products and services either directly or indirectly by utilizing the benefits of price transparency induced by competition among suppliers. Therefore, buying organizations can use RFPs as leverage for obtaining substantial price reductions and generous discount without having to participate in any negotiations with the suppliers. RFPs further portend the advantage of achieving significant market accessibility for small organizations when sourcing for products and services because RFPs enable organizations to discover opportunities for lower prices by initiating business-to-business relationships.

RFPs comprehensively summarize the preferential characteristics for products or services which buying organizations intend to achieve by spending on the acquisition of particular inputs. RFPs also indicate the long-term and short-term business objectives behind the acquisition of assets by organizations. Consequently, it is incumbent upon suppliers to base the perspectives of their offerings on the detailed insights of the buyers' specifications. An ideal RFP has the following key features:

- Price quotations
- Contract duration
- Performance limits
- Stipulated business requirements
- Item listings
- Guidelines for responding
- Submission deadlines
- Evaluation criteria
- Contacts for channeling inquiries
- Address of the company or organization

All these features are backed by stringent conditions through which organizations monitor the compliance of suppliers to the set guidelines for purchasing and procurement. For example, the U.S. military equipment acquisition system emphasizes innovation and reengineering as the prerequisite conditions for considering suppliers.

The use of RFPs by organizations to specify procurement requirements is viewed as a systematic and best

practices gesture that is closely linked to the transaction cost theory and resource-based theory.

TRANSACTION COST THEORY

Proposed by Ronald Coase (1910) and Oliver E. Williamson (1932), transaction cost theory (TCT) weighs the cost of acquiring goods or services from the market place against the cost of acquiring the same goods and services from within an organization. TCT focuses on the key aspects of transaction costs, asymmetrical information distribution, and asset specificity. Aspects of transaction costs include: costs for searching and bargaining, costs for bargaining and decision-making, and costs for policing and enforcing new structures vis-à-vis an organization's operational standards. The aspect of asymmetrical information distribution recognizes the fact that different parties involved in a transaction experience uneven access to information, a situation that may call for closer cooperation between or among the different parties for purposes of mutual benefits.

RESOURCE-BASED THEORY

Advanced by John Kay (1704–1780), resource-based theory (RBT) recognizes that each organization is characterized by unique sets of resources, opportunities, and core competencies. According to RBT, a firm can pursue competitive advantage by exploiting and combining its distinctive characteristics such as corporate architecture, innovation, and reputation, which are difficult to emulate. The idea of corporate architecture revolves around organizational characteristics such as the capacity to create, utilize, and store knowledge, as well as such characteristics as transparency, organizational flexibility, and employee cooperation. Innovation defines the capacity to reduce costs, improve service or product qualities, introduce new products and technologies, and emphasize best practices; this can often only be achieved through collaboration with other players external to the organization.

The arguments presented by the proponents of the two theories are in tandem with the primary purpose of RFPs, which is to contribute to the profitability of a firm by acquiring products and services of the highest qualities at the least possible total cost. Ultimately, the derivative satisfaction of the organization entirely depends on the acquisition of reliable supplies.

REQUEST FOR QUOTATION

Although an RFP is closely related to request for quotation (RFQ), the two forms of requests exhibit quite some considerable differences. In most cases, RFQ's serve as the preceding step to RFPs. Buying organizations use RFQs as tools for comparing quotes in situations where products or services are extremely commoditized or standardized.

For example, an organization seeking hotel accommodation services in a particular city can use an RFQ to source for the best prizes because of the standardized nature of accommodation rates of different hotels.

In addition to seeking specific price per unit for items, an ideal RFQ spells out the exact descriptive details for items such as quantity, quality, referees, skills, competencies, terms of service, transportation, shipping, tax settlement responsibilities, and terms and conditions. As such, price comparisons form the basis for choosing and engaging suppliers. Other forms of sourcing requests that can be used by buying organizations in procurement processes include request for tender (RFT) and request for information (RFI).

DESIGNING AN RFP

Many organizations have developed standardized RFP templates as a way of entrenching RFPs into the routine activities of the organizations. This is because standardized templates provide organizations with the advantage of accelerating the timeframe for procurement processes, especially in large firms which deal with high volumes of products and services. However, it must be noted that the use of standardized and automated RFPs does not guarantee a procurement process that is free of errors and administrative hitches.

The diversity of business requirements and customer demands can only be harnessed effectively if procurement processes are tailored to suit each and every need. Automated RFP software tools and standardized forms create uniformity of response that makes it difficult to ascertain differences in the qualities of products that different suppliers offer. Moreover, such a standardized approach makes it difficult for the buying organizations to base the vetting criteria on the creativity and innovative standards of the suppliers, especially in the outsourcing of large-scale services and transactions.

Therefore, the optimization of product and service qualities at the least possible cost should always be the overriding principle for composing and designing an RFP. This can only be achieved by designing an RFP that takes into account the diverse and competitive nature of the procurement environment. In this regard, an effective RFP should exhibit the following characteristics: define service boundaries; demonstrate flexibility; pronounce the criteria for evaluating performance; state discrete conditions; and establish contractual and binding relationships.

Defining Service Boundaries. An RFP must be as explicit and self-explanatory as possible, especially when sourcing for technological commodities or services that are complex in nature. An RFP must clearly state and define the scope of responsibilities, relationships, or partnerships

between the buying organizations and vendors. Buying organizations must never take the procurement process for granted by assuming that vendors are always ready to respond to any kind of an RFP without considering what the RFP offers. For example, an RFP that does not create a balance between possible risks and achievable benefits is unlikely to ignite much enthusiasm among suppliers, thus eliminating a competitive bidding environment.

Organizations can avoid such eventualities by designing RFPs that promote a competitive bidding environment with the potential to attract multiple suppliers who possess high qualifications for providing the best qualities of goods and services at favorable rates. Organizations can also achieve clarity on the nature of services being procured by preceding the issuance of RFPs with RFIs and RFQs. This will eliminate the likelihood of vendors misinterpreting the buyer's requirements because of ambiguity and uncertainty posed by buyer expectations.

Demonstrating Flexibility. RFPs that require lengthy and complicated selection processes may lock out potential suppliers. Similarly, RFPs with rigid response structures and overstated compliance conditions automatically disqualify many potential vendors from participating in procurement processes. These problems can be avoided through a comprehensive but balanced approach that ensures the organization is guarded from unqualified suppliers and at the same time leaves adequate room for suppliers to maneuver their aspirations. A flexible RFP also demonstrates the transition strategies for switching from an incumbent to a new supplier or for adopting new products or services from suppliers.

Pronouncing the criteria for evaluating performance. An ideal RFP should spell out clear guidelines for performance under specified conditions, either by means of a test or through the use of initial sample products and/or services. Other evaluation items—such as the criteria for passing tests as well as acceptable standards of performance—should be outlined with clarity and certainty.

Stating discrete conditions. In practice, RFPs should clearly indicate standards for passing or determining the fitness of required products or services. The specific requirements of the purchasers should always form the centerpiece of communications between the buyers and sellers of goods and services.

Establishing contractual and binding relationships. An RFP should have the capacity to bind a contractual relationship between a buyer and supplier. Consequently, an RFP should stand out as a reliable document against which comparisons between what a supplier finally delivers and specifications for orders can be based. In the event

of a dispute in a future date, an RFP can be referenced as a primary document through which a purchaser and a supplier established a framework for contractual relationship. However, due diligence must be observed to ensure that the legal implications of each and every specification contained in an RFP do not contradict limits set by the national and international standards of environmental, health, business, and/or safety regulations.

SEE ALSO *Purchasing and Procurement*

BIBLIOGRAPHY
Burnell, John. "U.S. Army Issues RFP for Large RFID Purchase". *The RFID Daily.* 6 May 2008. Available from: http://www.rfidupdate.com/articles/index.php?id=1598.

Carroll, Brian, J. *Lean Performance ERP Project Management: Implementing the Virtual Lean Enterprise,* 2nd ed. Auerbach, 2007.

Lysons, Kenneth, and Brian Farrington. *Purchasing Supply Chain Management, 7th ed.* Pearson Education, 2006.

Mhay, Suki. "Request for Procurement Process Terms," 2007. Available from: http://www.negotiations.com/articles/procurement-terms/.

Shaw, Jonathan. "Beyond the Template: Writing an RFP that Works." *Sourcingmag.com,* 2008. Available from: http://www.sourcingmag.com/content/c070228a.asp.

Wolf-Ruediger, Hansen, and Frank Gillert. *RFID for the Optimization of Business Processes.* Wiley, 2008.

"Writing a Professional RFP Letter." *Professional Letters,* 2008. Available from: http://www.rfp-templates.com/Writing-an-RFP-Letter.html.

RESEARCH METHODS AND PROCESSES

In any organization, managers at all levels need accurate and timely information for managerial decision making. Whether the decisions made are at technical, tactical, or strategic levels, good, accurate, and timely information always leads to a better decision. Gathering of information is done through a sound and scientific research process. Each year organizations spend enormous amounts of money for research and development in order to maintain their competitive edge. Accurate information obtained through research leads to enormous benefits.

APPLIED VERSUS PURE RESEARCH

Research can be defined as scientifically and methodically delving into the unknown in order to provide information for solving problems. The heart of this definition is the concept of problem solving. Both applied and pure (also known as basic) research attempt to solve problems. In applied research, the researcher attempts to solve a known problem and find answers to specific questions. In other words, the emphasis of applied research is on practical

problem solving. For instance, when a paper recycling company wants to determine whether or not their recycled papers meet the required specification as to the thickness of the paper across the roll, they might design a systematic procedure for answering this specific question. The research in such a situation represents applied research. Applied research might also involve making predictions. For example, an online magazine might want to predict the number of click-throughs on its ads for the following quarter; in this case, the practical problem is predicting this number and determining which variables are good predictors.

Applied research can help make a decision about the following, including a variety of other business and management decisions:

- Pricing a new product

- Where to locate a new retail store

- How many employees to hire

- How many products to offer

- What to pay employees

Applied research can be used to collect information about markets, competitors, and customers. For example, research can help pinpoint the optimal business location and the size of markets. It can also be used to monitor competitive actions. Customer research determines customer loyalty, customer satisfaction, and customer preferences.

On the other hand, pure, or basic, research does not necessarily try to answer specific questions or solve specific problems. Pure or basic research is done in order to expand knowledge and probe into the unknown. For example, when a researcher is interested in determining how employee demographics and tenure on the job relate to preference for flexible work schedules may represent pure research. Both pure and applied research deal with problem definition and problem solving. Most basic research is conducted by professors in academic institutions (i.e. colleges and universities), by the government, or by consulting firms. Few business organizations will engage in pure research related to business problems, although firms in certain industries—such as pharmaceuticals or defense—will engage in pure research in the hope of opening new markets. For all firms, it is important to understand the process and methods used for both applied and basic research in order to be able to interpret research results accurately and effectively.

RESEARCH PROCESS

All research involves several chronological steps, but that does not mean each step must be completed before the next step is undertaken. Furthermore, the process of research is dynamic and the process may change as the

Figure 1

The Research Process
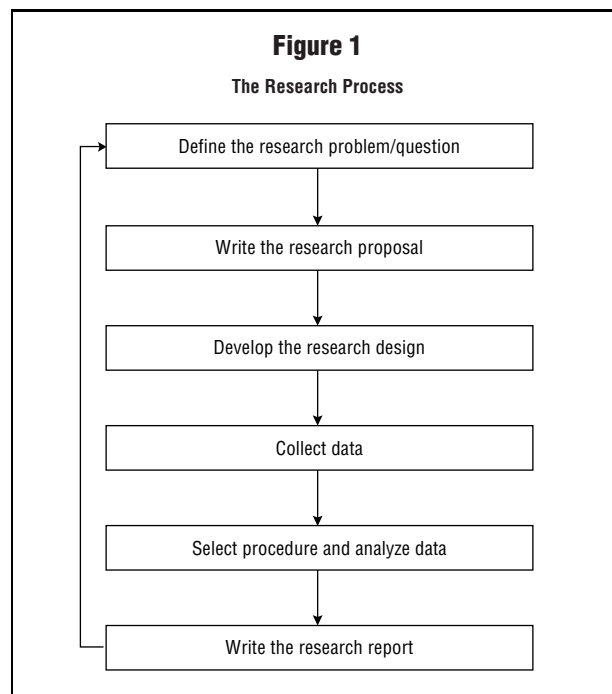
research progresses. The steps involved in most research endeavors are shown in Figure 1.

THE RESEARCH QUESTION

Managers' needs for information are the primary source of problem definition and the research question. Managers need information to make educated decisions arising from unanticipated as well as planned changes. As such, managers must select between different alternatives and thus require information about the organization and its environment. The question to be answered or the problem to be solved must first be clearly defined. Questions to be answered could be very specific or extremely broad. The more specific the questions, the easier it will be to answer the research questions. There might be hypotheses that could be tested scientifically. Once the questions to be answered are clearly defined, then the value of the research must be assessed. Clearly, if the costs of performing the research project exceed the value that the research will provide, then the project should not be continued.

THE RESEARCH PROPOSAL

Research endeavors require a proposal that explains the problem to be addressed and the procedure by which the questions will be answered. The researcher's proposal tells the managers what they should expect from the research. It is a contract between the managers and the researcher. For instance, if a company wants to know the degree to which its new incentive program is effective in improving

employee performance, then the consultant or employee conducting the research will create a proposal that indicates to that company how the question will be addressed and what specific information the company will have at the end of the research process. The proposal may indicate, for example, that the research will indicate the level of satisfaction of employees with the new incentive plan, the increased firm performance with the plan, and the individual increases in performance (as measured by managers) with the incentive plan. The purpose of the research proposal is to effectively guide the researchers in their development of the research design and data collection to answer the specific research questions.

RESEARCH DESIGN

Once the proposal is approved, the researcher has a foundation for development of the research design. The plan for conducting the research is the research design. There are two general forms of research design, namely non-experimental (ex-post-facto) and experimental. In a non-experimental design, the researcher does not control or alter any of the independent variables. The researcher merely studies existing situations, variables, and the inter-relation among variables and reports the results of his or her findings. The two major non-experimental designs are field studies and surveys. Field studies combine literature review and possibly analysis of some case studies. For example, if one is interested in determining the effectiveness of total quality management (TQM), there will be a thorough literature search on the topic as well as a study of the firms that have applied TQM and have been successful. A literature review means that a researcher identifies previous writings and research on a topic, summarizes the current knowledge on the topic, and assesses the value of that prior research on the current problem. On the other hand, surveys deal with the formulation of a questionnaire (survey instrument) by which one can measure the magnitude of the desired variables as well as the interrelation among the variables. Non-experimental designs are primarily exploratory in nature and provide descriptive measures and can also be used for predictive purposes.

There are two broad categories of experimental designs: field and laboratory. In both field experiments and laboratory experiments, the researcher controls and may alter and introduce some variables in order to determine the effect of a given variable. Field experiments are done in a natural setting, whereas laboratory experiments are undertaken in a simulated setting. Studies on the effectiveness of different configurations of teams and their level of effectiveness can be undertaken in both field and office settings. In an office setting, a researcher might organize workplace teams, using different criteria to estab-

lish each, and then measure the success of their group interactions and their productivity on real work tasks. This would be a natural setting, except for the way in which teams were organized. Team composition could also be studied in a laboratory in which the researchers had complete control over more variables. To study team effectiveness in a laboratory setting, individuals would be placed in teams using different criteria, then asked to perform a series of tasks specially designed to measure team interactions and performance. This laboratory setting would allow the researcher more control, because the types of individuals involved could be chosen, rather than using only the employees available in a field setting; by designing tasks specific to the study, rather than using existing work tasks; and by having more ability to watch and measure team performance without hindering organizational performance.

DATA COLLECTION

Data collection is the process of gathering the specific information used to answer the research questions. There are a number of issues associated with data collection, including the use of primary or secondary data, survey design, sampling, survey administration, and increasing response rates.

Primary Data and Secondary Data. Data can be primary or secondary, and whether one or both are used, and which is used, depends largely on the research question and the availability of these data sources. Secondary data refer to data gathered by others. Secondary data is generally less costly and less time consuming than gathering primary data, typically is accumulated before primary data is gathered, and may even help determine the course by which primary data is pursued. When a company uses data from the U.S. Census Bureau, for example, the company is using secondary data. While secondary data can be used for background information about specific research, it may also answer some specific research questions. For instance, the 2007 Census Bureau report on building permits can indicate to researchers where construction activity is taking place most vigorously.

It should be noted that secondary data was usually collected for another purpose; therefore, it may not adequately address the new research question, or it may do so in a way, and using terms, that differ from the present purposes. In today's world of rapidly growing information technologies, secondary data are available from numerous sources. A researcher should explore the existing data before starting the research process, since there are datasets for many different types of information currently available. There are abundant data available in literature, company

records, government publications, trade associations, and through the Internet.

Primary data is that which is collected by the researcher to address the current research question. Types of primary data include subject demographics, lifestyle characteristics, attitudes, knowledge, intentions, motivations, and behavior. Demographic data includes statistics regarding populations, such as age, sex, income, level of education, and so forth. Lifestyle characteristics describe a respondent's activities, interests, and opinions. Attitudes refer to views and opinions about things, events, or ideas. Knowledge is the degree to which respondents are aware of these things, events, or ideas. Intentions generally refer to a respondent's planned future behavior. Motivations describe the reasons behind a respondent's behavior. Behavior is related to what respondents do.

Primary data can be collected in the field or the laboratory through communication and observation. Communication generally requires the direct questioning of respondents via a paper-and-pencil survey (i.e., questionnaire) or telephone survey. Observation involves the direct recording of respondent behavior. Surveys are probably the most common design in business research. For instance, if one is interested in determining the success of TQM, a survey can be designed that encompasses questions regarding elements of success, strengths, weaknesses, and other questions dealing with TQM. Then the survey can be sent to companies that have been successful in implementing TQM. The survey results could shed light on many aspects of TQM.

Survey Design. Survey design is of major importance, because if a survey is poorly designed, it will not provide the researchers with the data that addresses the research question. Survey questions, called items, must be properly chosen to elicit appropriate respondent answers. The steps involved include determining the information that will be sought, the type of questionnaire, the method of administration, the content of individual questions, the form of response to each question, the wording of each question, the sequence of questions, the physical characteristics of the questionnaire, and, finally, pretesting the questionnaire.

Some items for certain areas of interest already exist. For instance, there are existing surveys that measure employees' satisfaction with pay and benefits. If survey items do not already exist in the published literature, the researchers must create their own items, based on their review of the existing literature and their own expertise. Often, a focus group of experts can also help to create items. For example, if a company wants to assess its employees' attitudes towards an intended change in work rules, the researcher may lead a focus group of several experienced company managers to capture all of the rel-

evant ideas that need to be addressed by the survey. Before the survey instrument is sent out, it must be tested for reliability and validity. Reliability refers to how consistently the instrument measures, and validity refers to whether the instrument is measuring.

One concern when designing a survey is how to word the items. One of the most popular ways to measure attitudes on a survey is by using the Likert scale. This method presents a series of statements to respondents for which they are asked to indicate the degree to which they agree with the statements. An example of a statement might be "The sales people are helpful." Respondents are asked to indicate the degree to which they agree with the statements by checking either SA (strongly agree), A (agree), N (neither agree nor disagree), D (disagree), or SD (strongly disagree). Respondents' answers would then be scored where SA = 5, A = 4, N = 3, D = 2, and SD = 1. A total score would be computed by average or summing scores on related items.

Sampling. When administering a questionnaire there are two options as to who should complete the survey. Option one is to give the questionnaire to everyone in the targeted population. This is called a census. However, a census is usually not practical or cost effective. For instance, you may not be able to survey every one of your customers from last year to determine levels of customer satisfaction with your products. Consequently, in order to save time and money, only a sample or subset of the target population receives the questionnaire.

When selecting individuals for a sample, either a probability approach or a nonprobability approach can be used. Probability samples are those where each element of the population has a known probability of being selected. A random sample, for example, is the case where each element has the same probability of being selected. There are some specific types of nonprobability samples: convenience samples, judgment samples, and quota samples. Convenience samples are chosen at the convenience of the researcher. For example, a researcher might distribute a survey to all customers who enter one retail store in a one-week period to determine their level of customer satisfaction with the company's products. This sample is rather easy to select, but it may not represent the full range of customers who have used that product. In a judgment sample, individuals are selected by the researcher because they are believed to represent the population under study. Quota samples attempt to make the sample representative of the population under study where quotas are set for specific groups of people, which are generally selected on the basis of demographic characteristics.

The chief advantage of a probability sample over a nonprobability sample is the ability to assess the reliability and the amount of sampling error in the results. For

example, if the goal were to estimate the annual household income for a given county, probability sampling would allow an accuracy assessment of the estimate. This could not be accomplished with a nonprobability sample.

Survey Administration. After the survey has been designed and its reliability and validity assessed, the company must decide the administration method that it will use. Each administration method has its own advantages and disadvantages in terms of cost, information control, sampling control, and administrative control. Information control refers to the possible variation in responses to questions. Sampling control is the ability to select cooperative respondents. Administrative control refers to factors affecting the efficiency of the survey, including timing, quality control, and standardization.

Personal interviews are generally the most expensive means of data collection. In a company, this would mean having researchers meet with employees one-on-one to ask them the survey questions and record their responses. One of the main advantages of the personal interview is the ability to ask any type of question, including an open-ended question, and to adapt to the respondent's answers. However, in addition to being expensive and time consuming, this method is not anonymous, and therefore respondents may be reluctant to answer questions that they feel are sensitive or invasive.

The mail questionnaire is usually the least expensive method of data collection. Besides cost savings, another advantage of the mail questionnaire is its wide distribution potential. However, mail questionnaires cannot control the speed of responses, and the researcher cannot explain ambiguous questions. Mail questionnaires are probably best utilized when asking personal or sensitive questions, particularly if the survey can be made anonymous. Questionnaires can be circulated using various methods, such as post, electronic mail, and fax.

The telephone interview is associated with relatively low cost and higher response rates, and is one of the fastest methods of data collection. While there are methods to address the problem, unlisted numbers make it more difficult to obtain representative samples. Establishing rapport is also more difficult in telephone interviewing than in the personal interview.

One survey administration method that is growing in popularity is the Internet survey, in which respondents answer items on a survey that is located on a Web site. Newer, specialized software products are making it easier to conduct online surveys, even for those people with little to no computer programming skills. Studies indicate that Internet research can result in faster responses, lower costs, higher response rates, and better flexibility. Additionally, this method aids in data administration, since survey responses can be directly inserted into a data spreadsheet by the Web survey software.

Response Rates. One of the main concerns of survey research is the response rate, or the number of people who are asked to complete a survey who actually do. Nonresponse error is a source of bias because of the failure to get answers from some of the sample. "Not-at-homes" plague telephone surveyors. Recent laws have created a further difficulty with conducting telephone surveys. In 1999, Great Britain created a "no-call" list. The United States followed in 2003 and Canada in 2004. These lists block commercial telemarketers and surveyors from calling numbers registered by their owners. The widespread use of these lists by telephone customers has significantly limited the use of telephone interviewing for research purposes. At the same time, the Internet has opened other avenues of survey research, and traditional means such as mailings and personal interviews still remain viable.

While research results are mixed regarding effective means for increasing response rates, the following represent some ideas for increasing response rates:

- Give respondents advance notice of the survey.
- Guarantee confidentiality or anonymity.
- Provide monetary incentives.
- Provide a postage-paid return envelope for mail surveys.
- Personalize outgoing envelopes.

DATA ANALYSIS

Research provides data, and it is the task of the researcher to transform the collected data into useful information for management. The first step in data analysis is preparing the data by editing it for several factors, including:

- Completeness—checking for any omissions
- Legibility—making sure that handwriting is understandable so that answers will be coded correctly
- Comprehensibility—making sure the answer is understandable
- Consistency—checking for consistent answers from the respondent
- Uniformity—checking to see that responses are recorded in the same manner

Once the data is edited it is ready for coding, which is determining how survey responses will be transformed into numerical data. The first step in coding is the development of a codebook. The codebook formalizes the coding process by listing answers and their accompanying codes. After

Figure 2

Parts of a Complete Research Report

Research report parts

I. Prefatory section
   A. Title fly
   B. Title page
   C. Letter of authorization
   D. Letter of transmittal
   E. Table of contents
   F. Synopsis or executive summary

II. Introduction to the research
   A. Background comments
   B. Statement of the problem (research question)
   C. Objective of the research

III. Methodology
   A. Research design
   B. Instrument used and data collection
   C. Data analysis and statistical procedures used
   D. Limitations of the study

IV. Findings

V. Summary, conclusions and recommendations

VI. Appendices

VII. Bibliography

the data is coded and entered into a data spreadsheet, statistical analyses can be performed to create useful information for the researchers. If there are hypotheses to be tested, the researcher is in a position to use the gathered data to test the hypotheses. Data analysis could be as simple as reporting descriptive statistics such as averages, measures of variability, and percentages, or if needed, advance statistical techniques could be applied.

RESEARCH REPORT

The research report can be as simple as a short report of a few pages giving the overall findings of the research, or it can be a long report with numerous parts. The degree of formality required by management dictates the type of report to prepare. Figure 2 presents the order of inclusion of the various parts of a long formal report.

Prefatory Section. In this part of the report, first a title fly needs to be prepared. The title fly only includes the title of the report. The title should be carefully worded so it tells the reader exactly what the report is about. Following the title fly is the title page. The title page should include the title of the report, the name and the title of the recipient of the report, and the name and the title of the individual who prepared the report and the date. The letter that authorized the undertaking of the research project, followed by a letter of transmittal indicating the completion of the research report are the next items included in the report. Include a table of contents followed by an executive summary. The executive summary, summarizing the report's

major findings, should be brief and to the point. This summary should briefly explain the conclusions.

Introduction to the Research. This section of the report provides a clear background and statement of the research question and provides information about the objectives of the research. Included in this section would be a literature review about previous studies with the same or a similar problem. If there are hypotheses to be tested, population parameters to be estimated, theories to be considered, they will be incorporated into this section of the report

Research Method. This section will provide a detailed explanation of research design and will provide answers to many questions. What type of design was used? What instruments were used for the collection of data? Were there any subjects involved in the study? What did the subjects do? How was the sample selected? What kind of statistical or non-statistical techniques were used for data analysis? Finally, in this section of the report the limitations encountered in the study should be presented.

Findings. This section is one of the most important parts of the research report. Provided in this section would be the results of the data analyses and explanation of all the findings. At this point, all the raw data have been analyzed and converted to meaningful information for management's use. This is the section where the original research question is answered.

Summary, Conclusions, and Recommendations. A concise yet precise summary of major findings will be included in this section, followed by any recommendations that the researcher considers important and meaningful.

Appendices and Bibliography. Statistical tests, large tables of information, copies of measurement instruments, and supporting documents should be included in the appendices. Finally, the report should end by providing a bibliography of all sources of information.

SEE ALSO *Statistics*

BIBLIOGRAPHY
Babbie, Earl R. *The Practice of Social Research.* 11th ed. Belmont, CA: Thomson/Wadswoth, 2006.

Cooper, Donald R., and Pamela S. Schindler. *Business Research Methods.* 9th ed. New York: McGraw-Hill, 2005.

Davis, Duane. *Business Research for Decision Making.* 6th ed. South-Western College Publishing, 2005.

Hoover, Kenneth R., and Todd Donovan. *The Elements of Social Scientific Thinking.* 9th ed. Belmont, CA: Thomson/Wadswoth, 2007.

"How to Find the Latest Business Data." U.S. Census Bureau. Available from: http://www.census.gov/epcd/www/recent.htm.

Kerlinger, Fred N., and Howard B. Lee. *Foundations of Behavioral Research.* 4th ed. Fort Worth, TX: Harcourt College Publishers, 2000.

Pedhazur, Elazur, and Llora Pedhazur Schmelkin. *Measurement, Design, and Analysis.* Hillsdale, NJ: Lawrence Erlbaum Associates, 1991.

Salkind, Neil J. *Exploring Research.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2008.

Schwab, Donald P. *Research Methods for Organizational Studies.* 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates, 2004.

RESULTS-ONLY WORK ENVIRONMENT

Results-Only Work Environment (ROWE) is a twenty-first century management concept that was invented at Best Buy company headquarters under the tutelage and guidance of Cali Ressier and Jodi Thompson. ROWE is simply a result-oriented work environment that attaches employee retention to output and performance. The distinctive nature of ROWE is defined by the following characteristics:

- No working schedules
- No fixed work stations
- No clocking in and out of work
- Greater performance accountability
- Increased staff morale
- Greater teamwork and cooperation
- Increased output
- No meetings
- Increased employee engagement
- Greater employee flexibility

Ressier and Thompson were serving as employees of Best Buy when they were tasked with the responsibilities of measuring human resource management practices at Best Buy against industry benchmarks, identifying problems and tracing roots of the problems, and suggesting the most appropriate solutions to eliminate the problems. Upon the completion of their research, Thompson and Ressier identified time wasting and lack of motivation among employees as being the biggest hurdles to the achievement of efficiency and increased productivity among employees. The two employees particularly identified the nine-to-five clocking system as being absolutely irrelevant to the prevailing company objectives. (Ressier and Thompson have since left Best Buy and are running a private human resource consultancy firm called CultureX, which guides different organizations in the process of adopting ROWE into their management practices.)

INITIAL IMPLEMENTATION OF ROWE

After intensive research and experimentation, Ressier and Thompson finally came up with the idea of ROWE, an idea which marks a radical shift from the traditional forms of work environments (such as the clocking system, job sharing, shift work, or flexible workforce). ROWE debuted at Best Buy in 2002 on an experimental basis; it was gradually adopted by different departments within the organization, and by the end of 2007 the company had fully adopted ROWE into its organizational structure. (Therefore, apart from pioneering the founding of ROWE principles, Best Buy was also a pioneer in experimenting and integrating a management concept into the daily activities management structure of a company.) At Best Buy, the company policy allows workers to report to work at any time of the day and leave at any time; they can even choose to stay away for several days and work from any location, just as long as they perform their responsibilities diligently.

Unlike the traditional forms of work environments which measure work in terms of hours spent at the workplace, ROWE measures work performance according to output, with the ultimate objective of retaining only productive workers. As such, employees are allowed to work from any location of their choice, at whatever time of their convenience, and with whatever tools they prefer, as long as they deliver the company's output targets in an efficient and timely manner. ROWE stands out as one of the most significant human resource management concepts of the early twenty-first century because of its radical and pragmatic approach to organizational management and workplace processes.

ROWE is definitely a revolutionary approach to human resource management that transforms the work environment by capitalizing on the intellectual engagement of employees and knowledge-based resources of the firm. The underlying principle of ROWE is to achieve maximum work output from employees while guaranteeing unlimited flexibility at the same time. The work—rather than the mode and location of working—is what should matter to the company's management. According to Ressier and Thompson, ROWE portends the following benefits to organizations:

- ROWE provides the organization with the advantage of retaining only clear-minded, pragmatic employees who get the job done.
- ROWE nurtures responsibility and ethical practices in organizations.
- ROWE encourages commitment, tenacity, and drive among the employees by guaranteeing employee engagement.

- ROWE provides employees with the flexibility to work offsite, thus eliminating the need for spacious corporate offices. This enables a company to reduce rental expenses or even generate extra revenues by renting out extra spaces to other business organizations.

- ROWE significantly reduces voluntary turnover and increases productivity because of its motivational nature.

In the book titled *Why Work Sucks and How to Fix It*, Cali Ressier and Jodi Thompson emphasize that ROWE represents a dynamic cultural transformation that demystifies workplace attitudes and improves individual responsiveness by giving employees absolute autonomy as long as they execute their respective duties and responsibilities satisfactorily.

ROWE has significantly transformed operations at Best Buy with statistics showing that employee job satisfaction and output have taken the upward trend ever since the concept was introduced in the firm. According to a *Time* article titled "Finding the Freedom at Work," Best Buy's productivity increased by 41 percent between 2005 and 2007. The *Time* article further notes that the move saw the voluntary turnover in the firm reduce by 90 percent during the same period, saving the company an equivalent of $16 million a year. These are impressive statistics that indicate increased flexibility for employees portends great output returns to companies relative to traditional work and management modes.

THEORETICAL BACKGROUND OF ROWE

The emergence of ROWE serves as a distinct testimony to the quest by organizations to embrace continuous improvement programs. In fact, the principles behind ROWE are defined by the concepts of total quality management (TQM). TQM emphasizes innovation and continuous improvement of processes in organizations with the objective of achieving increased efficiency in production.

The revolutionary views of quality management were fronted by great management theorists such as Joseph Juran (1904–2008) and W. Edwards Deming (1900–1993), both of whom emphasized quality management as a key determinant of both operational and management success in organizations. Quality management places emphasis on the recognition of all the participants in continuous improvement processes both within and outside the organization. One conspicuous aspect of quality management is the expanded definition of customers to include even players within the internal organizational fraternity. This was seen to be a radical departure from the traditional concepts of management, which recog-

nized customers to be external organizational players such as suppliers and buyers. Therefore, the concept of quality management views employee empowerment as a key factor of continuous improvement that enables organizations to achieve an effective and lean workforce environment.

Quality management further emphasizes the need for a teamwork approach to production processes. To this end, teams are viewed as empowerment tools for maximizing the potential of knowledge-based resources in organizations. Teams help individuals to understand customer relations management processes, identify internal and external problems, and provide appropriate solutions. ROWE increases the flexibility of workers to coalesce into organized teams because it provides employees with absolute independence to manage their work schedules.

ADOPTING AND MANAGING ROWE

The process of adopting continuous improvement programs is always coupled with changes in procedural structures and management activities in organizations. Therefore, the transition from the traditional work arrangements to ROWE is not an easy overnight task. The process is delicate and expensive because it requires significant overhaul and restructuring of human resource policies and management processes. In addition to adopting expensive networking structures that can enable employees to access the company's database from any location of their choice, the organization may also have to incur extra expenses on employee training before implementing the new model of operations to ensure that all affected employees understand how to execute their duties under the new policies and structures.

ROWE AND CHANGE MANAGEMENT

When introducing ROWE to the structures of organizational operations, managers must always endeavor to embrace change management to ensure that all employees are well prepared to adjust to the new models and styles of operations. This is because the task of psychologically and materially preparing individuals for change is not an easy one; it requires extensive consultations with employees and customers alike to offer explanations as to why change is needed and how the change will be implemented.

Employees must be made to understand what is expected of them during the transition period, what their responsibilities are in the changed working patterns, and what the new reporting structures and relationships are. The human resources division should be at the forefront in helping all affected employees overcome any barriers presented by the new operational procedures that may arise from both anticipated and unanticipated resistance.

Organizations must always recognize that ROWE is a radical approach towards improving employee performance and productivity, and thus, training and empowering employees must be a prerequisite step towards achieving the new organizational order. Employees should be made to understand how to delegate duties, how to work as teams under the new working arrangements, and how to determine and set their individual goals for meeting targets in time. For example, when Best Buy was gradually adopting ROWE into its management structures, the company provided employees with comprehensive training on interpersonal skills, advice on how to sustain teamwork even from virtual locations, and guidelines on how to meet management expectations and targets without close supervision.

In the book titled *Fundamentals of Human Resource Management,* ninth edition, David A. DeCenzo and Stephen P. Robbins reckon that training of employees is a learning experience that has the potential to influence permanent change in attitudes, knowledge, skills, and behavior among employees with the resultant effects of increased efficiency, production, and performance. This means that employee training during ROWE adoption processes will achieve employee motivation, innovation, dedicated customer relations management, positive working relationships, increased legal responsibilities and awareness, enhanced ethical standards, and individual responsibility and maturity among employees.

It is equally important to note that ROWE can be applied only in certain types of organizations or selected departments in organizations. ROWE fits well in highly homogeneous service-oriented organizations where employees can conveniently provide their services from remote locations. Therefore, implementing ROWE in heterogeneous industrial activities that require physical contact between employees, raw materials, machinery, and finished goods can be quite a tall order.

SEE ALSO *Quality and Total Quality Management; Scalable Workforce*

BIBLIOGRAPHY
Baum, Tom. *Human Resource Management for Tourism, Hospitality and Leisure: An International Perspective.* Thomson Learning, 2006.

Belkin, Lisa. "Time Wasted? Perhaps It's Well Spent." *New York Times,* 31 May 2007. Available from: http://www.nytimes.com/2007/05/31/fashion/31work.html?_r=1&adxnnl=1&oref=slogin&adxnnlx=1219404441-lkeka6d/KH+vcJmXmwlVXQ.

DeCenzo, David A., and Stephen P. Robbins. *Fundamentals of Human Resource Management,* 9th ed. John Wiley & Sons Limited, 2007.

Ferriss, Timothy. *The 4-Hour Workweek: Escape 9-5, Live Anywhere, and Join the New Rich.* Crown Publishers, 2007.

"Finding Freedom at Work." *TIME* 30 May 2008. Available from: http://www.time.com/time/business/article/0,8599,1810690,00.html.

Kiger, Patrick, J. "Throwing Out the Rules of Work." *HR Management,* 2008. Available from: http://www.workforce.com/section/09/feature/24/54/28/index.html.

Ressier, Cali and Jodi Thompson. *Why Work Sucks and How to Fix It.* Portfolio Hardcover, 2008.

REVERSE AUCTION

In the typical business auction, many different buyers will offer to buy from a single service provider or supplier, bidding the price higher until one business purchases the selling agreement. In a reverse auction, many suppliers bid to offer services to a single buyer. This often lowers the price considerably, as suppliers offer increasingly better deals so the buyer will choose them.

Such reverse auctions have become much easier through online communication, so much so that they have been dubbed "e-auctions" or "e-sourcing." One of the most common types of reverse auctions occurs when contractors bid for government projects through established marketing channels. These reverse auctions are often successful because the government can be trusted to contract the final provider, and a large number of suppliers are often willing to take part in the auction. Businesses, however, may find it difficult to implement an effective reverse auction over the Internet, due to marketing and time constraints.

ADVANTAGES OF A REVERSE AUCTION

The benefits possible with reverse auctions are clear: lower costs, better quality of production, and increased opportunities to find a better supplier relationship. For suppliers, reverse auctions over the Internet allow them to keep track of ongoing bids, often seeing what their competitors are offering and thereby gaining a clearer understanding of the market. Reverse auctions also offer suppliers more flexibility to move in and out of markets. If a supplier has no chance in a particular bid, then they usually find out early on; this can save them money they would have spent on winning a normal contract.

By this same principle, suppliers are often able to successfully enter markets not normally open to them, as reverse auctions tend to level the playing field between suppliers. In addition to market benefits, the process involved in winning reverse auctions is usually simple, saving the costs associated with paperwork and lengthy negotiations.

For buyers, a competitive reverse auction will result in lower prices, saving them time and cost. Sometimes a reverse auction can even lower the price below market

standards. Buyers, too, can benefit from the efficient process of gathering all interested suppliers into one system of negotiation that often lasts for a set amount of time, allowing companies to consolidate their contractors and judge contract possibilities much more easily.

DISADVANTAGES OF A REVERSE AUCTION

On the other hand, critics of the reverse auction process claim that they endanger supplier relationships in the production line, provide loopholes through which to conduct unethical activity, and overturn accepted supply contract traditions that companies have come to depend on. Because the practice of using reverse auctions has grown so rapidly among Internet-savvy companies, analysis of these effects is still ongoing, and clear data is still being collected. One common complaint is that reverse auctions put unfair pressure on suppliers already situated within the market, forcing them to respond with lower bids and decreasing their profit until it becomes difficult for them to sustain business. According to these dismayed sellers, buyers can make demands of the suppliers within their reverse auction, threatening to drop them unless they lower their prices or agree to other set conditions. These types of reverse auctions can violate corporate codes of conduct and lead to suspicious, worried relations along the supply chain.

In addition to mistreatment by buyers, the Internet-era reverse auctions are seen as a danger to product quality. Suppliers argue that qualifications are most important when choosing a contract source, not price. These suppliers say that the focus on lower prices in reverse auctions distracts buyers from who has the experience and talent to fulfill the position; instead, too much value is placed on who will operate at the least cost. This can be especially important in government contract jobs, where there may be only a few firms that have the expertise required for the job, but many who choose to bid themselves at a lower cost in the auction.

CONDUCTING A REVERSE AUCTION

Lee Crane, in a 2008 article in *Purchasing* magazine, offers seven important questions for organizations to consider before setting up a reverse auction to improve their product and costs:

1. "Is there enough competition?" Reverse auctions are only successful when there are enough suppliers to bid the price down to a level where the company will save money on the venture.

2. "Are the suppliers really qualified?" Quality is a vital facet of a good supplier, and suppliers should be

vetted for qualifications before they enter the reverse auction.

3. "Is the value worth the supplier's time?" Is this purchase going to attract capable suppliers?

4. "Is the product/service speculation clear?" All service requirements should be stated, and complex topics fully explained so that suppliers are aware of necessary tasks and communications.

5. "How does the auction fit in the big picture?" If a reverse auction may disturb existing partnerships or endanger other supplier contracts, it may not be the best idea.

6. "What's the benefit?" The idea of a reverse auction is to save costs without sacrificing any other important attribute, such as quality of service. It should be clear that enough efficient suppliers are a part of the auction to ensure an overall benefit to the company.

7. "Can you translate evaluation factors into numerical values?" Specific analysis tools are very important to accurately estimate supply factors.

BIBLIOGRAPHY

Crane, Lee S. "Seven Questions to Ask Before Running Your Next Reverse Auction." *Purchasing*, 2008. Available from: http://www.purchasing.com/article/CA6537987.html?q=reverse+auction.

Giempietro, C. and M.L. Emiliani. "Coercion and Reverse Auctions." *Central Conneticut State University*, 2007. Available from: http://www.technology.ccsu.edu/personnel/information/emiliani/ra_papers/ra_coercion.pdf.

Martinez, Rick. "The Reverse Auction Dilemma." *The Triangle Business Journal*. America City Business Journals Inc., 2008.

Parente, Diane H. *Best Practices for Online Procurement Auctions*. Hershey, PA: Idea Group Inc, 2008.

Sanborn, Stephanie. "Reverse Auctions Make a Bid for the Business World." *InfoWorld*, 2001. Available from: http://www.infoworld.com/articles/hn/xml/01/03/19/010319hnetrend.html.

"SO77 Using the Reverse Auction Procurement Method to Save Millions." *California Performance Review*, 2008. Available from: http://cpr.ca.gov/report/cprrpt/issrec/stops/proc/so77.htm#10b

REVERSE SUPPLY CHAIN LOGISTICS

Supply chain management takes into account all the companies and processes involved in the production of goods and services, from suppliers to manufacturers to wholesalers to retailers to final consumers and beyond (disposal and recycling). Because of increased consumer awareness, government oversight, and legally imposed environmental constraints, the stages beyond final consumption have become more important, leading to the need for safe return of products from the field as well as for more

environmentally-friendly products and by-products, such as recyclable containers and packaging materials. As a result, logistics planning must now consider both forward and return flows of products, parts, subassemblies, scrap, and containers. This is known as reverse supply chain logistics.

In their 2002 *Harvard Business Review* article, Guide and Wassenhove describe a reverse supply chain as "the series of activities required to retrieve a used product from a customer and either dispose of it or reuse it." Donald F. Blumberg describes reverse logistics as the "coordination and control, physical pickup and delivery of the material, parts, and products from the field to processing and recycling or disposition, and subsequent returns back to the field where appropriate." This may include the services related to receiving the returns from the field, and the processes required to diagnose, evaluate, repair, and/or dispose of the returned units, products, parts, subassemblies, and material, either back to the direct/forward supply chain or into secondary markets or full disposal.

FORCES BEHIND THE REVERSE SUPPLY CHAIN

A confluence of various economic and political forces has created an entirely new spectrum of goods at what was once considered the end of the supply chain. These goods include the following:

- Products that have failed, but can be repaired or reused
- Products that are obsolete but still have value
- Unsold products from retailers
- Recalled products
- Parts repaired in the field that still have value
- Items that have secondary usage, i.e. items that have another usage after they have exhausted their original use
- Waste that must be accounted for and disposed of or used for energy production
- Containers that must be returned to their origin or some sort of consolidation facility

Among the most powerful forces influencing the development of reverse supply chain logistics is the increase in both environmental legislation and consumer awareness and concern. Frequently, due to legislation, the original manufacturer is now responsible for final disposal of the product. New state laws passed since the early 1990s are mandating an increasing shift to waste reduction and recyclability in products and product packaging. Consumers are also increasingly paying attention to the recycled content and recyclability of packaging as well as the environmental friendliness of both products and production methods.

Another important factor includes a steady rise in customer returns because of increased demand for customer service and satisfaction, the frequent use of warranty returns, and the proliferation of rental businesses. Large retail chains usually have an agreement with suppliers allowing them to return goods. While originally intended to cover failed products, it has expanded to cover perfect goods that simply have not sold. From the consumer perspective, the buyer may return a good simply because they have decided not to keep it. Perhaps the largest source of increasing returns is the rapid increase of Internet purchases, which leads to increased returns as consumers buy merchandise "sight unseen" only to be disillusioned or dissatisfied with their purchase. Many e-retailers offer free returns and even free-shipping on returns in an effort to attract customers.

Consumer expectations have also changed as product life-cycles have been shortened by rapid technological advancement that makes products become obsolete more quickly. This has led to an increased demand for repairs, re-manufacturing, upgrades, or recalibration as well as discarding potentially valuable products that are no longer viewed as such by the current user. For example, many consumers purchase new televisions even though the one they own still has a useful life because the most recent model is larger, more advanced, or has new features.

The competitive environment of the twenty-first century global economy has also played a significant role in the rise of reverse supply chain logistics. An increase in global competition brought on by the advancement of free-trade agreements and the rapid economic rise of such newly industrializing nations as China, India, and Brazil has led to an increased drive to reduce costs. Firms are striving to take advantage of potentially good items and waste materials through reuse, recycling, or secondary usage. There has been an increased use of returnable or reusable containers for both public-relations purposes and in response to dwindling or increasingly expensive raw materials such as paper.

Finally, there is the issue of product recalls mandated by federal safety guidelines. The U.S. Consumer Product Safety Commission (CPSC), which protects the public from risks of injury or death from more than 15,000 types of consumer products, has issued over 4,000 product recalls and recall alerts. The globalization of the supply chain has resulted in a greater number of recalls as products are increasingly produced in countries with few environmental or safety regulations or poor enforcement of existing laws. The spate of Chinese-manufactured toys that were recalled in 2006 and 2007 dramatically highlighted this problem. In 2006, 467 products made in China were recalled by the CPSC, an annual record and nearly double the number from the beginning of the 2000s.

KEY COMPONENTS OF THE REVERSE SUPPLY CHAIN

Guide and Van Wassenhove list five key components to the reverse supply chain:

1. Product acquisition. The used product must be retrieved.

2. Reverse logistics. Once collected, used products are transported to some sort of facility for inspection, sorting, and disposition.

3. Inspection and disposition. The returned products are tested, sorted, and graded. Diagnostic tests may be performed to determine a disposal action that recovers the most value from the returned product. If a product is new it may be returned to the forward supply chain. Others may be eligible for some form or reconditioning while others may be sold for scrap or recycling.

4. Reconditioning. Some products may be reconditioned or completely remanufactured. Most people have seen products labeled *factory reconditioned* which implies it is used but like new and may have a warranty. Some products may have parts that can be extracted for reuse or as spare parts. Others go for salvage or recycling.

5. Distribution and sales. Reconditioned or remanufactured products may be sold in secondary markets where customers are unwilling to purchase a new product. In other instances the firm may need to create a new market if demand is not currently present. Of course, there are distribution needs in getting the product to the secondary market.

Blumberg lists a number of important characteristics that need to be managed, coordinated, and controlled if the reverse supply chain is to be economically viable:

- Uncertain flow of materials—firms often do not know when a return item will arrive nor are they certain of its condition. The item may be *like new* or may require substantial repair or even disposal. Field service engineers often try a new part in a field failure, assuming the old part is bad. Subsequently, the old part is returned. When it turns out that the new part did not fix the problem, the old part is still returned as *bad,* thus creating a flow of mixed good and bad parts. Typically, 30 to 35 percent of high-tech returns are perfectly good.

- Customer diversity—the return flow can be quite diverse and dependent upon the specific customer or end user. This may require considerable knowledge of specific customers and their use of the product.

- Time—from a cost or service perspective it may be desirable to return/repair/process an item as quickly as possible so that it may be quickly disposed of or reused.

- Value improvement—the firm will of course want to maximize the value of its return goods by transforming them into the state that will provide the most revenue or least cost.

- Flexibility—where demands fluctuate, the facility, transportation or other services may need to be flexible to support the firm's goals for the returned material.

- Multiparty coordination—since reverse logistics almost always involves multiple parties, an efficient and rapid real-time communication system or network is needed.

CLOSED-LOOP SUPPLY CHAIN

Increasingly, it is found that the original supplier is in the best position to control the return process. The basic reverse supply-chain logistics model operates independently of the forward supply chain that delivered the original product. When a firm controls the full process of forward and backward shipment the result is called a closed-loop supply chain.

The closed-loop supply chain generally involves a manufacturer, although sometimes it is the buyer, taking responsibility directly for the reverse logistics process. The products, parts, etc. are returned and recovered directly by the original manufacturer or through indirect (dealer) channels representing the original manufacturer's own field service force. The primary difference in this and the reverse supply chain is that in this model the entire direct and reverse flow can be and usually is controlled by the original manufacturer.

Within a closed-loop system involving a consumer market the primary interaction is between the retailer and the original manufacturer. Returns can be failed products or simply those purchased and returned. In this model there are two reverse linkages, consumer to retailer and retailer to original manufacturer.

Closed-loop systems allow firms to track the product and its failure-and-repair experience, thereby revealing how to cost-effectively service and support field service. Also, the close control and rapid recovery provided by a closed-loop system allows minimum inventory for field support. Blumberg states that inventory value is maximized in the following ways:

- Rapid returns to the manufacturer for reuse

- Ability to liquidate products, parts, and subassemblies with value to secondary markets

- Controlled recycling or disposition within environmental and other legal requirements

- Ability to efficiently process returns back into the original direct supply chain

Reducing inventory often produces significant additional efficiencies and results to the firm including the following:

- Simplifying processes of retail and wholesale return, reducing labor cost

- Reducing undesirable shrinkage and damage from returns

- Improving the database and visibility of products throughout their life cycle

- Reducing disposition cycle times, thereby, increasing cash flow

Blumberg also states that the strategic value of closed-loop reverse logistics management operations will have a very positive effect in terms of:

- Reducing the cost of returns

- Increasing the value of the salvage merchandise

- Capturing vital information and reliability, maintainability, and dependability of products supported

- Reducing transportation and warehousing expenses and time including the partial or full elimination of small package shipments

- Automating and fully controlling the total returns process

General experience dictates that the introduction of closed-loop supply chain management can result in the bottom line direct savings of 1 to 3 percent or more of total revenues, particularly for organizations in a mature or stagnating market.

RESPONSIVE VS. EFFICIENT

By strategic design, forward supply chains generally strive to be either efficient; that is, designed to deliver the product at a low cost; or responsive, meaning designed for speed of response. Obviously, there is a trade-off between the two structures; the quest for low cost (efficiency) would involve foregoing actions that would increase responsiveness, while striving for increased responsiveness almost always involves an increase in cost (or a decrease in efficiency).

Blackburn, Guide, Souza, and Van Wassenhove suggest that reverse supply chains follow a similar structure even though most currently strive to be efficient. They propose that reverse supply chains may be structured as efficient or responsive depending upon the type of product returned. Their research indicates that for reverse

supply chains, the most influential product characteristic is marginal value of time (MVT). They also propose that efficient reverse supply chains can achieve processing economies by delaying testing, sorting, and grading until the products have been collected at a central location. This works well for products that have a low marginal value of time. However, for items with a high marginal value of time, for example, PCs, a responsive reverse supply chain is appropriate. Early diagnosis, for example by field testing, can maximize asset recovery value by accelerating returns to their ultimate disposition, a process they call *preponement* (as opposed to the postponement tactic prevalent in forward supply chains). Also, diverting new and scrap products from the main flow for items requiring additional work, repair and reconditioning, reduce flow time. Therefore if efficiency is the objective, then the reverse supply chain should be designed to centralize the evaluation activity. If responsiveness is the goal, a decentralized evaluation activity would be appropriate in order to minimize time delays in processing returns.

The total value of returned products in the United States alone is estimated at $100 billion per year. The factors influencing this trend—such as environmental legislation and awareness, rising consumer expectations, and global competition—are unlikely to be reversed any time soon. With this kind of volume and the strength of the underlying factors, the importance of improving reverse supply chain logistics is likely to continue increasing in the foreseeable future.

SEE ALSO *Inventory Management; Inventory Types; Logistics and Transportation; Production Planning and Scheduling; Purchasing and Procurement; Quality and Total Quality Management; Supply Chain Management*

BIBLIOGRAPHY

Blackburn, Joseph D., et al. "Reverse Supply Chains for Commercial Returns." *California Management Review* 46, no. 2 (2004): 6–22.

Blumberg, Donald F. *Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes.* Boca Raton, FL: CRC Press, 2005.

Guide, V. Daniel R., Jr., and Luk N. Van Wassenhove. "The Reverse Supply Chain." *Harvard Business Review* 80, no. 2 (2002): 25–26.

Lipton, Eric S., and David Barboza. "As More Toys Are Recalled, Trail Ends in China." *New York Times*, 19 June 2007. Available from: http://www.nytimes.com/2007/06/19/business/worldbusiness/19toys.html.

Pochampally, Kishore K., Satish Nukala, and Surendra M. Gupta. *Strategic Planning Models for Reverse and Closed-Loop Supply Chains.* Boca Raton, FL: Taylor & Francis, 2008.

"Recalls and Product Safety News." *U.S. Consumer Product Safety Commission.* Available from: http://www.cpsc.gov/cpscpub/prerel/prerel.html.

Sarkis, Joseph. *Greening the Supply Chain* London: Springer, 2006.

RIGHTSIZING

SEE *Downsizing and Rightsizing*

RISK MANAGEMENT

Risk management is a systematic process of identifying and assessing company risks and taking actions to protect a company against them. The task of the risk manager is to predict and enact measures to control or prevent losses within a company. The risk-management process involves identifying exposures to potential losses, measuring these exposures, and deciding how to protect the company from harm given the nature of the risks and the company's goals and resources. Some risk managers define risk as the possibility that a future occurrence may cause harm or losses, while noting that risk also may provide possible opportunities. By taking risks, companies sometimes can achieve considerable gains. However, companies need risk management to analyze possible risks in order to balance potential gains against potential losses and avoid expensive mistakes.

THE EVOLUTION OF RISK MANAGEMENT

The field of risk management emerged in the mid-1970s, evolving from the older field of insurance management. The term *risk management* was adopted because the new field has a much wider focus than simply insurance management. Risk management includes activities and responsibilities outside of the general insurance domain, although insurance is an important part of it and insurance agents often serve as risk managers. Insurance management focused on protecting companies from natural disasters and basic kinds of exposures, such as fire, theft, and employee injuries, whereas risk management focuses on these kinds of risks as well as other kinds of costly losses, including those stemming from product liability, employment practices, environmental degradation, accounting compliance, offshore outsourcing, currency fluctuations, and electronic commerce.

In the 1980s and 1990s, risk management grew into a vital part of company planning and strategy and risk management became integrated with more and more company functions as the field evolved. New areas of risk management began to emerge in the 1990s, providing managers with more options to protect their companies against new kinds of exposures. According to the Risk and Insurance Management Society (RIMS), the main trade organization for the risk management profession, among the emerging areas for risk management were operations management, environmental risks, and ethics. As the role of risk management has increased to encompass large-scale, organization-wide programs, the field has become known as enterprise risk management (ERM).

TYPES OF RISK

Risk managers need to be aware of the types of risks they face. Common types of risks include automobile accidents, employee injuries, fire, flood, and tornadoes, although more complicated types such as liability and environmental degradation also exist. Furthermore, companies face a number of risks that stem primarily from the nature of doing business. In *Beyond Value at Risk* (1998) Kevin Dowd sums up these different types of risks companies face by placing them in five general categories:

1. Business risks or those associated with an organization's particular market or industry

2. Market risks or those associated with changes in market conditions, such as fluctuations in prices, interest rates, and exchange rates

3. Credit risks or those associated with the potential for not receiving payments owed by debtors

4. Operational risks or those associated with internal system failures because of mechanical problems (e.g., machines malfunctioning) or human errors (e.g., poor allocation of resources)

5. Legal risks or those associated with the possibility of other parties not meeting their contractual obligations

Environmental risks constitute a significant and growing area of risk management, since reports indicate the number and intensity of natural disasters are increasing. For example, the periodical *Risk Management* reported that there were about five times as many natural disasters in the 1990s as in the 1960s, and the 2000s seemed to continue this trend. In 2004, three major hurricanes hit the state of Florida, and a tsunami caused death and incalculable devastation in the Pacific Rim. Hurricane Katrina, which hit the Gulf Coast in 2005, was the costliest hurricane in U.S. history. Analysts expect that the twenty-first century will be just as bad as or worse than the past. Some observers blame the rising number of natural disasters on global warming, which they believe will cause greater floods, droughts, and storms in the future. Whatever the cause, it is clear that natural disasters are wreaking expensive havoc.

Any given risk can lead to a variety of losses in different areas. For example, if a fire occurs, a company could lose its physical property such as buildings, equipment, and materials. In this situation, a company also could lose

revenues, in that it could no longer produce goods or provide services. Furthermore, a company could lose human resources in such a disaster. Even if employees are not killed or injured, a company would still suffer losses because employers must cover benefits employees draw when they miss work.

ASSESSING RISKS ASSOCIATED WITH DOING BUSINESS

One way managers can assess the risks of doing business is by using the risk calculator developed by Robert Simons, a professor at the Harvard Business School. Although the risk calculator is not a precise tool, it does indicate areas where risks and potential losses exist, such as the rate of expansion and the level of internal competition. Using the risk calculator, managers can determine if their company has a safe or dangerous amount of risk. The risk calculator measures three kinds of internal pressures: risk stemming from growth, corporate culture, and information management. Rapid growth, for example, could be a risk and lead to losses, because if a company grows too quickly, it may not have enough time to train new employees adequately. Hence, unchecked growth could lead to lost sales and diminished quality.

Managers can assess the increased risk associated with growth by determining if sales goals are set by top management without input from employees. If a company sets sales goals in this manner, then it has a high level of risk in that the goals may be too difficult for employees to meet. In cases where employees feel extreme pressure in trying to achieve goals, they may take unnecessary risks. Similarly, companies that rely heavily on performance-based pay also tend to have higher levels of risk.

To assess risk arising from corporate culture, managers should determine what percentage of sales comes from new products or services developed by risk-taking employees. If the percentage is high, then the amount of risk is also high, because such a company depends significantly on new products and the related risks. In addition, a corporate culture that allows or encourages employees to work independently to develop new products increases company risk, as does a high rate of new product or service failures.

Finally, managers can determine business risks resulting from information management by determining if they and their subordinates spend a lot of time gathering information that should already be available. Another way of assessing these risks is by managers considering whether they look at performance data frequently and whether they notice if reports are missing or late.

RISK MANAGEMENT METHODS

Company managers have three general options when it comes to choosing a risk manager:

1. Insurance agents provide risk assessment services and insurance advice and solutions to their clients.
2. Salaried employees manage risk for their company (often chief financial officers or treasurers).
3. Independent consultants provide risk-management services for a fee.

Because risk management has become a significant part of insurance brokering, many insurance agents work for fees instead of for commissions. To choose the best type of risk manager for their companies, managers should consider the company's goals, size, and resources.

Risk managers rely on a variety of methods to help companies avoid and mitigate risks in an effort to position them for gains. The four primary methods include exposure or risk avoidance, loss prevention, loss reduction, and risk financing. A simple method of risk management is exposure avoidance, which refers to avoiding products, services, or business activities with the potential for losses, such as manufacturing cigarettes. Loss prevention attempts to root out the potential for losses by implementing such things as employee training and safety programs designed to eradicate risks. Loss reduction seeks to minimize the effects of risks through response systems that neutralize the effects of a disaster or mishap.

The final option risk managers have is to finance risks, paying for them either by retaining or transferring their costs. Companies work with risk managers insofar as possible to avoid risk retention. However, if no other method is available to manage a particular risk, a company must be prepared to cover the losses; that is, to retain the losses. The deductible of an insurance policy is an example of a retained loss. Companies also may retain losses by creating special funds to cover any losses.

Risk transferring takes place when a company shares its risk with another party, such as an insurance provider, by getting insurance policies that cover various kinds of risk that can be insured. In fact, insurance constitutes the leading method of risk management. Insurance policies usually cover (a) property risks such as fire and natural disasters, (b) liability risks such as employer's liability and workers' compensation, and (c) transportation risks covering air, land, and sea travel as well as transported goods and transportation liability. Managers of large corporations may decide to manage their risks by acquiring an insurance company to cover part or all of their risks, as many have done. Such insurance companies are called captive insurers.

Risk managers also distinguish between preloss and postloss risk financing. Preloss risk financing includes financing obtained in preparation for potential losses, such as insurance policies. With insurance policies, companies pay premiums before incurring losses. On the other hand, postloss financing refers to obtaining funds

after losses are incurred (i.e., when companies obtain financing in response to losses). Obtaining a loan and issuing stocks are methods of postloss financing.

During the implementation phase, company managers work with risk managers to determine the company goals and the best methods for risk management. Generally, companies implement a combination of methods to control and prevent risks effectively, since these methods are not mutually exclusive, but complementary. After risk management methods have been implemented, risk managers must examine the risk management program to ensure that it continues to be adequate and effective.

EMERGING AREAS OF RISK MANAGEMENT

Beginning in the 1990s and continuing into the twenty-first century, risk managers have started focusing on new types of risks and have begun using new methods of risk analysis. As the authors of *Making Enterprise Risk Management Pay Off* (2002) noted at the beginning of the 2000s, "As businesses worldwide enter the twenty-first century, they face an assortment of risks almost unimaginable just 10 years ago."

Risk managers of corporations have started focusing more on verifying their companies' compliance with federal environmental regulations. According to *Risk Management,* risk managers began to assess environmental risk such as those arising from pollution, waste management, and environmental liability to help make their companies more profitable and competitive. Furthermore, tighter environmental regulations also goaded businesses to have risk managers check their compliance with environmental policies to prevent possible penalties for noncompliance.

Companies also have the option of obtaining new kinds of insurance policies to control risks, which managers and risk managers can take into consideration when determining the best methods for covering potential risks. These nontraditional insurance policies provide coverage of financial risks associated with corporate profits and currency fluctuation. Hence, these policies in effect guarantee a minimum level of profits, even when a company experiences unforeseen loss from circumstances it cannot control (e.g., natural disasters or economic downturns). Moreover, these nontraditional policies ensure profits for companies doing business in international markets, and hence they help prevent losses from fluctuations in a currency's value.

Risk managers can also help alleviate losses resulting from mergers. Stemming from the wave of mergers in the 1990s and 2000s, risk managers became a more integral part of company merger and acquisition teams. Both parties in these transactions rely on risk management services to determine and control or prevent risks. On the buying side, risk managers examine a selling company's expenditures, loss history, insurance policies, and other areas that indicate a company's potential risks. Risk managers also suggest methods for preventing or controlling the risks they find.

Finally, risk managers have been called upon to help businesses manage the risks associated with increased reliance on the Internet. The importance of online business activities in maintaining relationships with customers and suppliers, communicating with employees, and advertising products and services has offered companies many advantages, but it has also exposed them to new security risks and liability issues. Business managers need to be aware of the various risks involved in electronic communication and commerce and include Internet security among their risk management activities.

ENTERPRISE RISK MANAGEMENT (ERM)

As the field of risk management expanded to include managing financial, environmental, and technological risks, the role of risk managers grew to encompass the organization-wide risk embodied in ERM. This approach seeks to implement risk awareness and prevention programs throughout a company, thus creating a corporate culture able to handle the risks associated with a rapidly changing business environment. Practitioners of ERM incorporate risk management into the basic goals and values of the company and support those values with action. They conduct risk analyses, devise specific strategies to reduce risk, develop monitoring systems to warn about potential risks, and perform regular reviews of the program.

The development of ERM was spurred by sudden and dramatic changes in the business environment. As the authors of the 2008 *New Frontiers in Enterprise Risk Management* note, the development of ERM was "encouraged by traumatic recent events such as 9/11 and business scandals to include Enron and WorldCom." Passage of the Sarbanes-Oxley Act of 2002 provided the concrete impetus for a number of large firms to implement enterprise risk management. Passed in the wake of scandals involving accounting compliance and corporate governance, the act required public companies to enact a host of new financial controls. In addition, it placed new, personal responsibility on boards of directors to certify that they are aware of current and future risks and have effective programs in place to mitigate them. "Fueled by new exchange rules, regulatory initiatives around the globe, and a bevy or reports that link good corporate governance with effective risk management, attention is turning to ERM," Lawrence Richter Quinn noted in *Financial Executive.* "[Some executives believe that it] will

save companies from any number of current and future ills while providing significant competitive advantages along the way."

In late 2004 the London-based Treadway Commission's Committee of Sponsoring Organizations (COSO) issued *Enterprise Risk Management-Integrated Framework,* which provided a set of "best practice" standards for companies to use in implementing ERM programs. The COSO framework expanded on the work companies were required to do under Sarbanes-Oxley and provided guidelines for creating an organization-wide focus on risk management. According to *Financial Executive,* between one-third and one-half of *Fortune* 500 companies had launched or were considering launching ERM initiatives by the end of 2004.

While companies face a host of different risks, some are more important than others. Risk managers determine their importance and ability to be affected while identifying and measuring exposures. For example, the risk of flooding in Arizona would have low priority relative to other risks a company located there might face. Risk managers consider different methods for controlling or preventing risks and then select the best method given the company's goals and resources. After the method is selected and implemented, the method must be monitored to ensure that it produces the intended results.

Risk management is best used as a preventive measure rather than as a reactive measure. Companies benefit most from considering their risks when they are performing well and when markets are growing in order to sustain growth and profitability.

SEE ALSO *Strategic Planning Tools; Succession Planning*

BIBLIOGRAPHY

Barton, Thomas L., William G Shenkir, and Paul L. Walker. *Making Enterprise Risk Management Pay Off: How Leading Companies Implement Risk Management.* Upper Saddle River, NJ: Prentice Hall, 2002.

Crouhy, Michel, Dan Galai, and Robert Mark. *The Essentials of Risk Management.* New York: McGraw-Hill, 2006.

D'Arcangelo, James R. "Beyond Sarbanes-Oxley: Section 404 Exercises Can Provide the Starting Point for a Comprehensive ERM Program." *Internal Auditor* (October 2004).

Dowd, Kevin. *Beyond Value at Risk.* New York: Wiley, 1998.

Lam, James. *Enterprise Risk Management: From Incentives to Controls.* Hoboken, NJ: John Wiley, 2003.

Mills, Evan. "The Coming Storm: Global Warming and Risk Management." *Risk Management* (May 1998): 20.

Moeller, Robert. *COSO Enterprise Risk Management: Understanding the New Integrated ERM Framework.* Hoboken, NJ: Wiley, 2007.

Quinn, Lawrence Richter. "ERM: Embracing a Total Risk Model." *Financial Executive* (January-February 2005).

Olson, David L., and Desheng Wu, eds. *New Frontiers in Enterprise Risk Management.* Berlin: Springer-Verlag, 2008.

Risk and Insurance Management Society, Inc. *RIMS.org* Available from: http://www.rims.org/.

Simons, Robert. "How Risky Is Your Company?" *Harvard Business Review* (May 1999): 85.

Telegro, Dean Jeffery. "A Growing Role: Environmental Risk Management in 1998." *Risk Management* (March 1998): 19.

White, Larry. "Management Accountants and Enterprise Risk Management." *Strategic Finance* (November 2004).

ROBOTICS

Robotics is a form of automation that is helping twenty-first century manufacturers in numerous industries gain rapid increases in productivity. Functions formerly performed by humans—especially difficult, dangerous, monotonous, or tedious tasks—are now often assumed by robots or other mechanical devices that can be operated by humans or computers. Moreover, robots can be used to take the place of humans in extreme settings or life-threatening situations involving nuclear contaminants, corrosive chemicals, or poisonous fumes. Firmly established as a critical manufacturing technology, robotics is gaining increasing acceptance by the workforce, garnering praise for its reliability, and being utilized more extensively in medium and small companies.

THE USE OF INDUSTRIAL ROBOTS

As manufacturing assembly has grown increasingly complex, the need for new and expanded capabilities, particularly in automated assembly systems, has become evident. As components get smaller, as in microchip manufacturing, greater precision is required, and throughout manufacturing, greater flexibility and higher throughput are necessary for competitive advantage. Manual assembly no longer suffices for a great many of manufacturing's current requirements. Without industrial robots, many manufacturing tasks would simply be impossible, or their performance would be prohibitively expensive.

During the early stages of robotics development, the automobile industry was the main market for robot manufacturers. In the early 1980s, 70 percent of robot orders were for use in the automotive industry. During this time, robot manufacturers simultaneously improved their reliability and performance and sought to lessen their dependence on the automotive industry by focusing on specific niche markets. By concentrating on applications other than spot welding, painting, and dispensing, the robotics industry was able to develop products that could successfully handle not only assembly, but also material handling and material removal. Spot welding, which for a long time was the major application of robotics, eventually was eclipsed by materials handling.

While the automobile industry remains the largest user of robotics, other industries are increasing their use of robotics. The development of materials-handling robots was a clear indication that the robotics industry was becoming less dependent on the automobile industry, since materials handling is used in a wide and varied range of industries. Additionally, non-manufacturing applications started to become viable in such areas as security, health care, environmental cleanup, and space and undersea exploration. According to reports from the Robotics Industries Association (RIA), industries such as semiconductors and electronics, metals, plastics and rubber, food and consumer goods, life sciences and pharmaceuticals, and aerospace are all finding ways that their services can be enhanced and improved through robotics.

Some manufacturers are also improving the quality of their products by using robots with powerful machine-vision inspection equipment or by linking their robots to statistical process control systems. Robot fixtures can move quickly and fluidly without sacrificing accuracy. Servo-driven positioners can be programmed to handle more than one model on the same line, something especially important to lean organizations. This programmability also allows its users to set up the systems again and again for different applications. In most cases, converting robots from one application to another can be completed with minimal downtime, requiring only programming changes. Benefits include reduced capital expenses (a firm does not have to buy new fixtures for new applications), as well as reduced floor space requirements, lead-time, component expenses, and training investment.

GROWTH IN THE ROBOTICS INDUSTRY

Robotics technology was first developed in the United States, but Japanese manufacturers were the first to fully embrace robotics. Observers view this as a significant factor in Japan's emergence as a global manufacturing power. Today Japan is not only one of the major users of manufacturing robotics, but it is also the dominant manufacturer of industrial robots.

The robotics industry has been growing in the twenty-first century. The Robotic Industries Association (RIA) reports that an estimated 178,000 industrial robots are in use in the United States as of 2008, up from 82,000 in 1998. In 2007, North American manufacturers purchased nearly 16,000 robots valued at over $1 billion, a 24 percent increase from the previous year. The key factors driving the current growth in robotics are mass customization of electronic goods (specifically communications equipment), the miniaturization of electronic goods and their internal components, and the restandardization of the semiconductor industry. The food and

beverage industry is also in the midst of an equipment-spending boom in an effort to improve operating efficiencies. Robot installations for such tasks as packaging, palletizing, and filling are expected to see continued growth. In addition, increases are anticipated in the aerospace, appliance, and non-manufacturing markets.

Though less dependent on the automotive industry than in the past, the robotics industry still finds its widest application in that market. Purchases in 2007 were particularly high in the automobile industry, with a 100 percent increase in orders for spot-welding robots and a 38 percent increase for coating and dispensing robots. However, driven by the need for increased manufacturing efficiency, the automakers and automotive-related industries are moving away from hard automation in favor of flexible automation. Analysts predict greater use of robots for assembly, paint systems, final trim, and parts transfer in the automotive industry. Realistic robot simulation is making an impact by integrating vehicle design and engineering into manufacturing.

One reason for increased practicality of robots is the availability to control machinery and systems through personal or laptop computers. According to Waurzyniak, some advances in computer-guided systems are robots with force-sensing capabilities and 3-D and 2-D vision-guidance capabilities. NASA is using sophisticated computer-guided robot controllers for its space shuttle *Endeavor* and the Mars landing craft. Each of these systems utilize computer control of some sort, ranging from simple machine-specific tracking to shop-wide data collection across a variety of machinery and instruments to galactic monitoring and control in a unique, outer space environment.

THE FUTURE OF ROBOTICS

To some, the future of robotics has never looked brighter. While robots are now a fixture in factories, robotics experts expect to see their range increasing. The author of *Theory of Applied Robotics: Kinematics, Dynamics, and Control* (2007) states, "Robots are prospective machines whose application area is widening." Other observers are even more excited, expecting robots to lead from the factory to other areas of life relatively soon. As the author of *Robots: From Science Fiction to Technological Revolution* (2005) put it, "Now, on the cusp of the 21st century, [robots] are poised to saturate every aspect of our culture, from medicine, science, and industry to artworks, toys, and household appliances."

Production of bipedal robots that mimic human movement are being created around the globe. Honda Motor Company's ASIMO (Advanced Step in Innovative Mobility) robot is considered the world's most advanced humanoid robot. It can climb stairs, kick, walk, talk, dance, and even communicate and interact via its voice

and facial recognition systems. Honda plans to one day market the robot as an assisted-living companion for the disabled or elderly. Other robots that simulate human movement have been created at Cornell University, Massachusetts Institute of Technology (MIT), and Holland's Delft University of Technology.

Chip Walter's 2005 article, "You, Robot," discusses renowned robotics researcher, Hans Moravec, Carnegie Mellon University scientist and cofounder of the university's Robotics Institute. Moravec is known for his long-standing prediction that super-robots that can perceive, intuit, adapt, think, and even simulate feelings, much like humans, will be practicable before the year 2050. His confidence in his predictions led him to open his own robotics firm in 2003, the Seegrid Corporation, to assist him in fulfilling his claims. His path toward that vision is to start simply—to create mobile carts with software and vision systems that can be "taught" to follow paths and navigate independently. Moravec believes that machines will evolve in small steps, eventually reaching the levels of human intelligence and movement. His bedrock belief, on which he bases his technology, is "... if robots are going to succeed, the world cannot be adapted to them; they have to adapt to the world, just like the rest of us."

Stuart Brown reports that navigation technologies such as the global positioning system (GPS) are allowing industrial robots to move around in the world. GPS in conjunction with inertial navigation systems (INS) and the booming field of silicon micro-electromechanical systems (MEMS) are impacting robotics from simple automated lawn mowers to complex airplane control systems. Robotics are reaching the micro-level with the exploration of robotic water "insects" equipped with biomechanical sensors that could be used as environmental monitors. The current prototype weighs less than a gram and draws power from ultra-thin electrical wires. An affordable and time-saving alternative to locating gas leaks has been developed in a pipe-inspecting robot crawler; equipped with multiple joints and video cameras, it easily navigates sharp turns and narrow pipes while projecting images of pipe integrity to a monitor. Plans for the future include a sensor that will detect corrosion and cracks in the pipes that do not appear in the video images.

Robots have come of age. While they were initially used for fairly simple tasks such as welding and spray-painting automobiles, these machines have increased tremendously in ability over the last decade, reaching further than simple auto applications. Robotics will remain vital in the decades to come due to expanding scientific fields and increasing demand for more affordable and sophisticated methods of accomplishing common tasks. If robotics experts and forecasters are correct, people will soon see robots leaving the factory and taking their place among the rest of society, performing tasks once imagined only in science fiction.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management; Simulation*

BIBLIOGRAPHY

Brown, S.F. "Send in the Robots!" *Fortune* (Industrial Management Version), 24 January 2005, 140C–146C.

Ichbiah, Daniel. *Robots: From Science Fiction to Technological Revolution.* New York, NY: Harry N. Abrams, Inc, 2005.

Jazar, Reza N. *Theory of Applied Robotics: Kinematics, Dynamics, and Control.* New York: Springer, 2007.

Meredith, Jack R., and Scott M. Shafer. *Operations Management for MBAs.* 3rd ed. New York, NY: John Wiley & Sons, Inc, 2006.

Robotic Industries Association. "North American Robot Orders Jump 24% in 2007." *Robotics Online*, 21 February 2008. Available from: http://www.robotics.org/content-detail.cfm/Industrial-Robotics-News/North-American-Robot-Orders-Jump-24-in-2007/content_id/423.

Siciliano, Bruno, and Oussama Khatib, eds. *Springer Handbook of Robotics.* New York: Springer, 2008.

"Six Degrees of Robotic Fixturing." *Automotive Manufacturing & Production* 110, no. 11 (1998): 80.

Vincent, D.A. "Leading the Charge to a Productive 21st Century." *Robotics World* 16, no. 4 (1998): 19–26.

Walter, Chip. "You, Robot." *Scientific American* 292, no. 1 (2005): 36–37.

Waurzyniak, P. "Automating the Factory." *Manufacturing Engineering* 134, no. 2 (2005): 93–99.

"Your Standard Robot." *Machine Design* 70, no. 15 (1998): 56.

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SAFETY IN THE WORKPLACE

Workplace safety is one of the biggest concerns of employers today. A wide range of government regulations covers workplace safety, yet workplace accidents are increasingly common. Organizations have both a moral and a legal responsibility to ensure the safety and well-being of their members. Organizational practices that promote safety can also help a company establish competitive advantage by reducing costs, which include lost time, damaged equipment and materials, and worker's compensation payments.

WORKPLACE INJURIES

Despite laws designed to ensure safety at the workplace, U.S. companies' accident rates are alarmingly high. The Bureau of Labor Statistics (BLS) statistics for 2006 show that there were over 4,000,000 nonfatal workplace injuries in private industry and nearly 6,000 work-related fatalities. According to one estimate, employees lose roughly 80,000,000 workdays annually from workplace injuries.

The causes of workplace injuries can be divided into three categories: employee error, equipment insufficiency, and procedure insufficiency. Examples of causes falling within each category include the following:

- Employee error—misjudged situations; distractions by others; neuromuscular malfunctions; inappropriate working positions; knowingly using defective equipment

- Equipment insufficiency—lack of appropriate equipment; safety devices being removed or inoperative; lack of such things as engineering controls, respiratory protection, and protective clothing

- Procedure insufficiency—failure of hazard-warning procedures; inappropriate procedure for handling materials; failure to lock out or tag out; lack of written work procedures

GOVERNMENT REGULATION OF WORKPLACE SAFETY

Federal laws regulate the safety practices of most organizations in an attempt to prevent or reduce the incidence of workplace injuries. The following discussion is limited to laws that affect a majority of organizations; there are, however, additional laws that cover particular segments of the workforce such as government contractors or workers in the mining, transportation, nuclear power, and food and drug industries.

Occupational Safety and Health Act. The Occupational Safety and Health Act of 1970 is the most comprehensive and wide-ranging legislation in the area of workplace safety. It applies to nearly all U.S. workplaces. The act aims to ensure safe working conditions for every American worker by setting and enforcing workplace safety standards, promoting employer-sponsored educational programs that foster safety and health, and requiring employers to keep records regarding job-related safety and health matters. The main agency created by this act is the Occupational Safety and Health Administration (OSHA), which develops and enforces health and safety standards. Also created were the Occupational Safety and

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Figure 1

OSHA – Employee Responsibilities

- Read the OSHA poster at the jobsite.
- Comply with all applicable OSHA standards.
- Follow all lawful employer safety and health rules and regulations, and wear or use prescribed protective equipment while working.
- Report hazardous conditions to the supervisor.
- Report any job-related injury or illness to the employer, and seek treatment promptly.
- Exercise rights under the Act in a responsible manner.

Health Review Commission, which hears appeals from employers who wish to contest OSHA rulings, and the National Institute for Occupational Safety and Health, which conducts health and safety research to suggest new standards and update previous ones.

The most active of these three agencies is OSHA, which has issued thousands of safety and health standards. Areas of basic concern include fire safety, personal protection equipment, electrical safety, basic housekeeping, and machine guards. Each standard specifies such things as permissible exposure limit, monitoring requirements, methods of compliance, personal protective equipment, hygiene facilities, training, and record-keeping.

To comply with these standards, most mid- to large-sized organizations employ safety professionals to keep up with them and ensure that each is being met. These professionals face too many specific issues to mention here, but some of the most important issues they must address appear in Figure 1.

Companies with more than ten employees are subject to routine OSHA inspections. Companies with fewer than ten employees are exempt from such inspections, but can be investigated if a safety-related problem is brought to the attention of OSHA. High-hazard industries, such as manufacturing firms, chemical companies, and construction companies, are subject to inspections regardless of the number of employees.

OSHA conducts inspections based on the following priority classifications, which are listed in order of importance:

1. *Imminent danger.* OSHA gives top priority to workplace situations that present an "imminent danger" of death or serious injury to employees. The company must take immediate corrective action.

2. *Fatality or catastrophe investigations.* The second highest priority is given to sites that have experienced an accident that has caused at least one employee to die or three or more to be hospitalized. Employers must report these events within eight hours. The

inspection aims to determine the cause of the accident and whether any violation of OSHA standards contributed to it.

3. *Employee complaint investigations.* OSHA responds third to employee complaints about hazards or violations. The speed with which OSHA responds depends on the seriousness of the complaint. Employees may request to remain anonymous.

4. *Referrals from other sources.* Consideration is given to referrals of hazard information from federal, state and local agencies, individuals, organizations, and the media.

5. *Follow-ups.* OSHA sometimes will return to verify that violations have been corrected.

6. *General programmed inspections.* OSHA will also inspect an organization if it is a high-hazard industry or has a lost workday injury rate that is above the national norm for that industry.

When an OSHA inspection reveals that an employer has violated one of its standards, it issues a citation. The citation, posted near the site of the violation, lists the nature of the violation, the abatement period (i.e., the time frame within which the company must rectify the problem), and any penalty levied against the employer. Willful violations (i.e., those that an employer intentionally and knowingly commits) carry a penalty of up to $70,000 for each offense. If a death occurs because of a willful violation, the employer may be both fined and imprisoned.

Hazard Communication Standard. In 1984 Congress enacted the Hazard Communication Standard (HCS)—also commonly referred to as the Employee Right-to-Know Law. This law gives workers the right to know what hazardous substances they are dealing with on the job, and it requires all organizations to (1) develop a system for inventorying hazardous substances, (2) label the containers of these substances, and (3) provide employees with needed information and training to handle and store these substances safely. A substance is considered hazardous if exposure to it can lead to acute or chronic health problems. Federal and state agencies have compiled lists of more than 1,000 substances deemed hazardous under this law. According to a 2004 OSHA report, over thirty million American workers are exposed to hazardous chemicals in their workplaces.

Government fines for right-to-know violations may be as high as $1000 per chemical for first violations and $10,000 per chemical for second violations. Additional penalties for environmental crimes include fines up to $75,000 per day and imprisonment. Despite these penalties, violations are of the HCS are quite common. Over 7,000 citations were issued in 2003, making it the second

most frequently cited OSHA standard. Over $1.3 million in penalties were assessed for these violations. The majority of companies are cited for failing to have:

- Written hazard communication programs

- An up-to-date hazardous chemical inventory list

- Properly labeled chemical containers

- Material safety data at the work site, in the form of material safety data sheets (MSDS)

- Training programs for teaching employees about the chemicals they work with

Americans with Disabilities Act. Another law affecting organizational safety and health practices is the Americans with Disabilities Act (ADA). An individual is protected by the ADA if he or she is disabled, that is, if the individual has a physical or mental impairment that substantially limits one or more of the individual's major life activities. According to the ADA regulations, temporary, non-chronic impairments that are short in duration and have little or no long-term impact are usually not considered disabilities under the act. For example, broken limbs, sprains, concussions, appendicitis, or influenza are not disabilities. However, if a broken leg did not heal properly and resulted in permanent impairment that significantly restricted walking or other major life activities, it could then be considered a disability.

In 2007, there were 17,734 total charges filed as ADA violations with the Equal Employment Opportunity Commission (EEOC). From July 1992 (when the law first took effect) through the end of 2007, employees had filed a total of 253,199 complaints with the EEOC. Employees who became disabled as the result of workplace conditions or injuries filed about half of these charges. Individuals with back impairments have lodged the greatest number of charges. People also frequently claimed emotional, neurological, and extremity impairments.

Penalties for ADA violations may be as high as $50,000 for initial violations and up to $100,000 for each subsequent violation. In addition, the Civil Rights Act of 1991 allows claimants to collect up to $300,000 in punitive damages for "willful" violations.

COSTS ASSOCIATED WITH WORKPLACE INJURIES

Failure to ensure safety in the workplace can be quite expensive for employers. Unintentional injuries alone cost around $150 billion per year for medical and insurance costs, workers' compensation, survivor benefits, lost wages, damaged equipment and materials, production delays, other workers' time losses, selection and training costs for replacement workers, and accident reporting.

Additionally, the legal penalties for violating safety laws can be quite severe. In addition to being issued large fines, employers who violate safety regulations can be held liable for criminal charges. The following two examples of OSHA fines illustrate the types of penalties associated with such violations:

- In November 2004, OSHA fined a General Motors (GM) Powertrain plant in Massena, New York, for six serious safety violations, including an obstructed exit route, inadequate guarding of moving machine parts, and the failure to assess the need for personal protective equipment for workers. There were additional fines for recordkeeping violations, specifically underreporting injuries and illnesses. The penalty was $160,000.

- In June 2008, OSHA fined the Niagara Falls Memorial Medical Center for failing to protect construction workers from asbestos exposure during a 2007 renovation. The medical facility was ordered to pay $110,000 in fines.

ACCIDENT PREVENTION

Workplace accidents pose serious problems for employees and for a firm's competitive advantage, but employers can prevent most of them. Many preventive strategies work.

Some people just seem to be accident prone. If some people do have inherent tendencies toward accidents, then organizations should be able to lower their accident rates by screening out accident-prone applicants. Research studies have discovered that individuals with certain personality characteristics are more likely than others to be involved in industrial accidents. For instance, one study found that people with higher accident rates tend to be impulsive and rebellious, and they tend to blame outside forces, rather than themselves, for their mishaps. Another study identified the following four "high-risk" personality characteristics:

- Risk taking: high risk-takers actually seek out danger rather than trying to minimize or avoid it.

- Impulsiveness: impulsive individuals fail to think through the consequences of their actions.

- Rebelliousness: rebellious individuals tend to break established rules, including safety rules.

- Hostility: hostile individuals tend to lose their tempers easily and thus engage in aggressive acts, such as kicking a jammed machine.

Many organizations now use personality tests to screen out individuals with accident-prone tendencies. For example, some companies use a test (called the Personnel Selection Inventory–Form 3S) to assess applicants'

safety consciousness. One part of the test measures the degree to which individuals perceive a connection between their own behavior and its consequences. As noted earlier, individuals unable to see this connection are at greater risk for accidents.

Employers who provide all new employees with training on safe and proper job procedures experience fewer accidents. Employees should learn how to perform each of their tasks as safely as possible. Training should be very specific, as illustrated in the example that follows. This example covers the procedures to be followed by employees working at a large food manufacturing plant:

- When picking up pans from the conveyor belt, pick up no more than two pans before you place them on the pan rack.
- Stack roll pans no higher than the rear rail of the pan rack.
- When you lift or lower the dough, keep both hands on the dump chain.
- When you pull the dough trough away from the dough mixer, hold both hands on the front rail and not on the rail sides.

While safety training is essential, employees do not always apply what they have learned. Just as many automobile drivers know it is wrong to exceed legal speed limits but do it anyway, workers may choose to ignore instructions and carry out procedures in their own, unsafe way. One way to mitigate this problem is to implement a safety incentive program. Such programs aim to motivate safe behavior by providing workers with incentives for avoiding accidents. The organization formulates safety goals (usually on a department-wide basis) and rewards employees if these goals are met. For example, a particular department may establish the goal of reducing lost-time accidents by 50 percent over the next three months. If this goal were to be met, all employees within that department would receive an incentive reward, usually in the form of a cash bonus or merchandise.

Safety incentive programs often work quite well. For example, Willamette Industries implemented a program because it was experiencing an average of thirty accidents per year that caused people to miss work. As a result of the program, the company went 450 days without a lost-time accident.

Two problems often arise with safety incentive programs, however. In some cases, workers get so caught up in trying to win incentive rewards that they conceal their injuries and do not report them. When injuries go unreported, injured workers relinquish their rights to workers' compensation and firms remain unaware of safety problems. Second, workers may continue to perform in an unsafe

manner (e.g., take risky shortcuts) because they remain unconvinced that such behavior is likely to result in accidents. Unfortunately, these employees are grievously mistaken; unsafe behaviors are a leading cause of accidents. According to one estimate, for every 100,000 unsafe behaviors there are 10,000 near-miss accidents, 1,000 recordable accidents, 100 lost-time accidents, and 1 fatality.

SAFETY AUDITS

Because employees who "know better" often continue to engage in accident-causing behavior, many employers have redirected their focus from accident prevention to the prevention of unsafe acts that could lead to an accident. To do so, firms conduct safety audits. A safety committee or supervisors who observe employees on the job and correct unsafe behaviors generally conduct such audits.

Each employee should be monitored according to a planned schedule, generally on a weekly basis, as follows:

Step 1: Observation. Stop in the work area for a few moments and observe worker's activities, looking for both safe and unsafe practices. Use the following guide:

- Be alert to unsafe practices that the employee corrects immediately upon seeing you enter the area (putting on protective equipment, such as gloves or goggles).
- Note whether appropriate protective clothing is being worn.
- Observe how employees use tools.
- Scrutinize the safety of the work area. For instance, is the floor slippery?
- Determine whether rules, procedures, and operating instructions are being followed.

Step 2: Employee Discussion. These discussions should help employees recognize and correct their unsafe acts. When engaging in them, adhere to the following advice:

- If you spot an unsafe act, be non-confrontational. Point out the violation and ask the worker to state what he or she was doing and what safety-related consequences may arise if such behavior continues. Your goal is to help, not blame. Audits should not result in disciplinary actions unless an individual consistently violates safety rules.
- As you observe your employees, encourage them to discuss any safety concerns they may have and ask them to offer any ideas for safety improvement.
- Commend any good performance that you observe.

Step 3: Recording and Follow-Up. Findings should be recorded in writing. Pursue any item discussed during the audit that requires follow-up.

Accident investigations determine accident causes so that changes can be made to prevent the future occurrence of similar accidents. "Near misses" should also be investigated so that problems can be corrected before serious accidents occur. Supervisors always play a key role in accident investigations. For minor accidents, investigation may be limited to the supervisor meeting with the injured worker and filing a report. In large-scale investigations, the supervisor is usually part of a team of experts, which may also include an engineer, maintenance supervisor, upper-level manager, and/or safety professional.

Accident investigations should be performed in the following manner. When an accident occurs, the investigator's first responsibility is to take the following steps to ensure the safety of all employees:

- Make sure the injured are cared for and receive medical attention, if necessary.

- Guard against a more dangerous secondary event by removing danger sources and evacuating other personnel from the area if necessary.

- Restrict access to the area so no one else will be harmed and so the scene will not be disturbed.

You should then begin an investigation to identify both the immediate and underlying causes of the accident. The immediate cause is the event that directly led to the accident, such as a slippery floor, failure to wear safety gear, or failure to follow proper procedures.

Immediate causes, while easily found, are not always very helpful in suggesting how future incidents of this nature can be avoided. To accomplish this aim, the investigator must discover the underlying cause of the accident. For example, suppose a worker slips and falls on spilled oil. The oil on the floor is the immediate cause of the accident, but you need to know why it was not cleaned up and why a machine was leaking oil in the first place. Poor training, lack of rule enforcement, low safety awareness, poor maintenance, or crowded work areas commonly underlie accidents.

The investigator should ensure the accident scene is kept intact until the investigation is finished, as this will be the only chance to view the scene exactly as it was at the time of the accident. If a camera is available, photographs of the scene should be taken. Nothing related to the incident should be destroyed or discarded. The investigator should inspect the location (e.g., check for chemicals, broken pieces of machinery) and interview injured or affected workers, eyewitnesses, and anyone else who may be familiar with the accident area. Interviews should be conducted immediately, while the incident is still fresh in everyone's mind. Individuals should give their own account of the incident; by letting them tell their stories

without interruption, the investigator can determine if the various responses corroborate one another. Continue asking why until the underlying causes surface. Once the causes are identified, the investigator should recommend any changes indicated by the findings.

Safety committees often oversee organizations' safety functions. Consisting of both management and non-management personnel, committees perform the following tasks:

1. Assist with inspections and accident investigations.

2. Conduct safety meetings.

3. Answer workers' questions about safety programs.

4. Bring workers' safety concerns to management's attention.

5. Help develop safety incentive programs.

6. Develop ideas to improve workplace safety.

7. Prepare evacuation plans.

8. Prepare procedures for disasters such as tornadoes, hurricanes, etc. and contingency plans following the disaster.

Safety in the workplace works most effectively with a combination of employer attentiveness and employee responsibility. Costs, both financial and physical, can be decreased and injuries reduced with proper training, employer involvement and company-wide adherence to OSHA rules and guidelines. Ensuring safety is important not only for each individual company and worksite, but for industries and national concerns as well.

SEE ALSO *Employment Law and Compliance*

BIBLIOGRAPHY
"Hazard Communication in the 21st Century Workplace." U.S. Department of Labor, Occupational Safety & Health Administration. Available from: http://www.osha.gov/dsg/hazcom/finalmsdsreport.html.

"Injuries, Illnesses, and Fatalities." U.S. Department of Labor, Bureau of Labor Statistics. Available from: http://www.bls.gov/iif/home.htm.

Juergens, J. "Safety First." *Occupational Health & Safety* 73, no. 6 (2004): 94–96.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* 4th ed. Cincinnati: South-Western College Publishing, 2006.

Nash, J.L. "OSHA Fines General Motors Corp. $160,000 for Recordkeeping, Safety Violations." *Occupational Hazards* 66, no. 11 (2004): 8.

Scheer, Mark. "Niagara Falls: OSHA fines Memorial Medical Center." *Niagara Gazette,* 16 June 2008. Available from: http://www.niagara-gazette.com/local/local_story_168204856.html.

Stewart, R. "The Challenge of Creating a Culture of Safety." *Canadian HR Reporter* 18, no. 6 (2005): 11.

Taylor, B., Jr. *Effective Environmental Health and Safety Management Using the Team Approach.* Hoboken, NJ: Wiley & Sons, 2005.

SALES MANAGEMENT

Sales management involves planning, implementing, and controlling personal contact programs designed to achieve the sales and profit objectives of the firm. Sales managers are responsible for directing the firm's sales program; in carrying out this responsibility, a sales manager assigns territories, sets goals, and establishes training programs. In addition to setting individual goals, sales managers monitor the performance of their salespeople and continually offer direction and leadership on ways to improve their performance. As such, sales management involves both organization and motivation.

DIFFERENT STRUCTURES FOR SALES MANAGEMENT

The organizational structure for sales management varies depending on the firm's size and strategy. In field sales management, the structure consists of the unit manager, district manager, regional manager, general manager and vice president of sales. The unit manager is often referred to as the manager-in-training with interaction taking place at the customer level. Key responsibilities for the unit manager include training new salespeople, recruiting, selling to small accounts, and running district meetings. District managers, a step up from unit managers, have five to ten years of management experience and generally manage eight to ten salespeople. District managers typically report to the regional manager, who is responsible for managing multiple districts in a given geographic area. The general manager is sometimes referred to as the vice president of sales and marketing. This position is traditionally at the top of the sales organizational chart, with the VP of Marketing and Sales driving the sales strategy of the firm.

There are distinct differences in bottom- and top-level managers. The main difference is the amount of time they spend on each of their tasks. Lower-level managers spend the majority of their time on staffing, directing and monitoring salespeople. Top-level managers generally focus on planning, organizing and coordinating their sales strategy with overall corporate objectives. They also forecast sales, set objectives, develop strategies and policies, and establish budgets.

Sales management jobs are found in both consumer and commercial industries, in positions ranging from district manager, to vice president of marketing and sales, to top sales management of the firm. Competition for sales management jobs can be intense. Sales managers typically start out as salespeople, working their way to the top with strong leadership and organizational abilities. The progression of salespeople into management positions is gradual, with representatives moving into more executive positions by taking on more responsibility with larger, national accounts. It is likely that a sales representative will spend a portion of their career as a district or regional sales trainer before moving into a senior sales management role. The progression of salespeople into management positions varies based on the size and organizational structure of the organization.

SALES MANAGEMENT STRATEGIES

Sales managers are confronted with several challenges when designing an effective sales strategy. How should a sales force be structured? How large a sales force is needed? What methods should the sales force use to deliver their message? Strategies vary based on the number of products that the firm offers and if the firm sells to one particular type of customer versus selling to many different types of customers.

When selling one product line to a single industry, with customers in many locations, a territorial sales strategy is used. With this strategy, a sales manager will assign sales representatives to exclusive territories in a given region. These representatives will sell full product lines consisting of multiple products to customers in that territory. A good example of this strategy is food equipment sales. A sales representative for a commercial food equipment company will typically promote the companies full line of products when selling to restaurants, schools, and cafeterias in their defined territory.

A product sales force strategy is often used when a firm sells along product lines. Using this strategy, a sales manager will require their representatives to focus on selling a single product or small select group of products. This strategy is used by managers when products are numerous and complex. This strategy is widely used in healthcare sales where a salesperson focuses on selling doctors and healthcare providers specific products that are integral to their specialized area of medicine.

Finally, sales managers may use a customer focused sales force strategy where salespeople specialize in matching target customers to specific products or services. This strategy helps a company to concentrate more on building strong, long-term relationships with key customers.

MOTIVATING THE SALES FORCE

A topic of particular interest in sales management is motivation. Motivation is quite possibly the most important aspect of sales management. If a sales force is properly screened, selected, and trained, and the product is right, then motivation becomes critical for success. There are

many reasons why motivating a sales force is an important part of the sales process. First, salespeople must cope with acceptance and rejection on a continual basis. They go from being exhilarated as the result of a big sale to the disappointment that results from being turned down. Often, salespeople will spend many hours on the road, away from their families, which may affect their overall morale. This, paired with the fact that salespeople usually operate without managerial supervision, indicates that these individuals require a high level of self motivation in order to consistently produce good results. And finally, motivation directly influences the level of enthusiasm a salesperson has in presenting the product or service to the customer. If a sales representative is passionate and enthusiastic about a product or service, it can directly influence the customer's decision to purchase, as well as building strong relationships for future purchases. With that said, it is important to note that sales managers are responsible for instilling and maintaining an effective level of motivation in their staff. In addition to providing strong leadership, a sales manager must motivate a sales force in order to achieve pre-determined sales goals.

Managers can use a variety of tools to successfully motivate their sales force. The most powerful motivator is a well-designed compensation package. Sales managers can effectively motivate salespeople by designing a compensation formula that is a good balance of salary, bonuses, and commissions. Managers define selling objectives in the form of quotas, established compensation levels, and an effective incentive portion. There are a variety of formulas for compensating salespeople; the formula depends on linking the firm's overall performance expectations to each salesperson.

Compensation Packages. Straight commission is used by sales managers to reward salespeople for their accomplishments, rather than their time or efforts. Straight commission compensation fosters independence for the salesperson. It is a strong motivator in that payout only occurs if a sale is made, resulting in lower costs for the company. It is a favorable program for organizations that want to minimize compensation costs; especially for new and growing companies. There are some disadvantages to straight commission, including the inability of sales managers to control selling activities, as well as high employee turnover.

Another compensation program frequently used by organizations is salary plus bonus. Essentially, the salary plus bonus formula includes base salary with a performance-based bonus paid when sales goals and quotas are achieved. Sales reps may also be evaluated on factors, including creation of new accounts, average gross margin, and after sales servicing. Unlike straight commission, this program helps to reduce the rate of employee turnover. The plan also encourages salespeople to build long-term

relationships with their customers. By having the security of a consistent income, salespeople can be patient with their customers and allow them to take the time needed to make an informed decision. This is particularly important when buying cycles are long and when sales representatives need time to get acclimated with the buying cycle of the customer.

When selling complex products or services, a salary plus commission structure may be used to compensate the sales force. Under this program, a salesperson is guaranteed a base salary and is awarded a commission based on factors determined by the organization. Typically, a salary plus commission program is structured around upper and lower thresholds related to sales volume. For example, a salesperson may earn 4 percent on the first $20,000 of sales volume each month, 5 percent on an additional $15,000 and 6 percent on sales over $40,000. Other firms may use different criteria, such as reaching sales quotas on the number of individual products sold in each product category. The advantages to this method are related to the flexibility of program. Firms are able to customize the program to meet corporate objectives as they relate to the sales force. Commissions can be spread out over a given period to ensure reps will continue to offer the customer a high level of service and to discourage the reps from leaving the company after a big sale.

Salary plus commission and a bonus is a combination of the aforementioned programs. This plan combines the stability of a salary, the incentive of a commission, as well as special bonus awards. Every activity of a salesperson is financially recognized by this program and is favored by salespeople because of the earning potential of the plan. The plan is not as popular as the others because of the complexity involved to administer the program.

Short-term incentive programs are often used by firms to motivate salespeople beyond standard compensation packages. Sales contests are the most common incentive used to generate excitement about selling products and services. The contests usually run for a limited time and include cash prizes or travel to those salespeople who achieve a certain level of sales. Timing of the contests is crucial. Typically, contests should be rolled out during the slower seasons of a given industry in order to boost sales and to generate incremental revenue.

RECRUITING A SUCCESSFUL SALES FORCE

The sales manager is responsible for recruiting salespeople by identifying sources for new employees, screening applicants, conducting interviews, contacting references, and recommending candidates to the regional manager. Typically, the regional sales manager recruits and selects new salespeople when needed. Often, candidates are found

through universities, Internet sites, or applicants who formally apply to the company through cold-calling efforts.

Managers should identify certain key qualities when recruiting candidates for employment. Personality is an important factor when considering a candidate for a sales position. Empathy, ego, and optimism are good personality attributes to consider when screening candidates for a sales position. Each of these attributes has a strong correlation to success in sales. Empathy is the ability to sense the reactions of another person and ego refers to the inner need to persuade another individual for one's own satisfaction. Both of these traits combined are predictors of a good salesperson and are strongly considered when recruiting and interviewing job applicants. Additionally, it is important to consider the applicant's level of optimism as it relates to personal achievement. Optimism and enthusiasm are good indicators of the ability of a salesperson to manage adversity and is a trait that is often needed to overcome rejection and slow sale months.

Although most companies have their own selection procedures, a typical candidate selection process will resemble the following:

1. The district sales manager conducts the first interview; the candidate is accepted and given a formal application, or they are not accepted and are sent a rejection letter.

2. A candidate who submits an application is invited to a second interview with the district manager.

3. The candidate may spend a day in the field with a salesperson and the district manager receives feedback from the salesperson on the candidate's level of enthusiasm.

4. The district manager checks the candidate's references and criminal background.

5. The regional sales manager interviews the candidate.

6. The regional manager and district manager discuss the candidate via telephone conference or personal meeting. A decision is made whether to offer the candidate the position.

7. The regional sales manager formally offers the job to the candidate.

8. If the candidate accepts the offer for the position, he or she must undergo a physical examination.

TOTAL QUALITY MANAGEMENT AND CUSTOMER SATISFACTION

A primary responsibility of a sales manager is managing relations with customers. The emergence of a global market for products and services has spurred new theories regarding management of products as they relate to the customer. Total quality management (TQM) is defined as a management process and set of disciplines that are coordinated to ensure that the organization consistently meets customer expectations. Originally defined as a manufacturing theory, TQM is now being applied to sales in particular. In the sales and marketing context, TQM defines the quality of the sales and service effort in terms of customer satisfaction. Sales and service systems that link individuals, departments, suppliers and customers are central to TQM. Each department within an organization has a direct responsibility to the customer in some capacity. Marketing designs its new products with the customer in mind. Manufacturing focuses on achieving the highest level of product quality. Under TQM, challenging, but reasonable improvement goals are set for sales and service quality. Innovation and continuous improvement of the sales and servicing process is paramount to the idea of TQM.

The customer is considered from every aspect of TQM. By focusing on customer expectations and questioning those expectations using formal techniques, TQM can discover previous misconceptions and new opportunities. Some fundamental ideas behind TQM are making continuous improvements to products and services, eliminating defects, doing things right the first time, and understanding that employees closest to the process know how to improve the process. As a function of sales and service, TQM focuses on the exchange between the buyer and the seller. Intangible issues such as responsiveness to varying customer needs, empathy for customer concerns, reliable service performance, and assurance of service capabilities are considered when managing relationships with customers. This process is somewhat more difficult than actual management of product quality because customers are required to be participative in the process. They are expected to offer feedback to the company on products and services to allow for continuous improvement to the process.

Customer satisfaction is central to the philosophy of total quality management. In sales management, TQM suggests that organizations need to have the majority of employees in customer support functions, with fewer staff positions. This will help to eliminate costs associated with management and reduces levels in the decision-making process. Fewer levels of management also allows for the organization to be flexible enough to change quickly to support new sales opportunities. Continuous improvement for all products and improvement in the selling process allows firms to consistently move forward with innovative products and services in order to remain competitive in the new global market.

In the twenty-first century global marketplace, managers face many challenges related to fulfilling the

customer's ever-changing needs and expectations. The concept of customer service has recently become more complex as a result of globalization of goods and services. Customers are now well-informed decision makers as a result of the abundance of information that is available online and in the media. In addition, today's consumer is most concerned with how a salesperson can solve basic problems and ultimately add value to a product or service. The role of sales intermediaries is now, more than ever, important to success in this new competitive global marketplace. As a result, sales managers face the ever-changing challenge of responding to this new environment with innovative techniques for managing and motivating the sales force.

SEE ALSO *Customer Relationship Management; Employee Compensation; Employee Recruitment Planning; Human Resource Management; Motivation and Motivation Theory; Quality and Total Quality Management*

BIBLIOGRAPHY

Calvin, Robert J. *Sales Management Demystified*. New York: McGraw-Hill, 2007.

Cron, William L., and Thomas E. DeCarlo. *Dalrymple's Sales Management: Concepts and Cases*. 9th ed. New York: John Wiley and Sons, 2005.

Johnson, Mark W., and Greg W. Marshall. *Sales Force Management*. 9th ed. Boston: McGraw-Hill, 2008.

Kotler, Philip, and Gary Armstrong. *Principles of Marketing*. 12th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Thomas, Wayne M. *The Sales Manager's Success Manual*. New York: AMACOM, 2008.

SCALABLE WORKFORCE

Scalable workforce is a practical approach to organizational human resource management that allows managers the flexibility of adjusting the number of employees in the organization whenever need arises. Scalable workforce strategy practice involves employing labor services in organizations according to the amount of workloads available in the organizations. In so doing, an organization eliminates problems of workforce shortages or excesses by increasing or decreasing the number of staff appropriately, relative to the amount of work available in the organization. Scalable workforce practices seek to eliminate waste and achieve greater efficiency in the management of human resources in organizations.

HISTORY OF SCALABLE WORKFORCE THEORY

The origins of scalable workforce can be traced back to lean manufacturing and management techniques that

have been practiced at Toyota motor manufacturing company in Japan for many years. Scalable workforce principle is a key component of the just-in-time (JIT) management system that has roots in the Toyota Production System. The development of JIT management system is credited to Taiichi Ohno (1912—1990), a Japanese manager who invented and advanced the concept at Toyota Production Company during the post—World War II period. As a production management system, JIT marks a distinct departure from the traditional uncontrolled bulk production of orders (which required painstaking inventory processes) to a streamlined production style guided by market demand and specific customer orders. In effect, companies that adopt scalable workforce systems make wise use of financial resources and human resources by matching inputs against expected outputs at all times.

In the book titled *Excellence in Business* third edition, Bovee, Thill, and Mescon contend that periodic strategy shifts, changes in production systems, continuous technological advancements, and fluctuations in sales remain the biggest challenges that managers face in efforts to maintain an adequate and competitive workforce in business organizations. The authors suggest the implementation of alternative work arrangements such as telecommuting, use of temporary employees, job sharing, and outsourcing as suitable solutions for addressing the staffing and demographic challenges prevalent in many business organizations.

The principle of scalable workforce is useful to firms that experience transitional stages in the execution of projects, whereby the completion of a particular phase of a project eliminates the need for particular skills, as is usually the case in construction firms. The principle is also valuable in firms that register seasonal fluctuations of demand for their products or services. It is unrealistic to retain the same number of staff for both the high seasons and the low seasons and thus, appropriate adjustment measures must always be implemented to ensure that the costs of maintaining employees are cut down during the low season by reducing the number of staff and operations within the firm.

SCALABLE WORKFORCE IN PRACTICE

The airline JetBlue is a good example of a firm that has successfully integrated the principle of scalable workforce into operations management. JetBlue fully implements the principle of flexible telecommuting staff for its airline reservations services. The work at home program was initiated at JetBlue ever since the airline was founded, and the practice has registered a lot of success for the airline in terms of saving financial resources and eliminating the

need for expansive office spaces. As Sharon Gaudin notes, 80 percent of JetBlue's reservations staff work from home; the company flexibly increases the number of reservations agents during periods of high call volumes and subsequently reduces the number of reservations agents during periods of low call volume by simply e-mailing some of the staff to sign off voluntarily and take time off.

Absence of close supervision and productivity of telecommuting employees is one of the obvious concerns that characterize the concept of scalable off-site workforce. However, this is a problem that can be addressed by simply using relevant information technology software tools (such as log-in and clocking systems) to track the performance of each employee working offsite. The management can also keep in constant touch with the employees through e-mails and phone calls. Productivity among off-site employees can further be enhanced through emphasis on regular meetings and consultations, provision of immediate solutions to problems whenever they arise, discussion of company specific work practices with employees, and ongoing training of the offsite workforce.

As much as the principle of scalable workforce eliminates redundancy among employees in organizations, managers must always be ready to encounter difficult challenges during the adoption and implementation stages of the strategy. Problems such as resistance to change and lack of clear understanding of the concept by employees and workers unions are inevitable. Therefore, implementation of scalable workforce practices in an organization requires a great deal of change management to overcome resistance and negative attitudes among employees. In an article titled *Lean Supply Chains, JIT and Cellular Manufacturing: the Human Side* Alony and Jones note that managers can initiate change in the culture of the organization to create a receptive environment for scalable workforce practices.

State laws and country labor regulations are very important points of reference when initiating scalable workforce processes in organizations. Laws in the United States require state-owned organizations and enterprises to seek the approval of the Congress before implementing any major adjustment to labor structures in the organizations. For example, in 2007 the National Aeronautics and Space Agency (NASA) sought Congressional approval for its strategy to adopt increase flexibility in its workforce, a plan aimed at offloading redundant workforce and replenishing the institution with more specialized and flexible employees with the capacity to achieve greater efficiency in the management of NASA's operations. NASA began moving towards a more scalable workforce after the passage of the Flexiblity Act of 2004, and this process continues in the late 2000s.

SEE ALSO *Managing Change*

BIBLIOGRAPHY

Alony, Irit, and Michael Jones. "Lean Supply Chains, JIT and Cellular Manufacturing–The Human Side." *Issues in Informing Science and Information Technology.* 5 (2008). Available from: http://proceedings.informingscience.org/InSITE2008/IISITv5p165-175Alony531.pdf.

Beasley, J.E. "Just–in–time (JIT)". *OR-Notes* 2008. Available from: http://people.brunel.ac.uk/~mastjjb/jeb/or/jit.html.

Bovee, Courtland L., John V. Thill and Michael H. Mescon. *Excellence in Business,* 3rd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2007.

Fiss, Peer C., and Edward Z. Zajac. "The Symbolic Management of Strategic Change: Sensegiving via Framing and Decoupling." *The Academy of Management Journal* 49, no. 6 (December 2006): 1174–1193.

Gaudin, Sharon. "Telecommuting Takes Flight at JetBlue," March 2006. Available from: http://itmanagement.earthweb.com/career/article.php/3589071.

Griffin, Mark, A. Andrew Neal and Sharon K. Parker. "A New Model of Work Role Performance: The Impact of Technological Diversity and Alliance Organization on Innovation." *The Academy Management Journal* 50, no. 2 (April 2007): 328–347.

Leath, Audrey T. "NASA Faces Major Transition in Workforce Needs." *AIP Bulletin of Science Policy News.* FYI No. 57 (June 1, 2007). Available from: http://www.aip.org/fyi.

SCENARIO PLANNING

Strategic planning and forecasting tend to use projections of past events to develop future plans. These approaches rely on historical data and assume a continuation of past business practices and environmental stability. Scenarios are used to develop plans for significant changes in the environment, personnel, or processes for which data are limited and uncertain. The premise is that the best way to prepare for radically different situations is to think through various events that could occur and consider alternatives for responding to those situations if they should happen.

Major corporations such as Shell and General Electric redefined scenario planning in the 1970s to meet specific company needs. These companies realized that traditional planning, which is based on forecasts, was becoming strategically dangerous as they moved out of the relatively stable 1950s and 1960s. Traditional planning assumes that tomorrow's business world will be quite like yesterday's. Scenario planning, on the other hand, involves creating a variety of possible future scenarios that may play out despite past patterns. As Peter Schwartz, an early pioneer of scenario planning, put it in his seminal 1991 work, *The Art of the Long View*, "scenarios can help people make better decisions—usually difficult decisions—that they would otherwise miss or deny."

Firms can use scenario planning in one of two ways. First, firms may examine each scenario and determine whether the organization's current strategy would help them survive and succeed in those situations. Or, firms can examine a desired future state and see what they must do to get to that point. The purpose of this planning is to try to understand how the underlying dynamics of an industry can change and how the organization could best respond to a change that could happen or to make a desired situation occur. The organization identifies certain events that could change the industry's structure and studies the present and future driving forces that might come into play that could cause such events. Scenario planning is effective for large organizations and small organizations alike. The organizations that utilize the plan the best are the ones that make scenarios relevant to long-term needs, which may require a more focused approach. The ultimate purpose of this method seems to be the same for large and small organizations: to analyze the consequences of present actions and decisions; to identify and avoid problems before they occur; to identify the present consequences of future events; and to envision aspects of possible or desired futures.

Scenario planning is different from other forms of strategic planning, such as forecasts and trend analysis. Scenario planning, in fact, uses both of these techniques, but also identifies how these can be upset and thus cause different outcomes. Some scenarios may seem nonsensical or highly improbable, but considering them can actually help organizations deal with major changes. In the past, only businesses in energy-intensive sectors, such as trucking companies and airlines, would consider scenarios where gas prices would double or triple in a short period of time. With the sharp spike in oil prices in 2007 and 2008, and with crude oil prices breaking the $80/barrel mark for the first time and then heading suddenly above $130/barrel within a six-month period, many firms in a broad spectrum of industries—from automakers to agribusiness—had to scramble to consider what would happen to their business and how they should respond if gas prices were to reach $10 or even $15 per gallon. These firms would have been better prepared for the sudden price shocks in the energy sector had scenario planning been employed sooner.

Scenario planning helps organizations understand that business decisions are not just about submitting numbers and creating budgets, but about recognizing a wider context of events that might happen. Scenarios are created around uncertainties in the business or its environment. The goal is to move from one predicted outcome to understanding how multiple uncertainties will impact an organization. Although every organization is different, success is higher when the company's strategy is correlated to changes in the environment, which can create opportunities for prepared organizations while creating threats to those less prepared.

In creating a scenario plan, these driving forces can be categorized into external and internal factors. External factors could include: market forces, which shape the needs and behaviors of consumers and suppliers; cost forces, which depend on the economics of the business; government forces, which are out of the hands of individual organizations but set the rules of the game; and, most importantly, competitive forces and uncertain strategic considerations. The need to match or beat competitors can determine the opportunities and threats of an organization. Internal factors could include planning for turnover of critical top managers, responding to major accidents, or significant changes in stock prices.

One pitfall of scenario planning is that organizations tend to make scenarios too broad or too narrow. When scenarios are too broad, people tend to dismiss them because they feel the scenarios are unrealistic or highly improbable. When they are too narrow, scenarios are usually minor variations of the existing strategy or the same theme.

There are many different approaches firms can use to develop meaningful scenarios. Schnaars and Ziamou suggest the following:

- Optimistic vs. best guess vs. pessimistic scenarios. This approach looks at the most likely (best guess) future situation based on current information. The optimistic scenario introduces question as to what things would or could happen to result in a better than anticipated outcome and how can the organization make those things happen? The pessimistic scenario looks at many of the things that could go wrong and tries to help decision makers plan responses to deal with these problems should they happen.

- Good vs. bad scenarios. This approach avoids the tendency to focus on the most likely alternative of the "best guess" and forces managers to give more attention to both extremes.

- Arrayed scenarios. These scenarios look at alternatives associated with a continuum along a single criterion or dimension. For example firms could plan their response to a slight, moderate, or severe change in the price of gasoline, or other key resource.

- Independently themed scenarios. This approach looks at different aspects of the future. One scenario could look at possible technological breakthroughs, another at environmental concerns, and a third at potential market changes. Each scenario is conceptually independent of the others.

After scenarios are created, strategies are developed by first determining the direction in which the organization should (or wants to) be going. The group then decides on the events that support this vision and the outcomes the organization wants for this event. This is sometimes difficult because the world is rapidly changing, and one designs his or her organization to deal with the change. Scenario planning is a valuable tool for an organization because it gathers the clues a company has and puts them together in different ways to allow people to think about them without making judgments.

Why should organizations implement scenario planning as opposed to other planning techniques? First, the company can use the method as an approach to risk management. The method attempts to answer questions like, "How do we come up with a strategy that's possible in a wide range of different futures?" The organization can also use the method to upset the rules that everybody understands, to create new rules of competition. Scenario development causes firms to deviate from a linear projection of past business practices by developing potential situations that question traditional assumptions about the firm's relevant industry, processes, markets, and people that may make it necessary to significantly alter the current strategy.

Scenario planning is effective when used properly by managers with good business judgment; it is not a substitute for business judgment. The process does not help an organization become better than they might be ordinarily, but helps utilize professional judgment across a wider range of alternatives.

SEE ALSO *Forecasting; Planning; Strategic Planning Tools*

BIBLIOGRAPHY

Epstein, Jeffery H. "Scenario Planning: An Introduction." *The Futurist* 32, no. 6 (1998): 50–51.

Gupta, M., L. Boyd, and L. Sussman. "To Better Maps: A T.O.C. Primer for Strategic Planning." *Business Horizons* 47, no. 2 (2004): 15–26.

Mitchell, Donald, and Carol Coles. "Establishing a Continuing Business Model Innovation Process." *Journal of Business Strategy* 25, no. 3 (2004): 39–49.

Mitroff, Ian. *Crisis Leadership: Planning for the Unthinkable.* New York: John Wiley. 2003.

Nutt, Paul. "Expanding the Search for Alternatives During Strategic Decision Making." *Academy of Management Executive* 18, no. 4 (2004): 13–28.

Ramirez, Rafael, John W. Selsky, and Kees Van Der Heijden, eds. *Business Planning in Turbulent Times.* London: Earthscan Publications, 2008.

Roney, Curtis. "Planning for Strategic Contingencies." *Business Horizons* 46, no. 2 (2003): 35–42.

Schnaars, Steven, and Paschalina Ziamou. "The Essentials of Scenario Writing." *Business Horizons* 44, no. 4 (2001): 25–31.

Schwartz, Peter. *The Art of the Long View: Planning for the Future in an Uncertain World.* New York: Doubleday, 1991.

von Oetinger, Bolko. "A Plea for Uncertainty." *Journal of Business Strategy* 25, no. 1 (2004): 57–59.

SECURITIES AND EXCHANGE COMMISSION

The U.S. Securities and Exchange Commission (SEC) is an independent, nonpartisan, quasi-judicial regulatory agency that is responsible for administering federal securities laws. The main objective of these laws is to protect investors in securities markets in the United States from fraud and other dishonest activities. The laws are designed to ensure that securities markets operate fairly and that investors have access to disclosures of all material information concerning publicly traded securities.

The SEC regulates firms engaged in the purchase and sale of securities, people who provide investment advice, and investment companies. The SEC may also provide the means to enforce securities laws through the appropriate sanctions. The commission may also serve in an advisory capacity to the federal courts in Chapter 11 cases (e.g., corporate reorganization proceedings under Chapter 11 of the Bankruptcy Reform Act of 1978).

ORIGIN AND STRUCTURE

Prior to the creation of the SEC, there were no federal securities laws. The state securities laws that did exist, known as the Blue Sky laws, were easily ignored by securities companies simply by making securities offerings across state lines through the mail. Congressional investigations of the collapse of the stock market in 1929 and the subsequent Great Depression found that investors suffered heavy losses for two major reasons. First, many companies had failed to disclose relevant information. Second, many misrepresentations of financial information had been made to the investors. The SEC was established by Congress in 1934 under the Securities Exchange Act to provide oversight in an attempt to prevent such a situation from arising again.

The commission is headed by five commissioners appointed by the President of the United States with the advice and consent of the Senate. Each commissioner is appointed to a fixed five-year term; terms are staggered so that one expires on June 5 of every year. One of the commissioners is designated as chair by the president. As a matter of policy, no more than three of the five commissioners may be from the same political party. The commission employs financial analysts and examiners,

accountants, lawyers, economists, investigators, and other professionals to carry on its responsibilities.

The SEC employs around 4,000 people in eighteen offices, with headquarters in Washington, D.C., and eleven regional offices throughout the United States. The commission consists of four main divisions—Corporation Finance, Trading and Markets, Investment Management, and Enforcement—as well as other commission offices.

Division of Corporation Finance. Corporation Finance has the overall responsibility of ensuring that disclosure requirements are met by publicly held companies registered with the SEC. Its responsibilities include reviewing registration statements for publicly traded corporate securities, as well as documents concerning proxies, mergers and acquisitions, tender offers, and solicitations.

Division of Investment Management. This division has the responsibility of administering three statutes: the Investment Company Act of 1940; the Investment Advisers Act of 1940; and the Public Utility Holding Company Act of 1935. The Division of Investment Management ensures compliance with regulations regarding the registration, financial responsibility, sale practices, and advertising of investment companies and investment advisers. New products offered by these entities are also reviewed by the staff in this division. The staff reviews and processes investment company registration statements, proxy statements, and periodic reports as per the laws specified under the Securities Act.

Division of Trading and Markets. This division is responsible for overseeing the securities markets and their self-regulatory organizations (SROs), such as the nation's stock exchanges, Financial Industry Regulatory Authority (FINRA), and the Municipal Securities Rulemaking Board. This division is empowered to interpret proposed changes to regulations. This division also registers and regulates trading firms not regulated by an SRO, and it oversees other market participants, such as transfer agents and clearing organizations.

Division of Enforcement. The Enforcement Division has the responsibility of investigating violations of the securities laws and regulations and bringing actions against alleged violators. This division works with the other three divisions, and other SEC offices, to enforce federal securities laws. The SEC is empowered to bring civil actions to a U.S. District Court or to engage in administrative proceedings heard by an independent administrative law judge. While the SEC does not have the authority to bring criminal charges, it may refer its cases to state and federal prosecutors. The SEC typically brings between

400 and 500 civil enforcement actions per year against companies and individuals that it suspects of breaking securities laws.

Office of Compliance Inspections and Examinations. This office conducts and coordinates all compliance inspection programs of brokers, dealers, self-regulatory organizations, investment companies and advisers, clearing agencies, and transfer agents. It determines whether these entities are in compliance with the federal securities laws, with the goal of protecting investors.

SECURITIES LAWS ADMINISTERED BY THE SEC

The Securities and Exchange Commission is responsible for enforcing a wide range of laws passed since the 1930s. The seven major acts enforced by the SEC are the Securities Act of 1933, the Securities Exchange Act of 1934, the Public Utility Holding Act of 1935, the Trust Indenture Act of 1939, the Investment Company Act of 1940, the Investment Advisers Act of 1940, and the Sarbanes-Oxley Act of 2002. The SEC also enforces the Securities Disclosure Act of 1968, the Depository Institutions and Deregulation Money Control Act of 1980, the Insider Trading Sanctions Act of 1984, and the Commodity Futures Modernization Act of 2000, among others.

Securities Act of 1933. The Securities Act imposes mandatory disclosure requirements on companies that sell their new securities through the securities markets. The act's base philosophy is to let the issuer disclose and to let the investor beware. This act is often referred to as the "truth in securities" law. The act requires that investors receive financial and other significant information concerning securities being offered for public sale. The act also prohibits deceit, misrepresentations, and other fraud in the sale of securities.

In 1975, Congress amended the Securities Act of 1933. The major focus of the amendment was the requirement that the SEC move towards establishing a single nationwide securities market. The law did not specify the structure of a national securities market, but it is assumed that any national market would make extensive use of computers and electronic communication devices.

Securities Exchange Act of 1934. The Securities Exchange Act of 1934 extends the disclosure concepts to securities already outstanding. The major provisions of the Securities Exchange Act of 1934 are as follows:

1. The act created the Securities and Exchange Commission as a watchdog for the securities business.

2. It required listed companies to file registration statements and periodic financial reports with both the SEC and the exchange.

3. It gave the SEC the power to prohibit market manipulation, misrepresentation, and other unfair practices.

4. It required all national securities exchanges to register with the SEC and to be under its effective supervision and regulation.

5. It gave the Board of Governors of the Federal Reserve System the authority to control margin requirements.

6. It granted the SEC the power to control short selling, trading techniques, and the procedures of the exchanges.

7. It required officers, directors, and major stockholders to file monthly reports of any changes in their stockholdings.

Public Utility Holding Act of 1935. Interstate holding companies engaged, through subsidiaries, in the electric utility business or in the retail distribution of natural or manufactured gas are subject to regulation under this act. These companies, unless specifically exempted, are required to submit reports providing detailed information concerning the organization, financial structure, and operations of the holding company and its subsidiaries. Holding companies are subject to SEC regulations on such matters as system structure, acquisitions, combinations, and issue and sale of securities.

The Trust Indenture Act of 1939. Under the scrutiny of the SEC, this act applies to debt securities, including bonds, debentures and notes, and similar debt instruments offered for public sale and issued under trust indentures with more than $7.5 million in securities outstanding at any one time. Even though such securities may be registered under the Securities Act, they may not be offered for sale to the public unless a formal agreement between the issuer of bonds and bondholder, known as the trust indenture, conforms to the statutory standards of this act.

Investment Company Act of 1940. Under this act, activities of companies—including mutual funds—engaged primarily in investing, reinvesting, and trading in securities, and whose own securities are offered to the investing public, are subject to certain statutory prohibitions and to Securities and Exchange Commission regulation. Public offerings of investment companies' securities must also be registered under the Securities Act of 1933. In this context, it should be noted that although the SEC serves as a regulatory agency in these cases, the SEC does not

supervise the company's investment activities. The mere presence of the SEC as a regulatory agency does not in itself guarantee a safe investment for potential investors.

Investment Advisers Act of 1940. The Investment Advisers Act of 1940 establishes a pattern of regulating investment advisers. The main purpose of this act is to ensure that all persons, or firms, that are compensated for providing advising services to anyone about securities investments are registered with the SEC and conform to the established standards designed to protect investors. The SEC has the authority to strip an investment adviser of his or her registration should he or she be found guilty of committing a statutory violation or securities fraud.

Sarbanes-Oxley Act of 2002. The Sarbanes-Oxley Act (commonly called SOX), signed into law by President George W. Bush on July 30, 2002, marked the first significant reform of American business practices in decades. High-profile cases of insider trading and fraud at such companies as Enron and WorldCom—which took place either under the noses or with the implicit approval of the major public accounting firms hired to audit them—led to a movement to increase the power of the SEC. The act was intended to enhance corporate responsibility, combat accounting fraud, and clarify financial disclosures. It also created the Public Company Accounting Oversight Board (PCAOB) to guarantee that the auditing profession remained unbiased in performing its vital role of ensuring corporate compliance with financial reporting standards.

Proponents of the Sarbanes-Oxley Act hoped that its passage would serve to clean up American capital markets, improve corporate governance, and restore investor confidence. A number of critics claim that the act is an unnecessary government intrusion and that the costs associated with compliance put American firms at a competitive disadvantage. One study estimates that Sarbanes-Oxley cost *Fortune* 500 companies an average of $5.1 million in compliance expenses in 2004, while another study found that the act increased costs associated with being a publicly held company by 130 percent. Whether the critics are correct or not, this act has increased the power of the SEC and has succeeded at least in part in reducing the number of corporate scandals seen during the early-2000s.

SEE ALSO *Due Diligence; Ethics; Financial Issues for Managers; Financial Ratios*

BIBLIOGRAPHY
Aspatore Books Staff. *Understanding the Laws Behind Securities Transactions.* Boston, MA: Aspatore Books, 2006.

Barber, Marc. "U.S. Clean-Up Operation: Regulators in the U.S. Are as Determined as Ever to Restore Faith after the Series of Accounting Scandals in Recent Years." *Accountant* May 2004.

Garg, Ramesh, et al. *Basics of Financial Management.* 2nd ed. Acton, Massachusetts: Copley Publishing Group, 2002.

"The Investor's Advocate." U.S. Securities and Exchange Commission. Available from: http://www.sec.gov/about/whatwedo.shtml.

U.S. Securities and Exchange Commission Handbook. International Business Publications, 2008.

SENSITIVITY TRAINING

Sensitivity training is often offered by organizations and agencies as a way for members of a given community to learn how to better understand and appreciate the differences in other people. It asks training participants to put themselves into another person's place in hopes that they will be able to better relate to others who are different from them. Sensitivity training often specifically addresses concerns such as gender sensitivity, multicultural sensitivity, and sensitivity toward those who are disabled in some way. The goal in this type of training is more oriented toward growth on an individual level. Sensitivity training can also be used to study and enhance group relations, i.e., how groups are formed and how members interact within those groups.

HISTORY

The origins of sensitivity training can be traced as far back as 1914, when J.L. Moreno created "psychodrama," a forerunner of the group encounter (and sensitivity-training) movement. This concept was expanded on later by Kurt Lewin, a gestalt psychologist from central Europe, who is credited with organizing and leading the first T-group (training group) in 1946. Lewin offered a summer workshop in human relations in New Britain, Connecticut. The T-group itself was formed quite by accident, when workshop participants were invited to attend a staff-planning meeting and offer feedback. The results were fruitful in helping to understand individual and group behavior.

Based on this success, Lewin and colleagues Ronald Lippitt, Leland Bradford, and Kenneth D. Benne formed the National Training Laboratories in Bethel, Maine, in 1947 and named the new process sensitivity training. Lewin's T-group was the model on which most sensitivity training at the National Training Laboratories (NTL) was based during the 1940s and early 1950s. The focus of this first group was on the way people interact as they are becoming a group. The NTL founders' primary motivation was to help understand group processes and use the new field of group dynamics, to teach people how to function better within groups. By attending training at an off-site venue, the NTL provided a way for people to remove themselves from their everyday existence and spend two to three weeks undergoing training, thus minimizing the chances that they would immediately fall into old habits before the training truly had time to benefit its students. During this time, the NTL and other sensitivity-training programs were new and experimental. Eventually, NTL became a nonprofit organization with headquarters in Washington, D.C. and a network of several hundred professionals across the globe, mostly based in universities.

During the mid-1950s and early 1960s, sensitivity training found a place for itself, and the various methods of training were somewhat consolidated. The T-group was firmly entrenched in the training process, variously referred to as encounter groups, human relations training, or study groups. However, the approach to sensitivity training during this time shifted from that of social psychology to clinical psychology. Training began to focus more on interpersonal interaction between individuals than on the organizational and community formation process, and with this focus took on a more therapeutic quality. By the late 1950s, two distinct camps had been formed: those focusing on organizational skills, and those focusing on personal growth. The latter was viewed more skeptically by businesses, at least as far as profits were concerned, because it constituted a significant investment in an individual without necessarily an eye toward the good of the corporation. Thus, trainers who concentrated on vocational and organizational skills were more likely to be courted by industry for their services; sensitivity trainers more focused on personal growth were sought by individuals looking for more meaningful and enriching lives.

During the 1960s, new people and organizations joined the movement, bringing about change and expansion. The sensitivity-training movement had arrived as more than just a human relations study, but as a cultural force, in part due to the welcoming characteristics of 1960s society. This social phenomenon was able to address the unfilled needs of many members in society, and thus gained force as a social movement. The dichotomy between approaches, however, continued into the 1960s, when the organizational approach to sensitivity training continued to focus on the needs of corporate personnel.

The late 1960s and 1970s witnessed a decline in the corporate use of sensitivity training and encounters, which had been transformed from ends in themselves into traditional therapy. However, multicultural training programs have picked up where the older sensitivity-training programs left off, and they are still used today by

organizations and agencies. Some of the twenty-first century versions of these programs focus on the legal issues that help employees keep themselves and their organization out of trouble. Others, with a more traditional focus, attempt to enable members of the multicultural workplaces of the twenty-first century to avoid engaging in behaviors that have negative or damaging consequences for themselves and others.

GOALS OF SENSITIVITY TRAINING

According to Kurt Back, "Sensitivity training started with the discovery that intense, emotional interaction with strangers was possible. It was looked at, in its early days, as a mechanism to help reintegrate the individual man into the whole society through group development. It was caught up in the basic conflict of America at mid-century: the question of extreme freedom, release of human potential or rigid organization in the techniques developed for large combines." The ultimate goal of the training is to have intense experiences leading to life-changing insights, at least during the training itself and briefly afterwards.

Sensitivity training was initially designed as a method for teaching more effective work practices within groups and with other people, and focused on three important elements: immediate feedback, here-and-now orientation, and focus on the group process. Personal experience within the group was also important, and sought to make people aware of themselves, how their actions affect others, and how others affect them in turn. Trainers believed it was possible to greatly decrease the number of fixed reactions that occur toward others and to achieve greater social sensitivity. Sensitivity training focuses on being sensitive to and aware of the feelings and attitudes of others.

By the late 1950s another branch of sensitivity training had been formed, placing emphasis on personal relationships and remarks. Whether a training experience will focus on group relationships or personal growth is defined by the parties involved before training begins. Most individuals who volunteer to participate and pay their own way seek more personal growth and interpersonal effectiveness. Those who represent a company, community service program, or some other organization are more likely ready to improve their functioning within a group and/or the organization sponsoring the activity. Some training programs even customize training experiences to meet the needs of specific companies.

IN PRACTICE

An integral part of sensitivity training is the sharing, by each member of the group, of his or her own unique perceptions of everyone else present. This, in turn, reveals information about his or her own personal qualities, concerns, emotional issues, and things that he or she has in common with other members of the group. A group's trainer refrains from acting as a group leader or lecturer, attempting instead to clarify the group processes using incidents as examples to clarify general points or provide feedback. The group action, overall, is the goal as well as the process.

Sensitivity training resembles group psychotherapy (and a technique called psychodrama) in many respects, including the exploration of emotions, personality, and relationships at an intense level. Sensitivity training, however, usually restricts its focus to issues that can be reasonably handled within the time period available. Also, sensitivity training does not include among its objectives therapy of any kind, nor does it pass off trainers/facilitators as healers of any sort. Groups usually focus on here-and-now issues; those that arise within the group setting, as opposed to issues from participants' pasts. Training does not explore the roots of behavior or delve into deeper concepts such as subconscious motives, beliefs, etc.

Sensitivity training seeks to educate its participants and lead to more constructive and beneficial behavior. It regards insight and corrective emotional or behavioral experiences as more important goals than those of genuine therapy. The feedback element of the training helps facilitate this because the participants in a group can identify individuals' purposes, motives, and behavior in certain situations that arise within the group. Group members can help people to learn whether displayed behavior is meaningful and/or effective, and the feedback loop operates continuously, extending the opportunity to learn more appropriate conduct.

Another primary principle of sensitivity training is that of feedback; the breakdown of inhibitions against socially repressed assertion such as frankness and self-expression are expected in place of diplomacy. Encounters that take place during sensitivity training serve to help people practice interpersonal relations to which they are likely not accustomed. The purpose is to help people develop a genuine closeness to each other in a relatively short period of time. Training encounters are not expected to take place without difficulty. Many trainers view the encounter as a confrontation, in which two people meet to see things through each other's eyes and to relate to each other through mutual understanding.

There is a difference between the scientific study of group dynamics (a branch of social psychology) and the human relations/group workshop aspect. The popularity of sensitivity training during the 1960s was due in large part to the emotional, experiential aspect. Yet many pragmatic advocates of sensitivity training felt it was necessary to avoid working with the most emotional converts, and conducted experiments in a laboratory in as realistic a

situation as could be approximated, seeking a scientific approach more characteristic of psychological studies.

Other programs, not so concerned with the scientific validity of their studies or with freedom from distraction, offer full-time training programs during the day. Participants can choose on their own whether or not to maintain contact with the office for the duration of training. Others offer part-time sessions for several hours a day, and the participants' daily routine is otherwise uninterrupted. Sensitivity-training programs generally last a few days, but some last as many as several weeks.

T-GROUPS

Within most training groups (T-groups), eight to ten people meet with no formal leader, agenda, or books— only a somewhat passive trainer. Trainers do not necessarily direct progress, just help participants to understand what is happening within the group. In defining a T-group, Robert T. Golembiewski explains the major distinguishing features as follows: "it is a learning laboratory; it focuses on learning how to learn; and it distinctively does so via a 'here-and-now' emphasis on immediate ideas, feelings, and reactions."

The learning takes place within a group's struggle to create something meaningful for itself in an essentially unstructured setting. Issues that traditionally arise in such a setting include developing group norms and cohesion, reasons for scape-goating, selective communication channels, struggles for leadership, and collective decision-making patterns. Power struggles and decision-making conflict are the most prevalent problems as groups work toward establishing an identity and meet individual member needs. More specifically, group members can help each other identify when they are: attempting to control others or, conversely, when they are seeking support; punishing themselves or other group members; withdrawing from the group; trying to change people rather than accepting them; reacting emotionally to a given situation; and ignoring, rather than scrutinizing, behavior between group members.

Ultimately, T-groups were not a tremendously successful part of the sensitivity-training movement. This was in part because T-group trainers do not actually teach, but help people learn by assuming a more passive role. This sometimes confuses and upsets those who expect and desire more guidance. Another reason is that despite the intensity of the learning experience, most participants have difficulty quantifying exactly what they have learned and why it matters.

IN ORGANIZATIONS

Organizational goals appear to be the antithesis of those of sensitivity training. Sensitivity training is fueled on emotional outbursts in group settings, possibly leading to a change in attitude toward another individual. Desired results include more openness, spontaneity, and sensitivity to others. And while organizations are made up of people who interact and could benefit from such training, the goals of an organization are often more related to increased production or higher profit margins than modifying means of interpersonal communication. To make sensitivity training work in organizational settings, the training must be adapted to the goals of the particular organization.

In its orientation as a study of group dynamics, sensitivity training is similar to the general concept of organizational development, a process by which organizations educate themselves in order to achieve better problem-solving capabilities. However, most sensitivity programs do focus on individual behavior within groups, while organizational development focuses on the group and how it works as a whole. Also, sensitivity-training groups are often composed entirely of people who are strangers to each other, while organizational-development programs seek to educate groups of people with shared working histories and experiences. Finally, the end goals of these training programs differ significantly. Sensitivity training, if successful, leads to self-awareness and insight that will help its participants in all aspects of life (including the workplace). Organizational development places more of its focus on becoming aware of one's role within workplace dynamics, leading to more effective group functioning (one of sensitivity training's goals, but with a more defined group in which to function).

POLITICAL CORRECTNESS AND THE RESPONSE TO SENSITIVITY TRAINING

The development of sensitivity training has led many critics to claim that such training is not really designed to help people be more sensitive to other people's ideas and feelings, but it is really crafted to change one's attitudes, standards and beliefs. These critics argue that sensitivity training merely wears people down until they conform to the mentality of the group, and agree that views of the group are acceptable, regardless of the value of the group idea or belief. These critics further assert that sensitivity training is often misused to force people into complying with community directives to conform to standards of political correctness. Political correctness has been defined as "avoidance of expressions or actions that can be perceived to exclude or marginalize or insult people who are socially disadvantaged or discriminated against" or the "alteration of language to redress real or alleged injustices and discrimination or to avoid offense." For example, the politically correct (PC) word

for someone who is crippled would be *disabled,* and the PC word for someone who is blind would be *visually impaired.* While political correctness seems like a good thing, opponents of the political correctness movement argue that it represents a totalitarian movement toward an ideological state in which citizens will be terrorized into conforming with the PC movement or risk punishment by the State.

This friction between advocates for sensitivity training and opponents of the PC movement has resulted in an emotional reaction to sensitivity training the workplace. In spring 2000, the Environmental Protection Agency announced to its Washington-area employees that it was planning a series of sensitivity training seminars to "create understanding, sensitivity and awareness of diversity issues and provide a forum for exchanging information and ideas." The course failed miserably. The EPA employees complained the course literature was condescending and one-sided. Many employees seemingly felt that only certain ones of them were being asked to *be sensitive* to the others.

Despite anti-PC reactions, sensitivity training continues to be pushed by organizations that are responsible for dealing with multicultural populations in a sensitive environment. In 2005, the Transportation Security Administration (TSA) began sensitivity training for 45,000 airport security workers specifically geared at helping them understand and handle Muslim passengers, and in 2007, the Department of Homeland Security—the department that oversees the TSA—produced a DVD entitled "Introduction to Arab American and Muslim American Cultures for DHS Personnel," which was distributed to more than 200,000 DHS employees across the United States.

Proponents of the PC movement assert that it merely makes each of us a bit more sensitive to the challenges that our fellow citizens may face on a day-by-day basis. Clearly, the debate will continue. Sensitivity training will continue, and employers and other organizations will continue to assess whether its effectiveness warrants the costs.

SEE ALSO *Continuous Improvement; Feedback; Group Decision Making; Group Dynamics; Human Resource Management; Teams and Teamwork; Training Delivery Methods*

BIBLIOGRAPHY
Back, Kurt W. *Beyond Words: The Story of Sensitivity Training and the Encounter Movement.* 2nd ed. New Brunswick, NJ: Transaction Books, 1987.

Engber, Daniel. "Sensitivity Training 101." *Slate.* 27 June 2006. Available from: http://www.slate.com/id/2144600/.

Golembiewski, Robert T., and Arthur Blumberg, eds. *Sensitivity Training and the Laboratory Approach: Readings about Concepts and Applications.* 2nd ed. Itasca, IL: F.E. Peacock Publishers, Inc., 1973.

Green, Thad B., and Raymond T. Butkus. *Motivation, Beliefs and Organizational Transformation.* Westport, CT: Quorum Books, 1999.

Hornestay, David. "Sensitivity Training Can Strike A Nerve." *Government Executive* 33, no. 2 (February 2001): 73.

Lakin, Martin. *Interpersonal Encounter: Theory and Practice in Sensitivity Training.* New York: McGraw-Hill Book Co., 1972.

Schloss, Gilbert A., et al. "Some Contemporary Origins of the Personal Growth Group." In *Sensitivity Training and Group Encounter.* edited by Robert W. Siroka, Ph.D., et al. New York: Grosset & Dunlap, 1971.

"Sensitivity Training." In *Encyclopedia of World Problems and Human Potential.* Brussels: Union of International Associations, 1994.

Weiss, Tracey B., PhD, and Franklin Hartle. *Reengineering Performance: Breakthroughs in Achieving Strategy Through People.* Boca Raton, FL: St. Lucie Press, 1997.

SERVICE FACTORY

The term *service factory,* coined in 1989 by Richard B. Chase and Warren J. Erikson, represents the idea that the factory can be a source of customer service in addition to a place where products are manufactured. Since those who make products (factory workers) are often more knowledgeable about them than those in field service, it stands to reason that they can contribute to sales and marketing efforts. In addition, factory workers can be a resource for installation, maintenance, and troubleshooting issues involving the products they had a hand in producing.

ROLES OF THE SERVICE FACTORY

As Chase and Garvin noted in another 1989 article that first developed the service factory concept, "Manufacturers that thrive into the next generation will compete by bundling services with products. The factory will be the hub of their efforts to get and hold customers." Chase and Garvin identify four roles that the service factory can play in strengthening a firm's marketing efforts: laboratory, consultant, showroom, and dispatcher.

Laboratory. The service factory can easily serve as a laboratory for testing new products and processes thereby enhancing potential quality and manufacturability of the new products. In addition, the laboratory can serve as a test site for traditional to high-risk experiments to modify or improve existing operations. Chaparral Steel claims that their research and development is done right on the factory floor.

Consultant. The service factory can also serve as a consultant, solving problems out in the field. Since they have worked extensively with both the firm's products and processes, factory workers are a natural source of technical

expertise when problems arise. Tektronix serves as a service factory consultant by providing a postcard with a toll-free number to a phone on the shop floor. In addition, factory floor workers can also serve as trainers for use of the product and quality control.

Showroom. As a showroom, the service factory can serve as a working demonstration of the systems and processes the firm uses to manufacturer products as well as a showcase for the factory's products themselves. Nissan in Smyrna, Tennessee offers weekly tours, open to the public, where visitors ride a small train, complete with a tour guide, through the manufacturing facility. Throughout the tour the train stops at points of interest, such as robots painting car bodies, where the tour guide emphasizes the quality and superiority of Nissan's processes. Frito-Lay's Vancouver, Washington, plant offers three different factory tours, one for wholesalers, one for retailers, and one for the public.

Dispatcher. As a dispatcher the service factory serves as the linchpin of after-sales support. The service factory can help their customers avoid stock-outs and the resulting downtime by quickly providing replacement parts. This responsiveness can then be emphasized by the company's sales force. Of course, this requires that the dispatcher firm be able to anticipate demand surges.

PUTTING THE SERVICE FACTORY CONCEPT TO WORK

In order to make the service factory work, manufacturing and marketing personnel must work well together; this might mean, for instance, that shop floor employees will need to be trained in communication skills. In addition to marketing personnel, factory managers and workers must understand customer needs. In their original article, Chase and Garvin discuss how a maker of electronic equipment put the service factory concept into practice by setting up an 800 number that goes directly to a phone on the shop floor: "Every day the factory gets several calls from customers . . . the six people working in the repair area who answer them have all received telephone training. . . . Workers and managers meet daily to discuss these calls; if necessary, further conversations with the customer follow up the meetings." Although the term does not have wide use in management discussions in the twenty-first century, the concept has been embraced in a number of industries.

OTHER USES OF THE TERM

The term "service factory" has been adopted in two other business contexts. The first context is when service industries look to manufacturing to improve productivity and efficiency in service operations. Although not all manufacturing processes can be borrowed successfully, service

industries have benefited from considering the methods employed in manufacturing.

The second context is software development. In the mid-2000s, Microsoft introduced the Service Factory development process for certain kinds of software. This process is a transparent development approach that involves developers shipping regular drops to an online community to receive feedback. As an article published by Microsoft states: "This adds significant value to developers who want to get involved and ultimately improves the quality of the deliverables, which is a benefit to all."

SEE ALSO *Service Industry; Service Operations; Service Process Matrix*

BIBLIOGRAPHY
Chase, Richard B., and David A. Garvin. "The Service Factory." *Harvard Business Review,* July–August 1989: 61–69.
Chase, Richard B., and Warren J. Erikson. "The Service Factory." *Academy of Management Executive* 2, no. 3 (1989): 191–196.
Chickan, Attila, and Krisztina Demeter. "Services Provided by Manufacturing—The Hungarian Case." *International Journal of Production Economics* 46-47 (December 1996): 489–495.
Lin, Binshan, Christopher L. Martin, and John A Vassar. "Strategic Implications of the Service Factory." *Human Systems Management* 14, no. 3 (1995): 219–226.
Lin, Binshan, and John A. Vassar. "The Service Factory: Implications for Manufacturing Managers." *Industrial Management and Data Systems* 92, no. l (1992): 18–22.
Seuring, Stefan. "Outsourcing into Service Factories: An Exploratory Analysis of Facility Operators in the German Chemical Industry." *International Journal of Operations and Production Management* 23, no. 10 (2003): 1207–1233.
Skonnard, Aaron. "Service Factory for WCF." *MSDN Magazine*, February 2007. Available from: http://msdn.microsoft.com/en-us/magazine/cc163481.aspx.
Turley, Lou W., and Douglas L. Fugate. "The Multi-Dimensional Nature of Service Facilities: Viewpoints and Recommendations." *The Journal of Services Marketing* 6, no. 3 (1992): 37–45.
Voss, Chris. "Applying Service Concepts in Manufacturing." *International Journal of Operations & Production* 12, no. 4 (1992): 93–99.
Youngdahl, William E., and Arvinder P.S. Loomba. "Service-Driven Global Supply Chains." *International Journal of Service Industry Management* 11, no. 4 (2000): 329.

SERVICE INDUSTRY

The United States is predominantly a service economy. As of 2008, service jobs accounted for over 80 percent of total U.S. employment, and current trends indicate that this figure will remain steady or increase continuing into the twenty-first century. The long-term growth of the service industry has prompted a number of questions about this sector of the American economy and the reasons for this trend. Some questions about the growth of the service

industry include: What is the service industry and what types of businesses operate in it? What are the trends in growth for the service industry and the reasons underlying its growth? How is the service sector affected by recessions and economic downswings? What are the human resources issues associated with the service industry? How is offshoring affecting American service jobs? What is expected in the future for the service industry?

DEFINITION OF THE SERVICE INDUSTRY

In the U.S. economy, jobs can be categorized into sectors, which can then be split into divisions, each of which include various industries. There are two major sectors in the U.S. economy, as identified by the U.S. Standard Industry Classification System: the goods-producing sector and the service-producing sector. The goods-producing sector includes agriculture, forestry, and fishing; mining; construction; and manufacturing. The service-producing sector includes the divisions of (1) transportation, communications, and utilities; (2) wholesale trade; (3) retail trade; (4) finance, insurance, and real estate; (5) public administration; and (6) services. This sixth group—the services division—includes a number of industries (see Table 1).

The service sector is difficult to define and to encompass. There are a number of ways to identify the sector, its divisions, its industries, and the types of jobs within them. The general category of the service division includes a wide variety of industries, but can be categorized into primarily consumer-oriented (providing a service directly

to a consumer), primarily business-oriented (providing a service directly to another business) or mixed (providing services to both businesses and individual consumers).

Alternately, the services division activities can be described by their economic activities as physical, intellectual, aesthetic, and other experiential activities. Physical activities involve working with objects; examples include repairing cars, landscaping, cutting hair, or preparing a meal. Intellectual activities involve providing education or training, such as at a university or trade school. The aesthetic activities entail providing consumers with artistic or visual experiences; museums, theater performances, art shows, and musical performances are examples. Finally, other experiential activities involve providing customers with recreation, such as in amusement and theme parks, zoos, or campgrounds.

A final way in which to categorize services is by what is transformed through the service. A service may transform a physical object, which occurs when something is repaired, altered, or improved. Having an article of clothing custom-made, a room remodeled, or an appliance repaired would involve transforming a physical object. Service division jobs may also change a consumer. Examples of changes to consumers are education, whereby the consumer learns knowledge or skills; health care, in which a person's health is improved; or personal services, such as when a hairstylist cuts a consumer's hair. A change to an organization is a third type of transformation involved in the service industry. For instance, a management consulting firm may make changes to an organization's structure or business processes to improve it. The final set of jobs in this categorization captures those professions in which there is no apparent object. For example, when an attorney provides legal representation to a client, or in professional sports competitions a service is provided, even though no specific object can be identified.

GROWTH IN THE SERVICES DIVISION

In the early part of the twentieth century, only 30 percent of those employed in the United States were working in services, with the rest in industry or agriculture. However, by 1950, half of the workforce was employed in services. In 1956, for the first time in the history of America's industrial society, the number of white-collar workers exceeded the number of blue-collar workers. By the 1960s, the United States could no longer be characterized as an industrial society but rather as a postindustrial or service society. This trend away from manufacturing towards service continued throughout the last half of the twentieth century. In 1984, the number of jobs in manufacturing was relatively high compared to the number of jobs in the services, but by 1999, the service industry employed about twice as many individuals as manufacturing or government. This largely resulted from the fact

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Table 1

Main Groups of Industries in the Services Division

- Some agricultural services (including landscaping and horticulture)
- Hotels and other places of lodging
- Personal services (including dry cleaning, tax preparation, and hair cutting)
- Business services (including temporary agencies and business software developers)
- Automotive services
- Miscellaneous repairs
- Motion pictures
- Amusements and recreation
- Healthcare
- Legal services
- Private education
- Social services
- Museums, zoos, and botanical gardens
- Membership organizations (including houses of worship and clubs)
- Engineering and management services (including consulting)
- Other miscellaneous services

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that more than 97 percent of the jobs added to U.S. payrolls from 1990 to 2002 were provided by the service-producing sector.

By the beginning of the twenty-first century, services accounted for approximately 70 percent of the national income and 80 percent of the jobs. This long-term shift from manufacturing to service is expected to continue. As the U.S. Bureau of Labor Statistics (BLS) report on industry trends, "Tomorrow's Jobs," put it, "Service-providing industries are expected to account for approximately 15.7 million new wage and salary jobs generated over the 2006–2016 period, while goods-producing industries will see overall job loss."

The three industries within the services division that experienced the most growth in the last decade have been (1) business services, (2) health care, and (3) social services. The business services areas in which the largest number of jobs was gained were personnel supply and computer services. The personnel supply area includes organizations such as temporary employment agencies, traditional employment agencies, and other organizations that supply labor to other companies. The computer services industry includes mass-produced software, custom programming, custom computer systems design, and computer leasing. The primary reason for growth in both of these areas has been changes in business processes.

In the health care industry, there were four components that added large numbers of jobs: offices of physicians and other practitioners, nursing and personal care facilities, hospitals, and home health care. These components gained 430,000 to 1.2 million jobs each between 1990 and 2002. Two main reasons for this increase are new medical procedures, which require additional personnel to perform them, and the increased number of elderly persons in the United States and their requisite health care needs.

The third industry that gained the most jobs in the services division is social services. Social services encompass daycare for children, residential care for the elderly, and other family services; engineering and management services; private education; recreation and amusement; and membership organizations (e.g., houses of worship).

The reasons for growth in the largest growth area of the services division—the business-oriented services—can be linked to three broad economic developments relevant to those services: contractual arrangements, increased construction activity, and changes in technology.

First, contractual labor arrangements, such as outsourcing, have created opportunities in the field of personnel supply (e.g., temporary agencies and employee leasing). This is due primarily to the increased demand for temporary employees from U.S. businesses that want more flexibility in staffing and more control over labor costs. Additionally, as temporary and leasing agencies

provide more training for the employees that they place with companies, this has made use of such agencies more attractive to many companies. A related reason for increased demand of such agencies is that many core employees are hired after a stint as temporary employees, which reduces recruitment and staffing costs for the companies utilizing temporary agencies. These contractual labor arrangements have also contributed to the growth of management services, such as consulting and facilities support. Finally, engineering services have changed; many engineers now operate under these new contractual arrangements rather than working for one employer as an employee.

The second major economic development that has led to growth in jobs in business-oriented services is the increase in construction activity. More construction brings higher demand for engineering, architecture, surveying, landscaping, and horticultural services. The third major economic development, improved technology, has driven a higher demand for computer services, such as computer repair, technical support, and software development. Management and engineering services, in the form of consulting, have also grown with this improved computer technology.

RECESSIONS AND THE SERVICES DIVISION

The U.S. Bureau of Labor Statistics (BLS) has studied the effects of economic recessions and expansions on the industries in the services division. The common wisdom has been that the service industry resists economic recessions; and to some extent that is true. Typically, the services do not show a decline in employment during the course of a recession. However, the BLS has found that some areas of the service sector are affected by economic downturns, indicated by a slowing of job growth.

Most areas of the services division are cyclical, which means that they are likely to experience slow growth or may even lose jobs during a recession. Engineering and management are the most cyclical areas of the services division and typically lose jobs in the average quarter of a recession. One reason for this is that these types of companies (e.g., management consulting firms, architectural firms, etc.) depend heavily on projects, not on ongoing production, which are likely to be cut back in times of economic recession. Business services are also cyclical, particularly with personnel supply (e.g., employment agencies) and computer services (e.g., custom software creation). Other cyclical areas are in agricultural services, because of the landscaping and horticultural component; automotive services, such as car rentals and repairs; miscellaneous repairs; the lodging industry; personal services, such as laundry, cleaning, and garment services; and motion pictures.

There are five areas of the services division that are deemed at least minimally counter-cyclical—that is, they

gain jobs more quickly during a recession than in normal times. Health care services are the most counter-cyclical, gaining jobs rapidly during an economic downturn. This is likely due to the nature of this industry; health care is unaffected by recession because consumers see it as a necessity rather than something that can be used less often depending on the economy. Moreover, because much of U.S. health care costs are supplemented by Medicare, Medicaid, and private insurance, this funding is not susceptible to competition with other types of purchases, and the benefits continue to be available to Americans during times of recession and unemployment.

The health care industry is one that is truly counter-cyclical; however, there is no strong consensus as to why this is. There is some evidence that health actually improves during economic recessions in the reduced use of tobacco and through improvements in diet and exercise. Thus, the demand for health care is unlikely to be driving the growth of this industry. Rather, some experts believe that the health care industry benefits from higher unemployment rates during a recession, because more people are likely to pursue jobs in the health care industry when unemployment is high. Because this industry tends to have many job vacancies, a recession may create a higher supply of employees to fill these jobs.

The other counter-cyclical service sector groups, as identified by the U.S. Bureau of Labor Statistics, are not truly counter-cyclical, in that they do not show statistical significance of this characteristic. However, they are likely to be less cyclical than the other areas of the service sector. One of these ostensibly counter-cyclical areas is private education, which is in higher demand when more people are unemployed due to an economic recession. That is, if people can't find jobs, they tend to go back to school, resulting in higher demand for teachers and administrators in public education. The other areas—child day care, amusements and recreations, and private colleges—exhibit their counter-cyclical tendencies because they tend to have fairly unattractive, low-paying jobs, which people are less likely to take in strong economic conditions, but more likely to take when the unemployment rate is high. A higher unemployment rate means that more attractive job opportunities in other industries are less available, and people must turn to less attractive jobs. Labor shortages in these lower paying industries are likely to be high in times of economic expansions, and thus these areas are less likely to be cyclical in their nature.

HUMAN RESOURCES IN THE SERVICES DIVISION

As jobs in the U.S. economy shift from the goods-producing sector to the services sector, so do many of the tasks involved in successful human resource management.

Job analysis, recruitment and selection, training, performance appraisal, compensation, and labor relations are all likely to be affected by this current trend towards increased services jobs. There are a few specific concerns for human resources in the service industry.

Job analysis, which involves gathering information to understand how to successfully perform a job, is likely to be conducted differently in service jobs than in manufacturing jobs. Because much of service work is knowledge work, in which job activities are less observable, this may mean differences in the way that job analysis is conducted. In service jobs, observation of job tasks may not be as useful as interviewing job incumbents or using a standardized form such as the Position Analysis Questionnaire.

Recruitment and selection practices in the services sector are as varied as the types of positions in this sector. The areas that are counter-cyclical or non-cyclical, however, may require stronger or more creative recruitment practices. As mentioned previously, many of the job areas that grow during economic recessions do so because there are fewer attractive job options available. Thus, during strong economic conditions, these areas (i.e., health care, day care, amusement and recreation, and private colleges) may have difficulty recruiting job applicants, and may need to be more innovative in their approach. During strong economic times, this may also mean that these counter-cyclical areas may find a lack of suitable job candidates, which may mean that selection criteria are changed, such that some skills are trained by the organization rather than having them present upon hire.

Training in the services sector may require increased attention to technology skills, as many service sector jobs now require the use of computers. Even entry-level retail jobs make use of computer technology for inventory and sales, and the ability to use these machines is critical. Additionally, customer-service skills are a crucial training need in many service industry jobs; thus, this type of training is likely to increase in value in service jobs.

Performance appraisal in the service sector is likely to be different than in the goods producing sector. While a physical accounting of performance through measuring production is possible in manufacturing and similar industries, it is less possible in service jobs. There may not be observable outcomes in service sector jobs. Thus, appraising performance by measuring behaviors is more appropriate for this sector. Additionally, outcomes other than production can be measured in service jobs: customer satisfaction, sales in a retail location, or other outcomes can be meaningful ways to measure performance.

Compensation in the goods-producing sector can be specifically linked to productivity (e.g., actual goods produced), but tying compensation to outcomes in the

services sector may be more difficult. Some outcomes are easy to measure, such as in the number and value of homes sold by a real estate agent, but others are more difficult to assess, such as the degree to which a customer service representative has successfully resolved a customer's problem. Thus, compensation that effectively rewards and motivates employees must be based on a performance appraisal that reliably and accurately captures performance. Human resources managers should use caution when developing rewards based on outcomes; a poorly designed incentive system may result in employees aiming for outcomes at the expense of customers. For instance, if a car repair shop pays employees for each new set of brakes they install, employees may begin to try to sell brakes to customers who don't need them in order to receive extra pay.

Labor unions originally grew in prominence in goods-producing jobs but now also represent many employees in the service industry. Although labor union membership has declined overall in recent decades, unions are still a presence in both manufacturing and service jobs. For instance, the Service Employees International Union (SEIU) is the largest growing union in North America, representing employees in areas of health care (e.g., nurses and nursing home employees), public services (e.g., school teachers and other government employees), building services (e.g., janitors and security guards), and industrial and allied employees (i.e., services in industrial companies). The SEIU has actually grown in membership over the years, from 625,000 members in 1980 to approximately two million in 2008, and this growth has coincided with the increase of jobs in the services industry. Many service sector employees seek representation from a union due to concerns about pay, benefits, and job security that may not be as strong as in some other areas of the economy.

OFFSHORING

One topic that is becoming increasingly important to the services division of the U.S. economy is offshoring. Offshoring occurs when U.S. jobs and production are relocated to a foreign country. Offshoring can be contrasted with outsourcing, which occurs when a company contracts with another company to perform part of their work, but does not necessarily shift to a foreign country.

India has gained many U.S. service sector jobs through offshoring in recent years. Much of this is due to India's focus on becoming more prominent in the world in their information technology capabilities. Additionally, many Indians now pursue higher education to give them skills that prepare them for jobs in which there is a labor shortage. For instance, many U.S. employers are now hiring Indian call center agencies to provide cus-

tomer service to clients in North America. Calls from overseas (e.g., American) customers are routed to an Indian call center, where an Indian employee who speaks English (often with little Indian accent) assists the customer with his or her computer problem or other customer service need. Since skilled Indian employees cost far less than similarly skilled American employees, offshoring for this job is very attractive to American companies wanting to cut costs. Author Paul Davies notes that the annual cost in 2003 of an American employee in a U.S. call center was about $43,000, but that a similarly skilled Indian employee cost about $6,200.

Offshoring began receiving a large amount of media attention during the mid-2000s, and it has been a subject of increasingly-intense debate from 2004 onward. Prior to that period, levels of job losses in the service sector due to offshoring were small relative to total U.S. employment. One study indicates that an estimated 103,000 jobs moved offshore in 2000, while another estimates that the loss in service jobs due to offshoring was about 75,000 per year from February 2001 to October 2003. However, that began accelerating in the mid-2000s. A May 2004 report indicated that roughly 830,000 U.S. service jobs would be offshored by the end of 2005 and that by 2015 there would be a cumulative job loss of 3.4 million jobs and respective wage loss of about $151 billion. In 2007, a Princeton economist warned that an estimated 35 to 40 million U.S. jobs are threatened by the ability of workers in India and other countries to provide comparable work electronically.

Even with the high level of media attention, there is significant disagreement about the actual effects of offshoring. While some economists issue dire warning about the threat of offshoring, others contend that offshoring does not represent a significant threat to U.S. jobs; some experts even claim that outsourcing is good for U.S. jobs by leading to increases in pay, higher productivity, and lower domestic inflation. While the debate continues, the increase in media coverage of this issue has caught the attention of U.S. lawmakers, as Congress and state legislators have focused attention on the issue and have even introduced legislation to limit offshoring.

FUTURE TRENDS IN THE SERVICE INDUSTRY

The U.S. economy has experienced a long-term shift from goods-producing jobs to service-sector jobs. While expansion of service-providing industries is expected to continue well into the future, projected growth varies among different types of service jobs. The major occupational groups expected to see large increases in employment in the United States are in computers, construction, healthcare, personal care, and business operations. Healthcare is

expected to lead the way during the period from 2006 to 2016. According to the BLS, "healthcare occupations are expected to make up 7 of the 20 fastest growing occupations, the largest proportion of any occupational group." Other areas of rapid growth include the social assistance industries and the professional, scientific, and technical services industries.

Technological advances are driving both automation and increases in efficiency and productivity in service-related industries. Automation, which has contributed to the decline of manufacturing jobs, is expected to contribute to the loss of certain kinds of service jobs as well. For example, according to the BLS, the installation of self-checkouts and other forms of automation are expected to lead to a loss of over 100,000 cashier jobs between 2006 and 2016. Duties that involve personal interaction—such as executive secretaries and administrative assistants—cannot be easily automated, while clerical duties that involve working with business records can either be automated or streamlined enough to be performed by other workers. As the BLS points out, "The difference between the office and administrative occupations that are expected to experience the largest declines and those that are expected to see the largest increases is the extent to which job functions can be easily automated or performed by other workers." For example, while the customer service field is expected to add over half a million new jobs by 2016, the positions of stock clerk and order filler are expected to see a decline of over 130,000 jobs during the same period.

The services sector is distinct from the goods-producing sector in the U.S. economy, and includes a very wide variety of industries and jobs. The number of jobs in the services sector has been growing in recent years, and data from the U.S. government indicate that this trend will continue. While many service sector jobs are believed to be recession-proof, only some areas of that sector are truly counter-cyclical, and some are simply noncyclical, meaning that they resist job loss during times of economic downturn. As service sector jobs increase in number, there are new concerns for managing human resources, one of which is the issue of offshoring, which is increasing slowly.

SEE ALSO *Human Resource Management; Outsourcing and Offshoring; Service Factory; Service Operations; Service Process Matrix*

BIBLIOGRAPHY
Brunelli, Mark. "Report: Offshore outsourcing helps U.S. job market." *CIO News,* 15 April 2004. Available from: http://searchcio.techtarget.com/news/article/0,289142,sid182_gci959840,00.html.

Davies, Paul. *What's This India Business?: Offshoring, Outsourcing, and the Global Services Revolution.* Yarmouth, ME: Nicholas Brealy Publishing, 2004.

Dresang, Joel. "Economist warns of off-shoring U.S. jobs." *JS Online,* 16 November 2007. Available from: http://www.jsonline.com/story/index.aspx?id=687198.

Fitzsimmons, James A., and Mona J. Fitzsimmons. *Service Management: Operations, Strategy, and Information Technology.* 4th ed. Boston: McGraw-Hill, 2004.

Garner, C. Alan. "Offshoring in the Service Sector: Economic Impact and Policy Issues." *Economic Review—Federal Reserve Bank of Kansas City* 89, no. 3 (2004): 5–37.

Goodman, Bill, and Reid Steadman. "Services: Business Demand Rivals Consumer Demand in Driving Job Growth." *Monthly Labor Review,* April 2002.

Goodman, William C. "Employment in Services Industries Affected by Recessions and Expansions." *Monthly Labor Review,* October 2001.

McCarthy, John C. "3.3 Million U.S. Service Jobs to Go Offshore." *WholeView TechStrategy Research,* 11 November 2002.

"Study: Offshoring of U.S. jobs accelerating." *Associated Press,* 18 May 2004.

"Tomorrow's Jobs." U.S. Department of Labor, Bureau of Labor Statistics. Available from: http://www.bls.gov/oco/oco2003.htm.

Zandi, Mark. "Off-Shoring Threat." *DismalScientist,* 24 October 2003.

SERVICE OPERATIONS

Services lie at the hub of economic activity in the United States. As of 2008, service jobs accounted for over 80 percent of total U.S. employment, and current trends indicate that this figure will remain steady or increase into the twenty-first century. As such, we say that the United States has a service economy. Within this service economy, the term service has several meanings when paired with other words. For example, a service firm is defined as one that derives more than 50 percent of its sales from providing services. RCA's service revenues now exceed its revenues from electronic manufacturing. A service package is a bundle of explicit and implicit benefits performed with a supporting facility and using facilitated goods. When you eat at a fast food restaurant (supporting facility), you may purchase a hamburger (facilitating good) that someone else cooked for you (service). The service concept is the perception and expectations of the service itself in the minds of the customers, employers, shareholders, and lenders. The service system is the equipment, layout, and procedures used to provide the service and maintain quality and delivery standards. The service revolution relates to the shift in the United States to a service economy and the proliferation of service automation.

A service operation is an open transformation process of converting inputs (consumers) to desired outputs (satisfied consumers) through the appropriate application of resources (family, material, labor, information, and the consumer as well). More simply, services are economic activities that produce time, place, form, or psychological utility. A meal in a fast food restaurant saves time. A meal with a date in an elegant restaurant with superior service provides a psychological boost. Wal-Mart attracts millions of customers because they can find department store merchandise, groceries, gasoline, auto service, dry cleaning, movie rental, hair styling, eyeglasses and optical services, and nursery items all in one place.

The U.S. economy consists of sectors producing goods and services. The goods-producing sector consists of manufacturing, construction, and extractive industries such as agriculture, mining, forestry, and fishing. Different types of services include business services such as consulting, banking, and financial services; trade services such as retailing, maintenance, and repair; social/personal services such as restaurants and healthcare; public services such as government and education; and infrastructure services such as transportation and communication.

SERVICES IN THE UNITED STATES

Services are not peripheral activities, but are an integral part of society. Except for basic subsistence living, services are an absolute necessity for a functional economy and enhancement of the quality of life. While an industrial society defines the standard of living by the quantity of goods, a service society sees the standard of living through quality of life as measured by health, education, and recreation. The central figure in this society is the professional who can provide information rather than energy or physical strength. In addition, infrastructure services (communication and transportation) are seen as essential links between sectors of the economy. These infrastructure services are prerequisites for the industrialization of an economy, so no advanced society can be without them.

The United States, like most societies, began as an agricultural economy. As manufacturing became dominant, the economy became centered around industry. In the early part of the twentieth century, only 30 percent of those employed in the United States were working in services, with the rest in industry or agriculture. However, by 1950, half of the workforce was employed in services. In 1956, for the first time in the history of our industrial society, the number of white-collar workers exceeded the number of blue-collar workers. The United States can no longer be characterized as an industrial society, but rather as a postindustrial or service society. By the beginning of the twenty-first century, services accounted for approximately 70 percent of the national income and 80 percent of the jobs.

A traditional lack of productivity in the service sector is one reason for its increasing growth. Generally, productivity in services lags behind that in manufacturing and agriculture. As productivity grows faster in some segments (manufacturing and agriculture) these segments will invariably shed jobs that will then be picked up by the less productive sector (services). Also, during the past four recessions in the United States, service-industry employment actually increased as jobs in manufacturing decreased or were lost to other countries. This suggests that consumers will postpone purchases of hard goods but are not willing to give up services such as education, telephone service, banking, healthcare, and public services (such as fire and police protection). Finally, countries with successful manufacturing histories are the ones that now have the ability to create service jobs. There is a ripple effect from manufacturing to the creation of services, along with a continual stream of newly invented services for sale. Also, services can now be bought in greater quantities than in the past.

The fact is that the service sector has replaced the goods-producing sector as the U.S. economy's dominant force. This shift in the economic locus has variously been called the service sector revolution, the postindustrial revolution, the information age, and the technotronic age.

CHARACTERISTICS OF SERVICES

While the variety of services is endless, there are a number of characteristics that most services share. Services are generally performed with an open-systems perspective, that is, the system is not closed or isolated from the consumer as it is in manufacturing. The consumer is said to be within the service's "factory." There is a high degree of customer contact throughout the service process, with the customer frequently participating in the process itself. Customer participation within the process means that there is simultaneous production and consumption; thus, the service cannot be stored for later use, possibly as a buffer to absorb fluctuations in demand.

Although services can have tangible (high goods content) and intangible (low goods content) attributes, services are generally regarded as intangible, that is, you can't see, feel, or test a service's performance before purchasing it. Hence, reputation is extremely important. Since services are intangible, it makes sense that they can't be patented. The intangibility of services sometimes makes it difficult for the service firm to identify their product. Is the product at a restaurant the food itself, the service, or the atmosphere? Another problem, due to intangibility, is the difficulty in measuring output. Service output tends to be variable and nonstandard, making quality control

and productivity measurement a problem. In fact, quality control is usually limited to process control. Even this is difficult since a high degree of personal judgment by the individual performing the service makes homogeneous input a near impossibility. Measures of effectiveness and efficiency are also subjective.

Services are time perishable. An empty seat on an airline means that that seat on that flight will never be available again. The same holds true for an empty hotel room. The empty room will never again be available on that particular night. The usefulness of service capacity is time-dependent—another reason that services cannot be inventoried and held for a later date. This means that services cannot be transferred or resold but must be sold directly to the customer. It also means that services cannot be mass produced.

Labor intensity is another characteristic of services. In fact, labor is usually the most important determinant of service organization effectiveness.

Site selection for services is usually dictated by the location of consumers. Preferably, services will utilize decentralized facilities within close proximity to customers.

Services can also have very weak barriers to entry. Though not true for all services, many require little in the way of capital investment, proprietary technology, or multiple locations.

CLASSIFYING SERVICE FIRMS

Service firms can be classified according to their various characteristics. This allows clarification of the relationships between firms and customers and of potential strategies for competition.

A simple classification of services is by capital intensity and labor skills. This allows services to be grouped into equipment-based services and people-based services. Equipment-based services can then be subdivided into automatic services such as vending machines and automated car washes; services monitored by unskilled labor, such as dry cleaning and movie theaters; and services operated by skilled labor, such as excavating, airlines, and computer services. People-based services are subdivided into those utilizing unskilled labor, such as lawn care, security guards, and janitorial service; those utilizing skilled labor, such as appliance repair, plumbing, catering, electrical work, and auto body repair; and professional services such as law, medicine, accounting, and consulting.

Though generally thought of as a manufacturing tool, Wheelwright and Hayes's product-process matrix also provides a basis for classifying services. This framework groups firms based on their position on the product life cycle and product structure and their stage within the process life cycle and process structure, yielding the classifications of project, job shop, batch, repetitive-assembly,

and continuous-flow manufacturing. Projects include professional services in which the process is characterized by a number of interrelated, well-defined activities, accomplished in a sequence. Doctors, lawyers, and architects typically manage a number of projects. Job shops and batches define services that are tailored to the customers' specifications. Repetitive assembly has a line flow, as do services that can be standardized and divided into routine tasks such as university registration, license renewal, and military medical examinations.

Richard Chase has argued that service delivery systems can be improved by separating them into high- and low-contact operations and managing them accordingly. High-contact services must have their operations near the customer and must be able to interact well with the public, since quality is often subjective (in the eye of the beholder). Output is variable, so wages have to be time-based. Low-contact services can place their operations near their suppliers, labor, or transportation, since the customer is not in the environment. The workforce is required to have only technical skills, as work would be performed on a customer surrogate. This also allows wages to be output based.

Roger Schmenner expanded this concept by including the degree of labor intensity and customization with the contact (interaction) classification. Service firms with low interaction/customization utilize standard operating procedures and pay less attention to physical surroundings. Firms with high interaction/customization strive to maintain quality, react to customer intervention, and gain employee loyalty. Low labor-intensive firms concentrate on capital decisions, technological advances, maintaining a high utilization rate, and scheduling service delivery. Highly labor-intensive services emphasize workload scheduling, managing growth, hiring, training, and employee welfare.

In his 1986 article, "How Can Service Businesses Survive and Prosper," Schmenner provided a framework for understanding services and utilizing them strategically. This framework, which resembles Wheelwright and Hayes's Product-Process Matrix and is used in similar fashion, is called the Service Process Matrix. Within this matrix service firms are classified by their position on a graph with two dimensions. The horizontal dimension is the degree of labor intensity, which is defined as the ratio of labor cost to capital cost. The vertical dimension of the matrix measures the degree of customer interaction and customization. Firms that have a high degree of labor intensity and a high degree of interaction/customization are termed professional services. Service firms with a high degree of labor intensity but a low degree of interaction/customization are called mass services. Low labor intensity and a high degree of interaction/customization

characterize the service shop, while firms with both low labor intensity and a low degree of interaction/customization constitute a service factory.

As with the product-process matrix, firms on the service matrix have strategic implications dependent upon where they fit within the matrix. Again like the product process matrix, service firms are generally more effective if they stay in close proximity to a diagonal running from the upper-left corner to the lower-right corner of the matrix.

SERVICES AND MANUFACTURING

Theodore Levitt, in his classic article, "Production-Line Approach to Service," describes how service managers can design their operations to achieve the economics of production. The design and conversion processes of services are sometimes called the "technical core." By insulating the technical core such that the customer has essentially no personal contact with the service providers, the business can operate more efficiently. The technical core can be insulated by restricting the offerings (fast food restaurants have very limited menus); customizing at delivery (as with computers); structuring the service in such a way that the customer has to go where the service is offered (as in banking); trying to incorporate self-service so that customers can shop at their own pace; and separating services that lend themselves to automation (ATMs and vending machines). By insulating the technical core one can essentially apply to services what has been learned in manufacturing, namely standardization and mass delivery. Levitt uses the example of McDonald's to provide a picture of a service that utilizes manufacturing techniques to the point that the end product results in what he terms the "technocratic hamburger." McDonald's makes use of a limited menu, division of labor, a standardized product (food preparers at McDonald's have little or no discretion when it comes to making the product), task grouping to allow specialized skills, and an assembly-line approach, all applied to the technical core that is insulated (away from the ordering and seating area) from the consumer.

LOCATION AND LAYOUT
IN SERVICES

Location selection in services is a macro decision, while site selection is a micro decision. As with manufacturing, service location decisions involve such variables as expansion, impact on the environment, and governmental regulation. However, services also factor in such variables as access, visibility, traffic, competition and parking.

Service layout requirements are somewhat different from manufacturing but the same terminology is used. In both services and manufacturing we find the fixed-position layout, process layout, and product, or in this case, service-based layout. The fixed-position layout is the

simplest. In this situation, the customer remains in one place throughout the service as materials and labor are brought to that location. If the customer or item being serviced must remain in one location, the service must relocate there, as with pool cleaning, landscaping, or home decorator consulting. In other cases, the nature of the equipment dictates a fixed position. Examples include dialysis machines, beauty salons, or psychiatric counseling.

In process layouts, similar machines, such as hair dryers in a beauty salon, are grouped together to produce batches of services (much the same as in the batch or disconnected line-flow process of the product-process matrix). University classrooms and movie theaters provide excellent examples of a process layout in a service environment.

If the equipment required to serve the customer is sequentially arranged according to the steps of the service process, the layout is said to be service-based (or product layout). As in manufacturing, the product layout can be continuous (without interruption) and is usually lacking in flexibility. Drivers-license renewal, registration for university classes, and cafeterias are examples of a service or product layout.

SERVICE OPERATIONS STRATEGY

As with manufacturing, service operations require a strategic approach. Metters, King-Metters, Pullman, and Walton describe the strategic planning process as a hierarchy consisting of strategic positioning, service strategy, and tactical execution

Strategic Positioning. Strategic positioning involves first defining the firm's target market. In other words, what is the set of customers the firm seeks to serve? Next, the firm must determine its core competence or what will distinguish it from other service firms, i.e., cost leadership, differentiation, or focus. At this point, the firm then must make decisions regarding its mission and high-level goals and objectives.

Service Strategy. At the service strategy level, the service firm must define its service concept, operating system and service delivery system. The service strategy links the firm's strategic position with tactical execution. The firm begins by determining its competitive priorities, and its order winners and order qualifiers. Competitive priorities are the characteristics of the firm or things that it does better than other service firms (e.g., low cost, quality, service, or flexibility). The firm's competitive priority must be both an order qualifier and an order winner. The order qualifier is a characteristic that the service must possess in order to compete in the market. If the firm lacks this then the consumer will not even consider purchasing the firm's service. The order winner is the characteristic that will cause the consumer to purchase the

firm's service over its competitors. The service concept then is the set of competitive priorities that the target market values.

The operating strategy describes how the firm's different functions (marketing, finance, and operations) will support the service concept. If the firm's order winning competitive priority is quality, what will operations do to ensure quality of the service and how will marketing promote this characteristic?

The service delivery system defines the components of the system necessary to execute the service concept. Examples of the needed variables are capacity requirements, quality management systems, and management policies. Each of these should support the firm's competitive priorities so that the firm is clearly distinct from its competitors.

Tactical Execution. Finally, the firm approaches tactical execution issues. Tactical execution involves the day-to-day activities required to function and support the service strategy. Included are capacity management, facility location, inventory management, facility layout, supplier selection, operations scheduling, staffing, and productivity improvement.

Decisions that are made in the above strategic planning process are heavily influenced by their position on Marc McCluskey's service maturity model. This model divides service maturity into four stages:

Stage 1: Baseline service—the focus is mainly on responding to requests in a timely manner.

Stage 2: Operational efficiency—the focus is on cost reduction.

Stage 3: Customer support excellence—the focus is on efficiency.

Stage 4: The focus is on changing the concept of service and growing market opportunity.

McCluskey notes that most firms are still in the first stage, moving into the second.

AUTOMATION IN SERVICES

A recent phenomenon in services is the application of automation. Often services lag behind manufacturing and agriculture in productivity. One way to improve productivity in services is to remove the customer from the process as much as possible by whatever means possible. One way is the use of automation. Many of these applications are things we see every day but give little consideration; most were introduced in fairly recent times.

Restaurants and supermarkets make wholesale use of optical scanning. Hotels utilize electronic reservation systems, electronic locks, electronic wake-up calls, and message services. Financial services first saw the proliferation of ATMs in the 1980s and then the rise of online banking in the mid-2000s. By the beginning of 2005, there were nearly 40 million online banking customers in the United States.

Similar trends exist in other service sectors. Education first made use of audio-visual equipment, calculators, translation computers, personal computers, and electronic library cataloguing; at the beginning of the twenty-first century, online courses and schools began proliferating. As of the fall term 2006, almost 3.5 million students were taking at least one online course, with an annual growth rate of nearly 10 percent (compared to the 1.5 percent growth rate for the overall higher education student population). Other fields such as government, communication, healthcare, and the leisure industry have all benefited from the automation of services. As technology continues to advance in the twenty-first century, we are likely to see more and more services being automated and put online.

SEE ALSO *Inventory Management; Layout; Operations Scheduling; Operations Strategy; Order-Winning and Order-Qualifying Criteria; Product-Process Matrix; Purchasing and Procurement; Service Process Matrix; Vendor Rating*

BIBLIOGRAPHY

Chase, Richard, and S. Dasu. "Want to Perfect Your Company's Service? Use Behavioral Science." *Harvard Business Review*, June 2001, 78–85.

Hayes, R. H., and S. C. Wheelwright. "Link manufacturing process and product life cycles." *Harvard Business Review* (January-February, 1979): 133–140.

Johnston, Robert, and Graham Clark. *Service Operations Management.* 2nd ed. Englewood Cliffs, NJ: Prentice Hall, Inc., 2005.

Levitt, Theodore J. "Production-Line Approach to Service." *Harvard Business Review,* September-October 1972, 41–52.

McCluskey, Marc. "How Mature is Your Service Operation?" *Supply Chain Management Review* 8, no. 5 (2004): 17–20.

Metters, Richard, Kathryn King-Metters, Madeleine Pullman, and Steve Walton. *Successful Service Operations Management.* Mason, OH: Thomson South-Western, 2006.

Schmenner, Roger W. "How Can Service Businesses Survive and Prosper." *Sloan Management Review,* Spring 1986, 21–32.

———. "Service Businesses and Productivity." *Decision Sciences* 35, no. 3 (2004): 333–347.

———. *Service Operations Management..* Englewood Cliffs, NJ: Prentice Hall, Inc., 1995.

SERVICE-ORIENTED ARCHITECTURE

Service-oriented architecture (SOA) is an information technology (IT) concept that defines the technical architecture used to structure and design the functionality of organizational network operations. SOA consists of

independent sequential units, software processes, and communication agents which relay commands and initiate feedback mechanisms across each other to achieve stipulated business requirements. Therefore, SOA determines the effectiveness of distinct business process functionalities that are interconnected, integrated, and supplemented by either new or existing software applications that include language programming technologies and operating systems.

ADVANTAGES OF SOA

The invention and eventual development of SOA programs was prompted by the need to depart from traditional technologies of data transfer and management such as the modular programming of the 1970s, event-tailored designs of the 1980s, interface-based designs of the 1990s, and local network electronic data interchange, all of which offer less flexibility to both internal and external demands of business processes. The twenty-first century has seen increased adoption of SOA standards by organizations because SOA enhances convenience and flexibility of internal and external access to data through a pooling of business applications and service. Pooling of services helps organizations to achieve flexibility and increased participation of affiliate partners. For example, the reservations system of Budget Rent-a-Car allows users to interact with other reservations systems for hotels and airlines in different parts of the world.

Implementing SOA is an important phase in the process of establishing sufficient organizational network systems and design structures with the capacity to integrate and coordinate business processes efficiently. SOA hastens business processes by consolidating communication procedures and initiating cohesion in IT applications to suit the prevailing business requirements. As such, expertly designed SOA structures hold the key for achieving uniformity in heterogeneous computer environments by initiating efficient interoperability and reusability of IT resources. The interactions among different service units consolidate the functionality of different IT network applications into cohesive structures that are free of hierarchy.

The functionality ability of SOA is determined by the distinctive and networked services which perform separate but coordinated functions. SOA service units are defined by the following distinctive characteristics:

- Compatibility—the service interface is open and accessible to varieties of hardware devices, software applications, and program protocols that enable conveyance of commands and feedback exchange across services.

- Traceability—the service can be readily identified and invoiced, such that one service can query about another service through a service directory; for example, an e-ticketing service can query for the existence of visa authorization service.

- Autonomy—the service is a complete unit with the ability to initiate actions without unauthorized influence of other services, and it responds with results to requests from another service without undergoing status change.

- Compliance—the service complies with the general industry standards as well as the recommended industry-specific standards.

- Reusability—services divide logical objects in the cycle of operations with the aim of facilitating reuse.

- Optimum quality–the service provides high-quality interface capabilities.

- Assembly—the service pools and coordinates functions to form composite capacities.

The distinctive characteristics of SOA determine the effectiveness of system design in identifying, monitoring, and delivering data communication. Microsoft, .NET, and Java are some of the application development approaches that enable interface access via recommended system protocols. Some of the technologies that can be used to implement SOA include simple object access protocol (SOAP), windows communication foundation (WCF), remote procedure call (RPC), distributed component object model (DCOM), representational state transfer (REST), and common object request broker architecture (CORBA). These technological protocols can be applied to SOA either independently or in varied combinations depending on their interface conformity to communicate SOA data specifications. Web service standards are notably the most widely applied service protocol because of its interoperability and security characteristics.

SOA WEB SERVICE APPLICATIONS

SOA achieves much system access and flexibility when implemented through Web-based Internet services. Many organizations are increasingly using Web-based service applications and standards to implement the SOA concept. Web service standards provide the advantage of pooling functional blocks that can be accessed through different open Internet protocols using new or existing software applications tailored to suit system requirements. Moreover, Web standards offer interoperability convenience and functional protection. SOAP is one of the widely accepted Web standards in the industry because of its friendly message exchange interface.

Software applications for Web-based SOA services basically carry out functions that end-users recognize as automated online services such as making payments online, filling out forms, viewing Web statistics, or purchasing tickets online. Web-based protocols are defined in such a way that services communicate to each other according to commands initiated at the user interface through a linking and sequencing process that is designed to meet existing or new business requirements.

Web services standard protocol is prone to myriads of operational challenges because the Web protocol exhibits difficulties of response time, reliability concerns, and human interface complications, especially when the SOA paradigm is applied to real-time systems. Therefore, the success of the Web-service SOA interoperability characteristics is determined by either interactive encounters with users or automated real-time communications across different databases and applications depending on the designs and specifications of a system. A good example of a company that utilizes such Web-service standards is Amazon.com, which executes information exchange with participant merchants via XML using an SOA. Numerous business software applications—including eXtensible markup language (XML), customer relations management (CRM), and electronic business language using eXtensible markup language (ebXML)—draw their basic infrastructure designs from SOA.

SOA GOVERNANCE IN ORGANIZATIONS

Organizations adopt SOA with the principle objective of aligning IT structures and designs with the prevailing business requirements. This is because SOA provides businesses with the mechanisms for responding appropriately to challenges posed by the ever-changing business environment. However, adopting and governing SOA in organizations is a logical and complex undertaking that requires a procedural approach. Moreover, the organizational management must be willing to invest in the process of adopting and integrating the SOA and the subsequent maintenance of the systems in the organization. The *SOA Practitioners Guide Part 3: Introduction to Service Lifecycle* identifies the traditional lifecycle development approach and the recommended development approach as the two main models of approach that organizations can use to adopt and implement SOA.

TRADITIONAL LIFECYCLE DEVELOPMENT

The traditional approach to developing SOA models in the organization focuses on tasks that the organization needs to accomplish. These tasks can be broken down further into e-business solutions, integration, packaged applications, and infrastructure.

E-Business solutions model. The e-business solutions model is suitable to organizations seeking to achieve competitive advantage by creating collaborative and interactive mechanisms across the entire spectrum of the organization's stakeholders (including employees, customers, suppliers, affiliates, franchisers, and business partners). The organization must identify the best systems architects and designers with the capacity to create, support, and share the accompanying technology, with due recognition to the need for e-business solutions to have simple and friendly user interfaces to facilitate easy access to information by both internal and external stakeholders. Nurturing of in-house expertise must be prioritized to enable the organization to cope with rapid adjustments that may be instituted occasionally in the organization's pursuit to achieve a competitive edge.

Integration model. The integration model is a flexible approach for adopting SOA that involves combining e-business solutions with outsourcing; the objective is to align SOA to the business processes and management requirements of the organization continuously. This model is suitable in situations where organizations aim at reducing the costs of IT operations while increasing the organization's capacity to interact and collaborate with all its internal and external stakeholders efficiently. As such, the organization aims at customizing the vendor's service architecture into the IT structures to enable in-house teams and external customers convenient access to the systems without overstepping the access boundaries set by the enterprise software vendor.

Packaged applications model. The packaged applications model is a cost-management approach that involves the outsourcing of system management and integration to independent or third-party software vendors. Implementing SOA management through outsourcing to third-party enterprise software providers introduces best practices and cost efficiency in the management of IT in organizations by spreading operational costs of maintaining the IT infrastructure over many organizations and limiting the adoption of SOA structures to prevailing business needs of the organization. Organizations that use third-party software vendors also benefit from the standardized IT practices continuous access to new and emerging IT applications in the industry.

The infrastructure model. The infrastructure model is also a flexible approach that focuses on matching the basic IT structures such as servers, networks, databases, and software programs to the size and level of activities of

the organization. Organizations that adopt this model rely on in-house expertise to implement and manage SOA with the objective of outsourcing the services to third-party vendors after achieving significant growth in size, business activities, and revenues that may become too burdensome for the internal IT team to manage. The infrastructure model aims at achieving efficiency at reduced costs at all times.

The traditional lifecycle approach to adopting SOA is an expensive affair for organizations because of the high frequency of new and emerging IT technologies that quickly convert existing technologies into obsolescence. Therefore, organizations have to incur additional costs of upgrading the existing IT infrastructures. This is a problem that cannot be overcome by outsourcing because even enterprise software vendors will always demand the latest and updated IT infrastructures for their improved applications. It is for this reason that the recommended approach offers better IT prospects for organizations.

THE RECOMMENDED APPROACH

The recommended approach involves creating organizational teams according to technical expertise endowments. According to *SOA Practitioners Guide Part 3: Introduction to Service Lifecycle*, these teams should include a composition team, user interface (UI) team, services team, and data team. The composition team is tasked with configuring and designing basic architectural frameworks and structures, a phase that is followed closely by the UI team, which configures the interaction and navigation framework of the IT processes. The services team develops and integrates the business logic into the IT framework model before the data team—usually consisting of the organization's in-house employees—finally develops the enterprise model for data management of both the general and special data needs of the business.

In the United States, companies are taking advantage of the incentives offered by the Economic Stimulus Act of 2008 to commit increased investments in acquisition of software and other equipments. Signed into law in February 2008, the act encourages increased business investments in software, firm equipment, and other assets by offering tax incentives that run to billions of U.S. dollars. This legislation provides one of the greatest opportunities for U.S. companies to adopt new SOA structures or improve on the existing SOA structures.

SEE ALSO *Service Component Architecture*

BIBLIOGRAPHY

Chaffey, Dave. *E-business and E-commerce Management: Strategy, Implementation and Practice, 3rd ed.* Pearson Education, 2007.

Company Overview. *SunSystems,* 2008. Available from: http://www.sunsystems.com/About_Us/.

Introduction to Services LifeCycle. SOA Practitioners' Guide, part 3. 15 September 2006. Available from: http://www.soablueprint.com/whitepapers/SOAPGPart3.pdf.

Jones, Steve. "Enterprise SOA Adoption Strategies". *infoQ,* 2006. Available from: http://www.infoq.com/minibooks/enterprise-soa.

Schroth, Christoph, and Janner Till. "Web 2.0 and SOA: Coverging Concept Enabling the Internet Services." *IT Professional* 9, No. 7, (2007): 35-42. Available from: http://www.alexandria.unisg.ch/Publikationen/37270.

"The U.S. Economic Stimulus Act of 2008 and Its Impact on the Near-Term IT Spending." *IDC* 2008. Available from: http://www.idc.com/getdoc.jsp;jsessionid=02TGPSCQ0P1EG CQJAFI CFGAKBEAUMIWD?containerId=IDC_P17810.

Waters, Richard. "New Architecture or Just New Hype?" *FT.com,* 7 March 2006. Available from:</http://us.ft.com/ftgateway/superpage.ft?news_id=fto030720061206529857>.

SERVICE PROCESS MATRIX

The Service Process Matrix is a classification matrix of service industry firms based on the characteristics of the individual firm's service processes. The matrix was derived by Roger Schmenner and first appeared in 1986. Although considerably different, the Service Process Matrix can be seen somewhat as a service industry version of Wheelwright and Hayes' Product-Process Matrix. The Service Process Matrix can be useful when investigating the strategic changes in service operations. In addition, there are unique managerial challenges associated with each quadrant of the matrix. By paying close attention to the challenges associated with their related classification, service firms may improve their performance.

The classification characteristics include the degree of labor intensity and a jointly measured degree of customer interaction and customization. Labor intensity can be defined as the ratio of labor cost to plant and equipment. A firm whose product, or in this case service, requires a high content of time and effort with comparatively little plant and equipment cost would be said to be labor intense. Customer interaction represents the degree to which the customer can intervene in the service process. For example, a high degree of interaction would imply that the customer can demand more or less of some aspects of the service. Customization refers to the need and ability to alter the service in order to satisfy the individual customer's particular preferences.

The vertical axis on the matrix, as shown in Figure 1, is a continuum with a high degree of labor intensity on one end (bottom) and a low degree of labor intensity on the other end (top). The horizontal axis is a continuum with a high degree of customer interaction and customization on one end (right) and a low degree of customer interaction and customization on the other end (left).

Figure 1
The Service Process Matrix

Degree of Interaction & Customization

Adapted from Schmenner, Roger W. *Service Operations Management,* Englewood Cliffs, NJ: Prentice Hall, 1995, page 11.
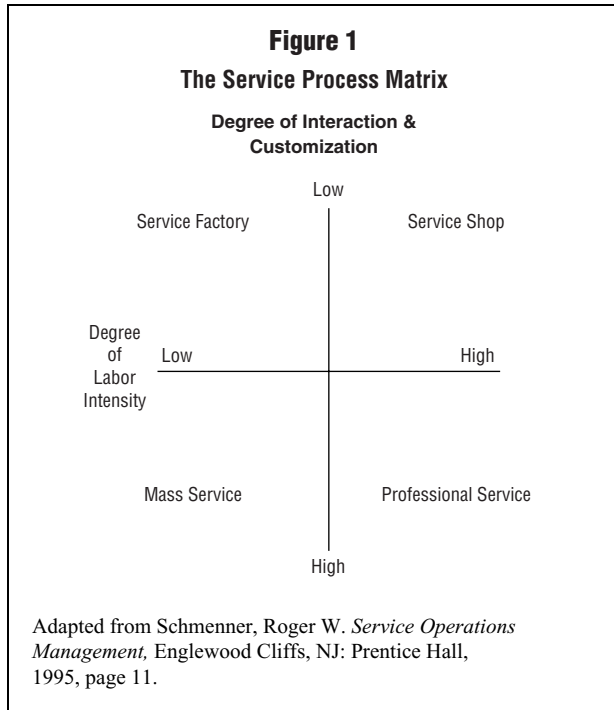
This results in a matrix with four quadrants, each with a unique combination of degrees of labor intensity, customer interaction, and customization.

The upper left quadrant contains firms with a low degree of labor intensity and a low degree of interaction and customization. This quadrant is labeled "Service Factory." Low labor intensity and little or no customer interaction or customization makes this quadrant similar to the lower right area of the Product-Process Matrix where repetitive assembly and continuous flow processes are located. This allows service firms in this quadrant to operate in a fashion similar to factories, hence the title "Service Factory." These firms can take advantage of economies of scale and may employ less expensive unskilled workers as do most factories. Firms classified as service factories include truck lines, hotels/motels, and airlines.

The upper right quadrant contains firms with a low degree of labor intensity but a high degree of interaction and customization. The upper right quadrant is labeled "Service Shop." Hospitals, auto repair shops, and many restaurants are found in this quadrant.

The lower left quadrant contains firms with a high degree of labor intensity but a low degree of interaction and customization. This quadrant is labeled "Mass Service." Mass service providers include retail/wholesale firms and schools.

Finally, the lower right quadrant contains firms with a high degree of labor intensity and a high degree of interaction and customization. The lower right quadrant is labeled "Professional Service." This quadrant is similar to the upper left section of the Product-Process Matrix where job shops and batch processes are found. Doctors, lawyers, accountants, architects, and investment bankers are typical service providers that tend to be labor intense and have a high degree of customer interaction and customization.

In 1994, Dotchin and Oakland proposed that in addition to the four categories of service factory, service shop, mass service and professional service, a fifth category should be added: personal service. They justify the inclusion by describing personal services as those directed at people, thereby high contact, as opposed to professional services which are directed to things, thereby, achieved with little contact time.

MOVEMENT WITHIN THE MATRIX

On Wheelwright and Hayes' Product-Process Matrix processes appear on a diagonal running from the upper left corner to the lower right corner. Firms that position themselves directly on the diagonal are seen to be the most efficient. Similarly, a notional diagonal can be said to run from the upper left corner to the lower right corner of the Service Process Matrix. Schmenner states that many of the segmentation steps taken by service firms have been toward the diagonal. The attraction seems to be better control. From the perspective of the matrix, need for control would be greater for service shops, which lie completely above the diagonal, and mass services, which lie below the diagonal. The need for control is not as great for service factories and professional services, as evidenced by the fact that the diagonal transverses each of those quadrants.

Schmenner also states that most services that have changed their positions within the matrix over time have tended to move up the diagonal. This, of course, implies a decrease in the degree of interaction and customization and a decrease in labor intensity. Those firms most affected by a move up the diagonal would be found in the professional services where labor intensity and interaction/customization was high. Obviously, any move up the diagonal, be it with professional services, mass service, or service shops, would be a movement toward the service factory.

The legal field, a Professional Service, is a prime example of "up the diagonal" movement. Most have surely noticed the increase of television advertising on the part of some in the legal profession. Other than personal injury, the most prolific amount of advertising seems to come from lawyers seeking cases involving bankruptcy and uncontested divorces. Obviously, these are the cases that require the least amount of customization. By

handling these cases "in bulk," the attorney lowers the labor intensity by handling multiple cases in one trip to the court house and enjoys economies of scale just like a factory (a Service Factory).

The traditional restaurant had a considerable degree of customization, customer interaction putting it into the Service Shop category. The fast food industry has taken restaurants into the Service Factory area through the dramatic elimination of customization and lowering of labor intensity. However, the degree of standardization may vary.

Hospitals have also seen movement within the matrix. Consider Shouldice Hernia Centre in Canada, a hospital that specializes in one type of surgery so that customization is at its lowest, allowing them to run as a service factory rather than a service shop. Even banking has made movement toward the Service Factory with the universal use of ATMs.

Retailing has also seen changes within the matrix. Warehouse stores such as Sam's Club and Internet sales have allowed retailers to move from Mass Service to Service Factory by drastically cutting labor intensity. However, some have gone in the opposite direction by becoming full-service boutiques and specialty stores stressing customer interaction, customization, and labor intensity.

MANAGERIAL CHALLENGES

There are a number of proposed challenges for management that are inherent in a firm's position within the Service Process Matrix. For firms with low labor intensity, plant and equipment choices are extremely important, implying the need to closely monitor technological advances. Since capacity is somewhat inflexible, scheduling service delivery is more important, so demand must be managed. For firms with high labor intensity, workforce issues such as hiring, training, employee development and control, employee welfare, and workforce scheduling are critical. Firms with low customer interaction and customization face more marketing challenges than other firms.

The need to "warm up" the service dictates special attention to physical surroundings. For these firms standard procedures are safe to use. In addition, the classic managerial pyramid with many layers and a rigid relationship between layers is appropriate. Firms with high degrees of interaction and customization must manage higher costs resulting from lack of economies of scale. In addition, higher skilled labor costs more and demands more attention, benefits, quality of work life, and benefits. The managerial hierarchy tends to be flatter and less rigid.

RECENT CHANGES

While the concept of the Service Process Matrix is conceptual or theoretical in nature, it should be noted that in 2000, Rohit Verma conducted an exploratory study, using a broad sample of quantitative data, in an attempt to validate the idea that management challenges do differ across the different types of services represented by the quadrants of the matrix.

Verma's findings did not closely match the proposed expectations. Capital decisions, technological advances, and scheduling service delivery are perceived to be more of a challenge in high interaction/customization. Conversely, hiring, training, employee scheduling, and loyalty were found to become less important as interaction/customization increases.

The importance of managing employee career advancement and marketing of services increases as labor intensity increases. Capital decisions and fighting cost increases were found to be more important for the service factory and the service shop than for mass service and professional service. Starting new operations, workforce scheduling and managing organizational hierarchy were found to be more important for service factory and service shops.

As such, only four of twenty-two management-challenge relationships proposed by the Service Process Matrix were supported by the empirical analysis. Despite this, the Product Service Matrix continues to be the standard classification scheme utilized in service research.

In 2004, Schmenner updated the Service Process Matrix by redefining the axes and the resulting diagonal. He had earlier stated that the lure of the diagonal was the need for control but later changed his mind. He stated that in retrospect, the issue was not control, but productivity that results from "swift, even flow." The concept of Swift, Even Flow argues that productivity increases as the flow of products and information becomes faster and variability decreases. Hence the X axis of the Service Process Matrix changes from interaction and customization to degree of "variation," in the sense that variation occurs in providing the service not that the firm provides a variety of services. Of course, interaction and customization are sources of variation.

The Y axis changes from labor intensity to relative throughput time. Throughput time is the time that elapses between the services or facilitating good's initial availability until the service is complete. The Service Process Matrix is now represented by Swift, Even Flow: Swift = relative throughput time; Even Flow = degree of variation; rather than degree of labor intensity and degree of customer interaction and customization.

Redefining the axes of the matrix then causes the classification of services to change from the type service itself to the provider of the service. For example, in the previous matrix, restaurants appeared as service shops. With the new axes, traditional restaurants are still service

shops but gourmet restaurants could be considered professional service and fast food restaurants (with their quick throughput time) would be service factories. Hence, particular services may now be spread out in the matrix.

In order to improve productivity then, firms would strive to move left and upward or up the diagonal. The previously noted challenges for managers remain the same. Consider Southwest Airlines, whose turnarounds are done swiftly and with little variation.

Although not all services fit cleanly into these quadrants, it is an instructive idea in terms of understanding service productivity better. It also provides insight into how service firms differentiate themselves from each other and helps to explain why successful service firms achieved their positions and maintained them. Management textbooks, such as *Service Management* (2004), *Service Operations Management* (2005), and *Operations Management* (2006), continue to reference the Service Process Matrix in order to discuss increasing productivity in service industries.

SEE ALSO *Product-Process Matrix; Service Operations*

BIBLIOGRAPHY
Dotchin, John, and John S. Oakland. "Total Quality Management in Services. Part 1: Understanding and Classifying Services." *International Journal of Quality and Reliability Management* 11, no. 3 (1994): 9–26.

Fitzsimmons, James A., and Mona J. Fitzsimmons. *Service Management: Operations, Strategy, and Information Technology.* 4th ed. Boston: McGraw-Hill, 2004.

Hayes, R. H., and S. C. Wheelwright. "Link manufacturing process and product life cycles." *Harvard Business Review* (January-February, 1979): 133–140.

Johnston, Robert, and Graham Clark. *Service Operations Management.* 2nd ed. Englewood Cliffs, NJ: Prentice Hall, Inc., 2005.

Russell, Roberta, and Bernard W. Taylor. *Operations Management: Quality and Competitiveness in a Global Environment.* 5th ed. Hoboken, NJ: John Wiley, 2006.

Schmenner, Roger W. "How Can Service Businesses Survive and Prosper?" *Sloan Management Review* Spring 1986, 21–32.

———. "Service Businesses and Productivity." *Decision Sciences* 35, no. 3 (2004): 333–347.

———. *Service Operations Management.* Englewood Cliffs, NJ: Prentice Hall, 1995.

Verma, Rohit. "An Empirical Analysis of Management Challenges in Service Factories, Service Shops, Mass Services, and Professional Services." *International Journal of Service Industry Management* 11, no. 1 (2000).

SHAREHOLDERS

Shareholders or stockholders own parts or shares of companies. In large corporations, shareholders are people and institutions that simply invest money for future dividends and for the potential increased value of their shares, whereas in small companies they may be the people who established the business or who have a more personal stake in it. When investors buy shares of companies, they receive certificates that say how many shares they own. Owning shares of a company often entitles an investor to a part of the company's profits, which is issued as a dividend. In addition, shareholders are typically offered a fixed payout per share if the company is bought out. Because they are partial owners of a company, shareholders are allowed to vote at shareholder meetings for certain company actions (such as approving or rejecting a merger proposal), review company accounts, and receive periodic reports on company performance. If shareholders cannot attend annual meetings, they are permitted to vote by proxy by mailing in their vote. Furthermore, if a company decides to issue more shares, current shareholders have the option to buy shares before they are offered to the public.

Shareholders are entitled to vote on a variety of issues, although the specific areas where shareholders have a say are determined by state laws and corporate bylaws. Generally, shareholders have the right to appoint a corporate president, elect members to a board of directors, and vote on significant changes in a corporation. These significant changes might include changes in the line of business, change of company name, and company divestments, acquisitions, and mergers. Boards of directors act on behalf of the shareholders and, in practice, make most decisions such as appointing corporate officers and reviewing corporate policies, finances, and strategies.

Shareholders may vote only during a corporation's annual shareholder meeting or at a special shareholder meeting, which would normally be called by the board of directors. A notice of the meeting and a notice of the agenda (the major points of the meeting) must be provided before each shareholder meeting. Shareholder voting power is proportionate to the number of shares each shareholder owns. For example, if a corporation had two shareholders—one with 400 shares and one with 100 shares—the one with 400 shares would wield far greater voting power.

Shareholders may own two kinds of stock: common stock and preferred stock. Owners of common stock have the last claim to company profits and assets and they may receive dividends at the discretion of a company's board of directors. In addition, common stock does not have a fixed value. Holders of common stock, therefore, profit when a company performs well and suffer losses when a company does not perform well. Nonetheless, common stockholders are typically the bulk of a publicly traded firm's shareholders and in many cases enjoy voting privileges that preferred stockholders lack. On the other hand, owners of preferred stock have first claim to a company's

profits and assets. Investors may own three different kinds of preferred stock: (1) stock with preferred dividends that entitles them to a fixed dividend rate, (2) stock with preferred assets that allows them to receive the first cut of the money from a company's sale, and (3) stock with both preferred dividends and preferred assets. Shareholders also may own redeemable and convertible stock. Redeemable stock allows a company to repurchase it at some point, whereas convertible stock enables stockholders to exchange preferred stock for common stock.

Companies sell their stocks to raise money. While they have other financing options such as loans and bonds, companies may choose to issue stocks because they need to raise more capital than they can readily borrow, because equity capital may be viewed as less costly than debt financing, or because favorable stock market conditions may present an opportunity for private owners to receive cash for part or all of their shares. Companies may sell their stocks either through private placement or public offerings. Private placement is usually limited to large institutions or a small group of individuals.

Before the rise of the publicly traded corporation, often the families that founded companies were the shareholders, managers, and members of the board of directors. But because these companies needed to raise increasing amounts of capital to expand, they eventually had to turn to outside investors. As a result, outside parties quickly became managers and members of the board. After offering shares to the public, founding family members still retained control of their corporations in many cases; however, shares also were dispersed among a variety of investors who had small holdings. This structure remained in place until the second half of the twentieth century when institutions such as banks, pension funds, and insurance companies began to accumulate large amounts of stocks in specific companies and became the major shareholders in the United States.

TYPES OF SHAREHOLDERS

Shareholders are generally classified as individual investors or institutional investors. Individual investors are individuals who invest their own money and institutional investors are organizations that invest the money of others. Institutional investors include insurance companies, banks, pension funds, and investment companies. The number of individual investors has risen over time, with slight decreases during periods of inflation or recession.

Institutional investors also have increased in number and influence. While they once concentrated on short-term investments by planning strategic stock trades, they since have become major players in the long-term investment market. Moreover, institutional investors have long clamored for a voice in company operations and they are the largest shareholders in the United States. The major institutional investors are pension funds, which invest retirement money. As a result of the trend towards concentration of stock in the hands of institutional investors, companies have become more attentive to this group's needs.

Private Equity. Private equity can usher in yet another type of shareholder. As Martin, Casson, and Nisar note, private equity and venture capital firms assume a very high risk for their investments in a company. With these types of arrangements, the investment capital is "illiquid," meaning that it is very difficult for shareholders to divest themselves of their stake. Because of this, these types of shareholders are likely to be directly involved in a firm's management decisions, though not in routine operations.

Martin, Casson, and Nisar point that it can sometimes be difficult to determine the identity of a shareholder. This is because the realm of financial investment can be complex. For instance, institutional investors not only make direct investments in companies, but also invest in other financial products, such as mutual funds. Because of this, determining who ultimately owns shares in a company can sometimes be difficult.

SIGNIFICANT NATIONAL EVENTS IMPACTING SHAREHOLDERS

In the early twenty-first century, two significant events occurred in the United States that directly impacted shareholders: the terrorist attacks of September 11, 2001 and the accounting scandals that were revealed in late 2001.

September 11. On September 11, 2001, terrorists hijacked four planes that targeted major emblematic and financial centers in the United States, with three of the four planes impacting their targets, the World Trade Center Towers in New York City, New York and the Pentagon in Washington, D.C. The impact on the U.S. Stock Market was immediate; the exchanges were closed on September 11 and remained closed for four consecutive days. The economy had slowed down prior to the attacks, with a sharp rise in unemployment rates and sluggish GDP growth; these events, coupled with the attacks, did not bode well for the stock market and the economy. Despite best efforts to reassure shareholders and shore up financial markets, stock market prices plummeted 14 percent as investors reacted in the first weeks following the terrorist attacks.

Accounting scandals. In mid-October 2001, Enron Corporation, one of the largest energy companies in the world, shocked Wall Street by reporting huge losses and

a dramatic reduction in shareholder equity. The U.S. Securities and Exchange Commission launched a formal investigation. On December 2, 2001, Enron filed for Chapter 11 bankruptcy. In January 2002, the U.S. Justice Department began a criminal investigation that ultimately revealed accounting discrepancies in the form of over-stated earnings, underreported losses, improper transactions and partnerships created to conceal liabilities from investors, as well as the illegal shredding of thousands of key accounting documents, e-mails, and memorandums by Enron and their accounting firm, Arthur Andersen LLP. Arthur Andersen LLP was indicted by the U.S. Justice Department in March 2002 making it the first major accounting firm ever to be criminally prosecuted.

Starting in 2002 and continuing throughout 2004, various officers of Enron Corp. were prosecuted for their part in the demise of the company. Also in 2004, the remaining accounting firms, now known as the "Big Four," were audited. The investigation into Enron and its fraudulent accounting acts spawned a flurry of similar investigations into Qwest, WorldCom, Global Crossing Ltd, and Tyco International Ltd, among others.

Shareholder confidence was sorely shaken which negatively impacted stock market prices, industry stability, and holdings in both personal and retirement accounts. In 2002, the government responded by passing regulations and safeguards designed to protect shareholder interests, the most impact being the Sarbanes-Oxley Act. The Sarbanes-Oxley Act provides accounting oversight in the form of the Public Company Accounting Oversight Board; requires chief executive officers to certify the accuracy of a company's financial statements, with harsh penalties for knowingly falsifying financial reports; institutes federal criminal penalties for executives and companies who defraud shareholders; prevents investment firms from retaliating against negative criticisms by analysts and protects employees who act as "whistleblowers" to reveal company misconduct.

SHAREHOLDER CONTROL AND CORPORATE DECISION MAKING

Since shareholders elect a corporation's directors, they can exert a significant amount of influence on a company and its policies, because directors know that they might be fired if shareholders are not satisfied with their performance and their decisions. Nevertheless, shareholders traditionally have been interested mostly in return on investment and hence they have not played a major role in company operations or governance, which they have left to boards and management. However, in recent decades investors have at times bought stocks to seize control of companies.

The influential shareholders are usually institutional shareholders who own large quantities of a company's stock and wield proportionate power. In contrast, individual investors have much less control and can influence decisions only by rallying large numbers of investors to support their position. Consumer advocate Ralph Nader introduced this process—often called a proxy fight—in 1969 to influence General Motors' policies towards public transportation, women, and minorities. However, the Securities and Exchange Commission issued a ruling in 1983 that helped prevent shareholders buying stocks solely to influence a company's operations. Despite this ruling, the practice of buying stocks to seize control of a company is common. When a company buys a significant share of stock of another company largely to influence its operations against its will, analysts refer to it as a hostile takeover. To prevent hostile takeovers, managers sometimes devote much effort to keeping stock prices high and other defensive tactics, although this strategy has harmed some companies ultimately. Michael Milken and some of his business associates, including Ron Perelman, were infamous in the 1980s for engineering hostile takeovers.

"Greenmailing" is another issue that involves both shareholders and managers. "Greenmailing" is a practice where a shareholder makes moves toward a hostile takeover though not with the intent to actually gain control of the firm. Instead, the goal is to get a company's managers to buy the greenmailer's shares back, but at an inflated price.

STOCK OPTIONS AND COMPENSATION

One technique shareholders have used to link top management and shareholder goals has been issuing corporate executives stock options, which allow them to purchase stocks at some point in the future at a predetermined price. If the stock price rises significantly over time (that is, well beyond the predetermined level), these options can provide a substantial profit opportunity for their holders. Therefore, if stock prices rise, both top managers and shareholders benefit and, in theory, their interests are more closely aligned.

However, this concept has not always been the conventional wisdom. The business historian Alfred Chandler, for instance, thought that the separation of a company's management and ownership was a definitive improvement over earlier business arrangements, where an owner's concerns often influenced management operations. Chandler felt that managers who were employees of a firm and not shareholders would favor strategies that would result in long-term benefits for a company.

More recently, paying CEOs and others in the form of stock options has come under criticism. Some have

argued that stock options encourage CEOs to favor strategies that have big rewards. What this means is that these same strategies also have big risks associated with them. Some also point out that payment to high level CEOs in the form of stock options is not always in the best interest of a company's shareholders.

Stock options are also sometimes used as payment to employees of a company. The idea here is to make employees both literally and figuratively invested in a company by making them shareholders. This practice was used during the tech boom of the 1990s. Of course, many of these stock options were ultimately of no value, as many start-up companies failed. Since this bust, the practice is not nearly as widespread.

SHAREHOLDERS AND MANAGEMENT PERSPECTIVE

Two general perspectives on companies and social responsibility exist in the field of management, making successful management inherently difficult in that managers sometimes must choose between shareholder interests and employee interests. Nevertheless, the interests of shareholders, employees, customers, and other stakeholders ultimately are interconnected, not mutually exclusive.

Shareholder Value. Because of direct and indirect influence from shareholders and because of company dependence on shareholders, many companies make increasing shareholder value a key goal, if not the ultimate goal. Shareholder value refers to a company's value less its debt. In other words, companies create value for their shareholders when their investment returns are more than investment costs. Shareholders normally expect a minimum return on their investments that is equal to the going return on a low-risk investment (e.g., U.S. Treasury securities) plus a risk premium for the level of risk associated with a particular company. For example, a new Internet company is expected to deliver a higher return (higher premium) than IBM, but IBM is more certain of delivering its return (lower risk). As a company delivers such returns, in the form of dividends and share price appreciation, the company is said to be enhancing shareholder value or wealth. If a company is perceived as not increasing shareholder wealth over time, investors may lose confidence and either sells off its shares or pressure the company to take steps to improve its performance, such as by replacing the CEO or altering the corporate strategy.

Managers of a company that focuses on shareholder value will strive to remain abreast of shareholder interests. Consequently, Andrew Black et al. suggest in *In Search of Shareholder Value* that managers must think like entrepreneurs in order to meet shareholders' needs and add to

shareholder value, which may require some refocusing if managers are accustomed to simply following the directions of their superiors.

To create additional shareholder value, managers must concentrate on a company's primary revenue-generating functions and running a company as efficiently as possible, which should help a company become a product or service leader and establish closer ties with consumers. Consequently, managers must begin their effort to increase shareholder value by identifying the key revenue-generating functions and then by promoting them. Furthermore, managers must distinguish between the interests of shareholders who have long-term interests in a company's worth and those who have short-term interests. Then they must strive to implement growth strategies that will benefit both kinds of investors insofar as possible, even though these interests may be in conflict with each other, according to J.P. Donlon and John Gutfreund.

However, this approach has come under the attack of employee advocates and other critics. In corporate theory, companies traditionally have been viewed according to the stakeholder model. This model suggests that a company can improve its financial conditions by attending to the needs and desires of its stakeholders, which include not only shareholders but also employees, distributors, customers, and so on. Shareholder and employee interests are sometimes viewed as being at odds with each other, especially around issues such as layoffs. According to the stakeholder model, managers should weigh the interests of one group of stakeholders against the interests of another in order to manage a company fairly. Hence, the shareholder value approach is controversial in that it gives priority to shareholder needs.

Supporters of the shareholder value approach defend their position by arguing that if a company is beholden to more than one interest group, then it will face the dilemma of having to decide between the different groups. If it must decide between competing interests, then the company must base this decision on some additional reason, but companies are hard-pressed to determine what the deciding criterion should be if not increasing shareholder value. The stakeholder model offers no suggestions. Without a decisive criterion, a company would constantly face this kind of dilemma, which would drastically slowdown the decision-making process. Such a dilemma could manifest itself, for example, as a proposal that would increase shareholder value and meet customer needs, but would result in the reducing the workforce. However, a company does not ignore the interests of other stakeholders while concentrating on shareholder value. For example, employees will quit if their interests are not attended to and customers will

patronize the competition if their needs are not met, and so management inevitably must take their needs into consideration. Finally, advocates of this approach contend that if a company fails to be profitable, then it will have to close, which would benefit none of the stakeholders.

Employee/Shareholder Partnerships and the Stakeholder Model. However, not all analysts subscribe to the shareholder value approach to management. Instead, some insist on the stakeholder model, arguing that the needs of both major stakeholder groups—shareholders and employees—can be met if a corporate structure is adopted that breaks down the adversarial relationship between them. The idea is to establish partnerships that empower employees and allow them to play a more active role in company decisions, according to William McDonald Wallace in *Postmodern Management.* The partnership arrangement makes all members' income dependent on company performance, which makes a company's costs flexible and provides an impetus for members to be flexible. This type of relationship, Wallace argues, enables companies to weather recessions and adjust prices to meet pricing tactics of competitors. Consequently, this approach would benefit both shareholders and employees.

Furthermore, while the shareholder value approach can lead to gains and benefits for shareholders, it can also lead to layoffs and closures that adversely affect employees. Because of the ubiquity of shareholder-oriented practices of hostile takeovers, many states passed laws to discourage such takeovers. These laws generally require corporate directors to consider the ramifications of their takeover plans on other stakeholders, especially employees. In addition, downsizing and layoffs are often attributed to too much emphasis on shareholder interests by management. Indeed, shareholders seem to encourage and applaud downsizing as stock prices typically increase on the announcement of impending layoffs alone.

Despite complaints from other stakeholders and despite alternative approaches, the shareholder orientation is forecast to remain the dominant bent of corporate management, according to William Beaver in his article "Is the Stakeholder Model Dead?" Beaver argues that three factors contribute to the institutionalization of the shareholder orientation: (1) the growing number of investors in the United States, (2) calls for the privatization of social security, and (3) the growth of using the stock market as a means for investing for retirement. If social security is privatized in part or in whole, investors will demand even more from companies in order to ensure that their stocks grow. Moreover, no opposing approach is gaining much ground. The stakeholder model, for example, has no major driving force behind it; for instance, labor unions represent only a small percent of the country's workers.

Nevertheless, management must attend to the needs of other stakeholders besides shareholders—especially employees and customers—in order to attract and retain highly qualified employees and satisfy customers. Clearly, a company's competitive strategy and human assets underlie the kind of economic performance and profitability needed to sustain shareholder value creation; the two need not be seen as opposing interests. Moreover, management can improve shareholder value while meeting the needs of other stakeholders such as employees and customers.

CORPORATE MONITORS

Shareholders also have come to be seen as monitors of corporations and their management. As the former head of the U.S. Labor Department during the Reagan Administration, Robert Monks argued that shareholding was a responsibility, not the mere buying of favorable stocks and selling unfavorable ones. Instead, Monks argued that shareholders have the responsibility to intervene in a company's operations and help implement policies that will increase a company's worth.

SHAREHOLDER RELATIONS

Because shareholders are owners of the company and because they hold considerable power, the management of public companies faces two ongoing tasks: (1) meeting shareholder needs and providing shareholders with information on company performance and plans, and (2) maximizing the profit of shareholders. Providing shareholders with both of these is the essence of shareholder relations—and one without the other generally will fail to satisfy shareholder demands. Companies must develop information systems that provide shareholders with periodic reports on company performance, since receiving this information constitutes one of the basic rights of shareholders. While a company is required to provide basic information such as sales, profits, assets, and liabilities in annual and quarterly reports, the investors of the late 1980s and the 1990s began demanding more detailed, frequent, and understandable information. Financial analysts and institutional investors in particular have a need for additional information. The accounting scandals of the 2000s and resulting regulations are also demanding more comprehensive disclosure. Furthermore, Securities and Exchange Commission regulations require public companies to release complete and timely information to shareholders. Hence, managers must make sure that the information they provide is current and not misleading. Management also benefits from putting forth effort to cultivate a knowledgeable pool of shareholders who are informed about company activities and goals, who will

support management decisions, and who have realistic expectations of the company's potential.

To meet the information needs of different types of investors, some companies have two separate investor relations programs: one for individual investors and one for institutional investors. An individual investor program might include issuing a magazine that highlights key aspects of a company, an annual report, quarterly reports, and a proxy statement seeking support for company proposals by proxy. On the other hand, an institutional investor program might include all the reports and information given to individual investors as well as meetings with these investors in various cities where they are concentrated, periodic conference calls to discuss current results and events, and tours of corporate properties.

Shareholder relations responsibilities cut across a company, extending from company executives on down through the corporate structure. Some companies develop special investor relations departments to handle these responsibilities, while others divide them among various departments. Either way, management must set specific goals when developing a shareholder relations program and management can establish these goals by determining what support it seeks from shareholders and what shareholders think of the company, according to H. Peter Converse in his article for *Investor Relations: The Company and Its Owners.* Since every company is unique to some extent, the goals and methods for achieving the goals will vary from company to company.

Martin, Casson, and Nasir also note that shareholders may increasingly be interested in participating in a company's activities. Specifically, institutional investors may lack the ability to exit a company; they are likely to prefer company practices that benefit the economy as a whole, since such investors are likely to have large diverse investments.

By implementing a successful shareholder and potential investor relations program, companies also can accomplish their business goals of advancing company growth and profitability. Through investor relations, companies can increase their ability to raise funds via stock offerings, offer a competitive stock option program to court talented executives, and prevent hostile takeovers.

SEE ALSO *Corporate Governance; Knowledge Management; Stakeholders*

BIBLIOGRAPHY

Anderson, C.D., and J.W. Blood. *Investor Relations: The Company and Its Owners.* New York: American Management Association, 1963.

Bartlett, Joseph W. "Exploring Options." *Daily Deal,* 21 August 2006.

Beaver, W. "Is the Stakeholder Model Dead?" *Business Horizons* 42, no. 2 (March/April 1999): 8–12.

Bebchuk, L.A. "The Case for Increasing Shareholder Power." *Harvard Law Review* 118, no. 3 (2005): 833–914.

Black, A.P., P. Wright, and J.E. Bachman. *In Search of Shareholder Value: Managing the Drivers of Performance.* London: Pitman Publishing, 1998.

Bruck, Connie. *The Predators' Ball.* New York: Penguin, 1989.

"The Business of Making Money——Public v. Private Equity." *The Economist,* 7 July 2007.

Caulkin, Simon. "Opinion: Buccaneering Bosses are the Worst of All Options." *The Observer,* 18 November 2007, 10.

Chandler, Alfred D. *The Visible Hand.* Cambridge, Massachusetts: The Belknap Press: 1976.

Deakin, S. "The Coming Transformation of Shareholder Value." *Corporate Governance* 13, no. 1 (2005): 11–18.

Donlon, J.P., and J. Gutfreund. "Good for the Company, Good for the Shareholder?" *Chief Executive* 132 (March 1998): 50–59.

Hochhauser, M. "Smart Executives, Dumb Decisions." *Risk Management* 51, no. 9 (September 2004): 64.

Letza, S., S. Xiuping, and J. Kirkbride. "Shareholding Versus Stakeholding: A Critical Review of Corporate Governance." *Corporate Governance* 12, no. 3 (2004): 242–262.

Roderick, Martin, Peter D. Casson and Tahir M. Nisar. *Investor Engagement.* Oxford: Oxford University Press, 2007.

Rose, C. "Stakeholder Orientation vs. Shareholder Value-A Matter of Contractual Failures." *European Journal of Law and Economics* 18, no. 1 (2004): 77–97.

Sasseen, Jane. "Master of the Options Universe." *Business Week,* 23 October 2006, 38.

Tipgos, M. A., and T.J. Keefe. "A Comprehensive Structure of Corporate Governance in Post-Enron Corporate America." *The CPA Journal* 74, no. 12 (2004): 46–51.

Wallace, W. M. *Postmodern Management: The Emerging Partnership Between Employees and Shareholders.* Westport, CT: Quorum Books, 1998.

SIMULATION

Simulation is used to model efficiently a wide variety of systems that are important to managers. A simulation is basically an imitation, a model that imitates a real-world process or system. In business and management, decision makers are often concerned with the operating characteristics of a system. One way to measure or assess the operating characteristics of a system is to observe that system in actual operation. However, in many types of situations the cost of direct observation can be very high. Furthermore, changing some of the relationships or parameters within a system on an experimental basis may mean waiting a considerable amount of time to collect results on all the combinations that are of concern to the decision maker.

In business and management, a simulation is a mathematical imitation of a real-world system. The use of computers to conduct simulations is not essential from a theoretical standpoint. However, most simulations are

sufficiently complex from a practical standpoint to require the use of computers in running them. A simulation can also be considered to be an experimental process. In a set of experimental runs, the decision maker actively varies some of the parameters or relationships in the system. If the mathematical model behind the simulation is valid, the results of the simulation runs will imitate the results of the real system if it were to operate over some period of time.

In order to better understand the fundamental issues of simulation, an example is useful. Suppose a regional medical center seeks to provide air ambulance service to trauma and burn victims over a wide geographic area. Issues such as how many helicopters would be best and where to place them would be in question. Other issues such as scheduling of flight crews and the speed and payload of various types of helicopters could also be important. These represent decision variables that are to a large degree under the control of the medical center. There are uncontrollable variables in this situation as well. Examples are the weather and the prevailing accident and injury rates throughout the medical center's service region.

Given the random effects of accident frequencies and locations, the analysts for the medical center would want to decide how many helicopters to acquire and where to place them. Adding helicopters and flight crews until the budget is spent is not necessarily the best course of action. Perhaps two strategically placed helicopters would serve the region as efficiently as four helicopters of some other type scattered haphazardly about. Analysts would be interested in such things as operating costs, response times, and expected numbers of patients who would be served. All of these operating characteristics would be impacted by injury rates, weather, and any other uncontrollable factors as well as by the variables they are able to control.

The medical center could run their air ambulance system on a trial-and-error basis for many years before they had any reasonable idea what combinations of resources would work well. Not only might they fail to find the best or near-best combination of controllable variables, but also they might very possibly incur an excessive loss of life as a result of poor resource allocation. For these reasons, this decision-making situation would be an excellent candidate for a simulation approach. Analysts could simulate having any number of helicopters available. To the extent that their model is valid, they could identify the optimal number to have to maximize service, and where they could best be stationed in order to serve the population of seriously injured people who would be distributed about the service region. The fact that accidents can be predicted only statistically means

that there would be a strong random component to the service system and that simulation would therefore be an attractive analytical tool in measuring the system's operating characteristics.

BUILDING THE MODEL

When analysts wish to study a system, the first general step is to build a model. For most simulation purposes, this would be a statistically based model that relies on empirical evidence where possible. Such a model would be a mathematical abstraction that approximates the reality of the situation under study. Balancing the need for detail with the need to have a model that will be amenable to reasonable solution techniques is a constant problem. Unfortunately, there is no guarantee that a model can be successfully built so as to reflect accurately the real-world relationships that are at play. If a valid model can be constructed, and if the system has some element that is random, yet is defined by a specific probability relationship, it is a good candidate to be cast as a simulation model.

Consider the air-ambulance example. Random processes affecting the operation of such a system include the occurrence of accidents, the locations of such accidents, and whether or not the weather is flyable. Certainly other random factors may be at play, but the analysts may have determined that these are all the significant ones. Ordinarily, the analysts would develop a program that would simulate operation of the system for some appropriate time period, say a month. Then, they would go back and simulate many more months of activity while they collect, through an appropriate computer program, observations on average flight times, average response times, number of patients served, and other variables they deem of interest. They might very well simulate hundreds or even thousands of months in order to obtain distributions of the values of important variables. They would thus acquire distributions of these variables for each service configuration, say the number of helicopters and their locations, which would allow the various configurations to be compared and perhaps the best one identified using whatever criterion is appropriate.

MONTE CARLO SIMULATION

There are several different strategies for developing a working simulation, but two are probably most common. The first is the Monte Carlo simulation approach. The second is the event-scheduling approach. Monte Carlo simulation is applied where the passage of time is not incorporated into the simulation model. Consider again the air ambulance example. If the simulation is set up to imitate an entire month's worth of operations all at once, it would be considered a Monte Carlo simulation. A

random number of accidents and injuries would generate a random number of flights with some sort of average distance incorporated into the model. Operating costs and possibly other operating values sought by the analysts would be computed.

The advantage of Monte Carlo simulation is that it can be done very quickly and simply. Thus, many months of operations could be simulated in the ambulance example. From the many months of operational figures, averages and distributions of costs could readily be acquired. Unfortunately, there is also a potentially serious disadvantage to the Monte Carlo simulation approach. If analysts ignore the passage of time in designing the simulation, the system itself may be oversimplified. In the air ambulance example, it is possible to have a second call come in while a flight is in progress which could force a victim to wait for a flight if no other helicopter is available. A Monte Carlo simulation would not account for this possibility and hence could contribute to inaccurate results. This is not to say that Monte Carlo simulations are generally flawed. Rather, in situations where the passage of time is not a critical part of the system being modeled, this approach can perform very well.

EVENT-SCHEDULING METHOD

The event-scheduling method explicitly takes into account time as a variable. In the air ambulance example, the hypothetical month-long simulation of the service system would emerge over time. First, an incident or accident would occur at some random location, at some random time interval from the beginning point. Then, a helicopter would respond, weather permitting, the weather being another random component of the model. The simulated mission would require some random time to complete with the helicopter eventually returning to its base. While on that service mission, another call might come in, but the helicopter would probably need to finish its first mission before undertaking another. In other words, a waiting line or queue, a term often used in simulation analysis to indicate there are "customers" awaiting service, could develop. The event scheduling approach can account for complexities like this where a Monte Carlo simulation may not.

With a computer program set up that would imitate the service system, hundreds of months would be simulated and operating characteristics collected and analyzed through averages and distributions. This would be done for all the relevant decision-variable combinations the analysts wish to consider. In the air ambulance example, these would include various numbers of helicopters and various base location combinations. Once the analysts have collected enough simulated information about each of the various combinations, it is very likely that certain combinations will emerge as being better than others. If

one particular design does not rise to the top, at least many of them can usually be eliminated, and those that appear more promising can be subjected to further study.

PROGRAMMING LANGUAGES

It was noted that while there is no theoretical need to computerize a simulation, practicality dictates that need. In the air ambulance example, analysts would require thousands of calculations to simulate just one month of operation for one set of decision-variable values. Multiply this by hundreds of monthly simulations, and the prospect of doing it somehow by hand becomes absolutely daunting. Because of this problem, programming languages have been developed that explicitly support computer-based simulation. Using such programs, analysts can develop either of the types of simulations mentioned here, a Monte Carlo simulation or an event-scheduling method simulation, or other types as well.

Commonly Used Languages. Many of the programming languages used in the twenty-first century were first developed in the 1960s and 1970s. SIMCRIPT, one of the most widely used simulation languages, was first developed in 1963. It is particularly well suited to the event-scheduling method. The language has undergone several incarnations; a recent version, SIMSCRIPT III, was released in 2005. To apply this language, analysts develop a logical flow diagram, or model, of the system they seek to study. SIMSCRIPT is a stand-alone language that can be used to program a wide variety of models. Thus, someone who uses simulation regularly on a variety of problem types might be well served by having this type of language available.

Another widely used language is called GASP IV, first introduced in 1974. It operates more as an add-in set of routines to other high-level programming languages such as FORTRAN or PL/1. With the rapid proliferation of personal computers in recent years, specific simulation software packages, simulation add-ins to other packages, and other capabilities have become widely available. For instance, a simple Monte Carlo simulation can be performed using a spreadsheet program such as Microsoft's Excel. This is possible because Excel has a built-in random number function. However, one must be aware that the validity of such random number functions is sometimes questionable.

Although older languages continue to be used, new simulation software is still being developed and upgraded. VisSim is of more recent origin, dating back to 1989. Originally developed as a Windows-based software for modeling and simulating dynamic systems, the newest version, VisSim 7.0 (2008), now includes such advanced features as 3D plotting and animation, new random generators, and an improved user interface.

Construction of Simulation Software. One of the basic building blocks within any simulation language or other tool is the random number generator. Ordinarily, such a generator consists of a short set of programming instructions that produce a number that "looks" uniformly random over some numeric interval, usually a decimal fraction between zero and one. Of course, since the number comes from programming code, it is not really random; it only looks random. Any fraction between zero and one is theoretically as likely as any other. Such numbers can then be combined or transformed into apparently-random numbers that follow some other probability function, such as a normal probability distribution or a Poisson probability distribution.

This capability facilitates building simulations that have different types of random components within them. However, if the basic generator is invalid or not very effective, the simulation results may very well be invalid even though the analysts have developed a perfectly valid model of the system being studied. Thus, there is a need for analysts to be sure that the underlying random number generating routines produce output that at least 'looks' random. There is a need for external validity in a simulation model, a need for the model to accurately imitate reality. There is just as critical a need for the building blocks within the model to be valid, for internal validity which can be a problem when an untested random number generator is employed.

EXPERIENTIAL GAMES

One particularly fast-growing area of simulation applications lies in experiential games. Board games that we played as youngsters were basically simulations. Usually, some kind of race was involved. The winner was the player who could maneuver his or her playing pieces around the board, in the face of various obstacles and opponents' moves, the fastest. The basic random number generator was usually a pair of dice. Computer simulations have expanded the complexity and potential of such gaming a great deal, and rapid advancements in computer-based and online simulations have resulted in a heavily proliferation of such simulations. *SimCity*, first introduced in 1989, is a city-building simulation game that has upgraded over the past twenty years and been made available for personal computers and various video-game console systems. The latest incarnation, *SimCity Societies*, was released in 2007. *SimCity* has spawned a host of imitators, including *SimEarth* (originally released in 1990), *SimRefinery* (1993), and *SimSafari* (1998).

Management and business simulations have been developed that are sufficiently sophisticated to use in the college classroom setting. Almost all of these consist of specialized computer programs that accept decision sets

from the game's players. With their decision sets entered into the computer program, some particular period of time is simulated, usually a year. The program outputs the competitive results with financial and operating measures that would include such variables as dollar and unit sales, profitability, market shares, operating costs, and so forth. Some competitors fare better than others because their decisions proved to be more effective than others in the face of competition in the computer-simulated marketplace. An important difference between board games and business simulations lies in the complexity of outcomes. The board game traditionally has only one winner. A well-developed business simulation can have several winners with different players achieving success in different aspects of the simulated market that is the game's playing field. Hence, business simulations have become very useful and effective learning tools in classroom settings and in online learning. A fundamental reason for this lies in the fact that simulation permits an otherwise complex system to be imitated at very low costs, both dollar and human; also, Internet connectivity permits participation by a widely-dispersed group of students.

Simulation will continue to prove useful in situations where timely decision making is important and when experimenting with multiple methods and variables is not fiscally possible or sound. Simulation allows for informative testing of viable solutions prior to implementation.

SEE ALSO *Models and Modeling*

BIBLIOGRAPHY

Laguna, M., and J. Marklund. *Business Process Modeling, Simulation, and Design.* Upper Saddle River, NJ: Pearson/Prentice Hall, 2005.

McLeish, D.L. *Monte Carlo Simulation and Finance.* Hoboken, NJ: Wiley, 2005.

Robert, C.P., and G. Casella. *Monte Carlo Statistical Methods.* 2nd ed. New York, NY: Springer, 2004.

Santos, M. "Making Monte Carlo Work." *Wall Street & Technology* 23, no. 3 (March 2005): 22–23.

Savage, S. "Rolling the Dice." *Financial Planning* 33, no. 3 (March 2003): 59–62.

Scheeres, J. "Making Simulation a Reality." *Industrial Engineer* 35, no. 2 (February 2003): 46–48.

SIX SIGMA

SEE *Statistical Process Control and Six Sigma*

SOCIAL NETWORKING

In Internet parlance, a social network is an online community of people interacting over such topics as business, culture, and friendship. Social networks are similar to

forums, but they are more selective in membership and have a clear structure, with each participant usually governing their own online portfolio of personal information and tastes. Online social participants develop relations with other members on the network and create channels of communication between each other, thereby setting up a complex structure. Social networks can be defined by geographic areas, age groups, business interests, informational needs, or other parameters.

Many of the largest social networks—such as Facebook, MySpace, and LinkedIn—allow participants to create their own profiles using pictures, videos, links, and other forms of rich media. These types of rich media can also be transferred across the network to friends or associates, making social networks an important, emerging communication tool. While businesses are examining social networks for their marketing and recruitment possibilities, several distinct difficulties have arisen that have affected the profitability of social networks for their owners. Due to these problems, many companies are investing in private social networks designed specifically for business use.

ENTERPRISE SOCIAL NETWORKING

Social networking can be used by companies within their organizations, by establishing the networks over intranet systems. These networks are available only to employees, have safeguards against security threats, and can be used in many different ways. Some businesses may wish to integrate a social network with their company directory so that lists of employee names become profiles through which employees can exchange information and show their interests and expertise. Other businesses may wish to establish intranet forums so that their employees can collaborate in solving specific problems or tackling certain departmental goals. This is especially effective when company departments are centralized and employees cannot see each other face to face.

Businesses are attracted to these company held social networks because of the opportunities for collective problem solving and creative thinking. Employees who are able to discuss options and share information are much more likely to produce innovative solutions to shared problems. Natural teams are often born over such networks, united by needed skills and similar interests. As people become more comfortable communicating in online channels, companies can implement more connecting networks as a form of project management.

Wikis are one of the most popular types of social networks used by businesses. These collaborative networks allow multiple users to edit the same piece of information, contributing other facts or deleting unnecessary content. Online wiki Web sites are considered unre-

liable due to their free access by all users, but a private wiki can help companies direct teamwork, organize events, update research, and take notes.

EXTERNAL SOCIAL NETWORKING

In addition to internal networking, companies are also eager to make use of well-established social networks available to other users of the Internet. Certain social networks are directed toward specific industries or certain professionals, designed as problem-solving and research-sharing Web sites. For the more widely available social networks, business interests fall into three main categories:

- **Marketing**. Many businesses implement marketing efforts through social networks. Advertisements can be placed in the network Web sites, usually featuring rich media applications involving sound, animation, and interactivity. A company interested in analysis can also embed code in their advertisements that keeps track of how many online users click on their ads, interact with them, and ultimately follow them to company Web sites or online stores.

- **Recruitment**. Other companies create their own profiles on such social networks as MySpace so that prospective employees and customers can access a more personalized version of the company Web site where jobs and updates can be posted. Many companies hope to find new employees more quickly through social networking than through job boards, and some social networks such as LinkedIn are based around recruitment possibilities. There have been attempts at creating a resume application by some social networks such as Facebook, but none have been remarkably successful.

- **Communication**. Some companies may prefer to communicate to their departments and employees over social networks, updating their social profiles with important information and sending messages to other users. It is more common, however, to do this with private intranet applications.

GOOD IDEAS DO NOT ALWAYS
EQUAL PROFITABLE IDEAS

External social networks, however, have several problems. Those invested in large social networks, such as MySpace and Facebook, are finding it difficult to make a profit with the massive amount of maintenance social Web sites require and the small amount of income so far obtained from advertisement. For others, marketing techniques have proved unsuccessful. Facebook's Beacon application, for instance, was meant to notify users when and what their friends bought on popular online stores, but the

trend-setting idea failed soon after it began when users declined to use it for reasons of privacy. Friends over Web sites, after all, are not always the same as friends face to face. It remains to be seen if external social networks will be able to integrate the proper applications to make themselves a successful tool for businesses or not.

BIBLIOGRAPHY

"Everywhere and Nowhere." *The Economist,* 2008. Available from: http://www.economist.com/business/displaystory. cfm?story_id=10880936.

Lesnick, Marc. "Increasing Internet Community Size . . . and Revenue!" *Social Networking Conference.* Intranet Business Conferences, 2008.

Kirkpatrick, Marshall. "Wikis Are Now Serious Business." *Read Write Web,* 2008. Available from: http://www.readwriteweb. com/archives/wiki_business.php.

McCarthy, Caroline. "Forrester: Social Networks Mean Business, Big Business." *the social.* cnet news, 2008. Available from: http://news.cnet.com/8301-13577_3-9924942-36.html.

Roberts, Jane. "Social Networking for Business Is the Next Big Thing." *Commercial Appeal.* The E.W. Scripps Group, 8 Jun 2008.

SPAN OF CONTROL

Span of control or span of management is a dimension of organizational design measured by the number of subordinates that report directly to a given manager. This concept affects organization design in a variety of ways, including speed of communication flow, employee motivation, reporting relationships, and administrative overhead. Span of management has been part of the historical discussion regarding the most appropriate design and structure of organizations.

HISTORICAL DISCUSSION OF SPAN OF CONTROL

A small, or narrow, span of control results in each manager supervising a small number of employees, while a wide span of management occurs when more subordinates report directly to a given manager. A small span of management would make it necessary to have more managers and more layers of management to oversee the same number of operative employees than would be necessary for an organization using a wider span of management. The narrower span of management would result in more layers of management and slower communications between lower level employees and top level managers of the firm. Recent moves to downsize organizations and to eliminate unnecessary positions has resulted in many organizations moving to wider spans of management and the elimination of layers of middle-level managers.

An argument for a narrow span of control was presented by V.A. Gaicunas, who developed a formula showing that an arithmetic increase in the number of a manager's subordinates resulted in a geometric increase in the number of subordinate relationships that a manager had to manage. According to Gaicunas, managers must manage not only one-to-one direct reporting relationships, but also relationships with various groups of subordinates and the relationships that exist between and among individual subordinates. The formula is shown below:

$$I = N(2N/2 + N - 1)$$
where I is the total number of interactions
and N is the number of subordinates.

Therefore, if a manager has two subordinates, there are six potential relationships to manage. However, if the manager's subordinates are increased to three, then the number of relationships is increased to eighteen. As the number of relationships increased, Gaicunas argued, the sheer number of interactions would exceed the abilities of the manager.

Researchers generally argue that a small span of management and a "tall" organization structure will be more expensive to operate because of the large number of managers and it may have communication problems resulting from the multiple levels of management. Such organizations are often seen as well suited for a stable, certain type of environment. A "flat" organization design resulting from a wider span of management would require managers to assume more administrative duties since those activities would be shared by fewer employees. It will also result in more employees reporting to each manager, increasing the managers' supervisory responsibilities. However, some research also suggests the wider span of management may cause employees to feel greater ownership of their work and increase their motivation, morale, and productivity. This type of organization design is often seen as effective in more uncertain environments.

FACTORS THAT MAY AFFECT SPAN OF CONTROL

While early discussions of span of control often centered on pinpointing the optimal number of subordinates, a number of factors may influence the span of control most appropriate for a given management position. Assuming that all other aspects of a manager's job are the same, these factors would likely alter the span of management as follows:

1. Job complexity. Subordinate jobs that are complex, ambiguous, dynamic or otherwise complicated will likely require more management involvement and a narrower span of management.

2. Similarity of subordinate jobs. The more similar and routine the tasks that subordinates are performing, the easier it is for a manager to supervise employees and the wider the span of management that will likely be effective.

3. Physical proximity of subordinates. The more geographically dispersed a group of subordinates, the more difficult it is for a manager to be in regular contact with them and the fewer employees a manager could reasonably oversee, resulting in a narrower span of management.

4. Abilities of employees. Managers who supervise employees that lack ability, motivation, or confidence will have to spend more time with each employee. The result will be that the manager cannot supervise as many employees and would be most effective with a narrower span of management.

5. Abilities of the manager. Some managers are better organized, better at explaining things to subordinates, and more efficient in performing their jobs. Such managers can function effectively with a wider span of management than a less skilled manager.

6. Technology. Cell phones, email, and other forms of technology that facilitate communication and the exchange of information make it possible for managers to increase their spans of management compared managers who have limited access to or limited abilities to use the technology.

The trend in the late-twentieth century and into the twenty-first century has been for not only firms but government organizations to move toward wider spans of control to reduce costs, speed decision making, increase flexibility, and empower employees. The U.S. federal government began increasing span of control during the 1990s; at the same time, other levels of government were taking similar steps in order to downsize their workforce. A 2005 study by the city of Seattle indicated that the span of control in the city government had been steadily increasing since 1995.

As of the late 2000s, organizations in both the public and private sectors have wider spans of control. To avoid potential problems of wide spans of control, organizations are having to invest in training managers and employees and in technology enabling the sharing of information and enhancing communication between and among managers and employees.

SEE ALSO *Empowerment; Management Styles; Organizational Structure; Organizing*

BIBLIOGRAPHY
Davison, Barbara. "Management Span of Control: How Wide Is Too Wide?" *Journal of Business Strategy.* 24 (2003): 22–29.

Griffin, Ricky. *Management*, 9th ed. Boston: Houghton Mifflin, 2008.

Hitt, Michael, Stewart Black, and Lyman W. Porter. *Management*, 2nd ed. Upper Saddle River: Pearson/Prentice Hall, 2008.

Klein, E.E. "Using Information Technology To Eliminate Layers Of Bureaucracy." *National Public Accountant* 23 (2001): 46–48.

Office of City Auditor. "Span of Control in City Government Increases Overall." City of Seattle, 19 September 2005. Available from: http://www.seattle.gov/audit/report_files/2005-13_Span_of_Control_In_City_Govt_Increases_Overall.pdf.

SPIRITUALITY IN LEADERSHIP

Before a definition of spirituality in leadership can be provided, one must first examine the meaning of the two key aspects of the phrase: the "spirit" and the "leader." One dictionary definition of spirit is "that which is traditionally believed to be the vital principle or animating force within living beings." Thus, the spirit relates to the deeper sense, meaning, or significance of something. A dictionary definition of the leader is "one who shows the way by going in advance; one who causes others to follow some course of action or line of thought." Thus, the leader is one who influences followers to think or behave in some way. Combining the two terms suggest that the leader who incorporates spirituality into his or her leadership will be one who causes others to seek out and understand their inner selves and who fosters a sense of meaning and significance among his or her followers. Thus, one definition of spirituality in leadership is a holistic approach to leadership in which the leader strives to encourage a sense of significance and interconnectedness among employees.

Spiritual leadership involves the application of spiritual values and principles to the workplace. The spiritual leader understands the importance of employees finding meaning in their work and demonstrates a genuine concern for the "whole" person, not just the employee. Spiritual leadership tries to assist others in finding meaning in their work by addressing fundamental questions such as:

• Who are we as a work team, department, or organization?

• Is our work worthy? What is our greater purpose?

• What are our values and ethical principles?

• What will be our legacy?

The spiritual leader strives for a workplace that is truly a community, consisting of people with shared traditions, values, and beliefs.

Spirituality in leadership implies that the focus will be less on formal position power and more on people; less on conformity and more on transformation and diversity; and less on controlling and more on partnership, collaboration, and inspiration. Spirituality in leadership does not require that the leader adhere to a particular religion or that he or she attempt to convince subordinates to pursue a specific set of religious principles. While leaders who emphasize spirituality may base their leadership approach in Christianity or another religious tradition, they may also have so-called "non-traditional" religious beliefs or may not adhere to any particular religion at all. Spirituality in leadership is more concerned with the development of employees as "whole people"—people who exhibit compassion to other employees, superiors, subordinates, and customers.

SPIRITUALITY IN THE WORKPLACE

Spirituality in leadership cannot be understood apart from the more general issue of spirituality in the workplace because spirituality plays an increasingly important part in the workplace. However, this trend has precedent. To a degree, business leaders have historically been concerned with the lives of their employees, including religion. In the nineteenth century, certain factories—such as the textile mills in Lowell, Massachusetts—envisioned themselves not just as profitable concerns, but also as institutions that contributed to the moral character of their workers. Similarly, the historian Anthony Wallace documented how the wives of factory owners in the mid-nineteenth century founded churches and other institutions because they were concerned about the religious salvation of their husbands' employees. Later, corporations such as Ford Motor Company also took an interest in their employees' moral development. However, many came to see these practices as too invasive into the personal lives of employees. Today, it is generally held that companies should not have that much access into the lives of their employees.

Still, many employees look to the workplace as a means of finding meaning in their lives. In highly mobile societies such as the United States, people may end up residing great distances from their "roots"—namely, where they grew up and where their family and close friends still reside. Many spend more time in the workplace with their coworkers than anywhere else. Close friendships, courtships, and marriages are common among coworkers. The modern workplace is not just a place where people work, but a place where they form friendships, socialize, and attempt to find a sense of fulfillment. It is also a place where people attempt to make sense of and derive meaning from the activities that comprise what people call "work" and how these activities fit within the greater fabric of an individual's life. This quest for meaning has prompted the recognition that spirituality in the workplace and spiritual leadership are real issues affecting the quality of life in the modern organization.

Spirituality in the workplace can take on many different flavors. For example, many "new economy" companies of the late 1990s were operated or staffed by people who came of age during the 1960s. As a result, some of these companies had a pervasive spiritual atmosphere that owed much to that time period (for instance, there are stories of executives who did yoga). More recently, spirituality in the workplace has meant a search for work that is more meaningful and rooted in social responsibility. Anita Roddick (1942–2007), founder of the Body Shop, was one corporate leader who sought to infuse her business activities with this type of spirituality through social responsibility.

Other types of spiritual workplaces do incorporate traditional and established religions into the workplace. Some authors and consultants note that achieving spiritual workplaces often takes effort, such as incorporating a set of values into a company's mission statement. In 2008, a Canadian newspaper reported that some companies in that country had begun hiring "corporate chaplains."

THE ROLE OF LEADERSHIP IN DEVELOPMENT

The study of leadership is multi-faceted and definitions of leadership vary, but in general, all definitions of leadership agree that it involves exerting influence on other people. If a leader in the workplace possesses a strong sense of spirituality that affects his or her attitudes, emotions, and behaviors in a positive way, then the leader is likely to influence subordinates to pursue the development of spirituality in their own lives. This raises at least two questions: "What leadership approach or style effectively promotes spirituality in the workplace?" and "What benefits are derived from fostering spirituality in the workplace?"

There appears to be a shift in approaches to leadership in the workplace, with an increasing focus on more holistic approaches that focus on compassion, encouragement, empathy, and service. Some contend that the greatest aspects of leadership are assisting followers in finding meaning and purpose in their work and fostering a sense of community among followers. This point of view suggests that spirituality in leadership does not involve directives and the chain of command, but transformational leadership that defines the organization's values and helps followers perceive that they are contributing to a valuable and worthwhile goal set.

Although there is little if any empirical evidence that any particular leadership approach or style would be more or less consistent with spirituality in the workplace, two leadership approaches seem to be more closely related to the concept of spiritual leadership than others: servant leadership and transformational leadership.

Servant Leadership. Servant leadership is not a full-fledged theory of leadership but can be thought of as a philosophy of leadership. It de-emphasizes the position of power or elite status of the leader. Instead, this approach to leadership suggests that the leader must first be a servant of others. It suggests that leaders must place the needs of subordinates, customers, and the community ahead of their own interests in order to be effective. Characteristics of servant leaders include empathy, stewardship, and commitment to the personal, professional, and spiritual growth of their subordinates. Servant leadership is consistent with aspects of Christianity, but is not a "Christian" theory per se. Servant leadership has not been subjected to extensive empirical testing but has generated considerable interest among both leadership scholars and practitioners.

Transformational Leadership. Beginning in the 1970s, a number of leadership theories emerged that focused on the importance of a leader's charisma to leadership effectiveness. Included within this class of theories are House's theory of charismatic leadership, Bass's transformational leadership theory, and Conger and Kanungo's charismatic leadership theory. These theories have much in common. They all focus on attempting to explain how leaders can accomplish extraordinary things against the odds, such as turning around a failing company, founding a successful company, or achieving great military success against incredible odds. The theories also emphasize the importance of leaders' inspiring subordinates' admiration, dedication, and unquestioned loyalty through articulating a clear and compelling vision.

Transformational leadership theory differentiates between the transactional and the transformational leader. Transactional leadership focuses on role and task requirements and utilizes rewards contingent on performance. By contrast, transformational leadership focuses on developing mutual trust, fostering the leadership abilities of others, and setting goals that go beyond the short-term needs of the work group. Bass's transformational leadership theory identifies four aspects of effective leadership, which include charisma, inspiration, intellectual stimulation, and consideration. A leader who exhibits these qualities will inspire subordinates to be high achievers and put the long-term interest of the organization ahead of their own short-term interest, according to the theory. Empirical research has supported many of the theory's propositions. Thus, transformational leadership styles would seem to be consistent with a spiritual approach to leadership.

THE BENEFITS OF SPIRITUALITY IN LEADERSHIP

Since there has been little empirical research regarding spirituality in the workplace or spiritual leadership, it is difficult to say precisely what the benefits (or costs) of spirituality in leadership will be. However, enough conceptual and empirical research has been conducted to suggest several potential benefits of incorporating a spiritual dimension into leadership. From the perspective of followers, incorporating spirituality into leadership has the potential to create a workplace that is more humane and that provides a sense of community and shared purpose. From the perspective of the organization, incorporating spirituality in leadership may lead to greater perceptions of trust, organizational support, and commitment among employees, which could have positive effects on organizational performance. However, spirituality in leadership should not be thought of as a "device" for developing positive organizational outcomes, but must instead be a genuine philosophical belief on the part of leaders.

There are also some who suggest that spirituality in the workplace makes good business sense. For example, some note that people will be more productive when they find work that is meaningful to them. This requires managers to be active in fostering such environments.

Some have also commented that a degree of spirituality in the workplace can actually become a competitive advantage. For example, in a 2008 article, Stanley E. Fawcett, James Brau, Gary Rhoads, and David Whitlark cite Southwest Airlines as an example of an organization that has consciously worked to create a corporate culture that is meaningful to its employees. The authors also note that since technologies can be reproduced very quickly, spirituality in a company's culture can be an asset. They argue that spiritual workplaces are also corporate cultures that focus on employees and often have similar values. They work to make employees feel valuable to the organization and to foster a sense of community among workers.

SEE ALSO *Leadership Styles and Bases of Power; Leadership Theories and Studies*

BIBLIOGRAPHY
"Body Shop founder sounds blast against CEO focus." *The Nation* (Thailand), 22 March 2004.

Bolman, L.G., and T.E. Deal. "Reframing Ethics and Spirit." *Business Leadership.* San Francisco: Jossey-Bass, 2003.

Conger, J. "Our Search for Spiritual Community." In *Spirit at Work.* San Francisco: Jossey-Bass, 1994.

Covey, S.R. *Principle-Centered Leadership.* New York: Free Press, 1990.

"Days full of meaning." *The Grocer,* 19 November 2005, 74.

Fawcett, Stanley E., James C. Brau, Gary K. Rhoads, David Whitlark, and Amydee M. Fawcett. "Spirituality and Organizational Culture: Cultivating the ABCs of an Inspiring

Workplace." *International Journal of Public Administration* 31, no. 4 (2008), 420-438.

Foot, Richard. "God finds a home on Bay Street: While churches struggle, workplace becomes a haven for spirituality." *National Post,* 25 November 2006, 14.

Gaite, Maribel R. "The View From Taft: Spirituality in the Workplace." *BusinessWorld,* 3 May 2007, S1/5.

Kinicki, A., and R. Kreitner. *Organizational Behavior.* Boston: McGraw-Hill Irwin, 2006.

Kotter, J. "Change Leadership." *Executive Excellence* 16, no. 4 (1999): 16–17.

McEnroe, J.J. "Portrait of Outstanding Leaders." *Trustee* 48, no. 2 (1995): 6–9.

Moody, Andrew. "Spirituality is new religion in the boardroom." *Mail On Sunday,* 9 January 2000, 52.

Sanders, J.E. III, W.E. Hopkins, and G.D. Geroy. "Spirituality-Leadership-Commitment Relationships in the Workplace: An Exploratory Assessment." *Proceedings of the Academy of Management National Meeting* (2004): A1–A6.

Scott, K.T. "Leadership and Spirituality: A Quest for Reconciliation." In *Spirit at Work* New York: Jossey-Bass, 1994.

Silverman, Craig. "Spirituality Inc." *The Globe and Mail,* 21 April 2008.

Vanderbilt, Tom. "The Capitalist Cell." *The New York Times,* 5 March 2000, 84.

Wallace, Anthony F.C. *Rockdale: The Growth of an American Village in the Early Industrial Revolution.* New York: Norton, 1980.

STAKEHOLDERS

A firm's stakeholders are the individuals, groups, or other organizations that are affected by and also affect the firm's decisions and actions. Depending on the specific firm, stakeholders may include: governmental agencies, such as the Securities and Exchange Commission; social activist groups, such as Greenpeace; self-regulatory organizations, such as the National Association of Securities Dealers; employees; shareholders; suppliers; distributors; the media; and even the community in which the firm is located, among many others. The following discussion divides the stakeholder perspective into three categorizations, but it is important to realize that firms do not always initially set out to establish one perspective over another. Instead, firms tend to develop their views of stakeholders and stakeholder management over time in reaction to events that unfold throughout the firm's history.

STAKEHOLDER PERSPECTIVE

Although numerous ways of viewing stakeholders exist, categorizing stakeholder perspectives into three broad categories helps elicit the basic underlying themes among these numerous views. These broad categorizations include the separation perspective, the ethical perspective, and the integrated perspective.

The Separation Perspective. The separation perspective suggests that, because managers are agents of the firm's owners (the shareholders), managers should always strive to act in the best interest of the firm's owners. This view does not cause managers to ignore non-owner stakeholders; indeed, taking actions that benefit stakeholders also benefit owners, and the separation perspective would advise managers to do so. One facet that differentiates this perspective from the others, however, is the rationale behind such decisions—the reason managers make decisions and take actions benefiting non-owner stakeholders is ultimately to reward owners. Clearly, problems arise when a given decision would maximize the benefit to non-owners at the expense of owners but would serve the greater good of society in general.

For example, suppose a new but relatively expensive technology was created that lowered pollution from steel mini-mills to well below the level required by the Environmental Protection Agency (EPA). As long as the mini-mills are already in compliance with EPA regulations, there is no legal mandate for the steel mini-mills to purchase and implement the new technology even though doing so would benefit stakeholders such as the community in which the mini-mill had factories. Yet, due to the cost of the new technology, owners' profits would suffer. The separation perspective would direct managers in this situation to dismiss the benefit of lower pollution levels for the community in favor of maximizing owners' profits by meeting EPA requirements, but not by spending funds in excess of what the EPA requires.

The Ethical Perspective. The ethical perspective is that businesses have an obligation to conduct themselves in a way that treats each stakeholder group fairly. This view does not disregard the preferences and claims of shareholders, but takes shareholder interests into consideration only to the extent that their interests coincide with the greater good. Budweiser, for example, has modified its advertising over the years to discourage underage drinking and driving while intoxicated. Social activist groups such as Mothers against Drunk Drivers have pressured Budweiser through their own advertising as well as media attention to maximize responsible alcohol consumption even though this may decrease overall sales for Budweiser. This approach focuses on ethics and suggests that managers have responsibilities apart from profit-oriented activities.

While recognizing the claims shareholders have to profit in exchange for putting their capital at risk, the ethical perspective holds ethics as the preeminent decision rule. Taken to an extreme, this perspective can minimize the right of owners to participate in financial gain in proportion to the risks they bear when doing what is ethically best for non-owner stakeholders runs counter to what is financially best for owners. A possible outcome

in a capitalist society could be that fewer and fewer owners place their capital at risk through firm ownership, a condition that may ultimately decrease the economic good of society in general and thus harm the very groups the ethical perspective intended to protect.

The Integrated Perspective. The third approach, the integrated perspective, suggests that firms cannot function independent of the stakeholder environment in which they operate, making the effects of managerial decisions and actions on non-owner stakeholders part and parcel of decisions and actions made in the interests of owners. This view holds that managerial decisions and actions are intertwined with multiple stakeholder interests in such a way that breaking shareholders apart from non-owner stakeholders is not possible. Managers who, according to this approach, make decisions in isolation of the multitude of stakeholders and focus singly on shareholders overlook important threats to their own well-being as well as opportunities on which they might capitalize.

For example, the National Association of Securities Dealers (NASD) is a self-regulatory organization that monitors and disciplines members such as insurance companies and brokerages. By incorporating NASD regulations into their management decisions and actions, insurance companies and brokerages, at least to some extent, preempt outside governmental action that may make compliance more restrictive or cumbersome. The NASD, in turn, answers to the governmental agency, the Securities and Exchange Commission (SEC). The SEC reports to the U.S. Department of Justice. Each of these—insurance companies and brokerages, the NASD, SEC, and U.S. Department of Justice—are linked in such a way that insurance companies and brokerages ignoring these stakeholders would quickly be unable to make a profit and thus fail to serve the interests of owners.

EMERGENCE OF THE STAKEHOLDER PERSPECTIVE

The conventional thinking dominating the early management literature with the rise of management as a "profession" separate from the firm's owners was that, as agents representing owners, top managers' responsibility was primarily and ultimately to these owners or shareholders. Increasingly, though, managers have come to view non-owner stakeholders as essential to firms' success, not only in financial terms, but also in societal terms. However, this has not eliminated managerial decisions that are overly concerned with financial performance at the expense of other stakeholder interests. The spate of corporate scandals and financial disasters in the early twenty-first century demonstrates that despite the apparent logic of an integrated perspective of stakeholder

management, some managers still hold to the separation perspective. The collapse of Enron and WorldCom—and charges of fraud against firms such as Tyco, Duke Energy, AIG, and Freddie Mac, among many others—illustrates this point quite well.

As shareholders of these and other firms have seen, a sole regard to financial results is not always in the best interests of these shareholders. Those holding Enron and WorldCom stock, even those who knew nothing about illegal activities by the firm's top management, quickly came to realize that excluding non-owner stakeholders is not necessarily consistent with maximizing shareholder wealth. In fact, excluding non-owner stakeholders can inadvertently bring more pressure on managers when non-owner stakeholder interests are not respected. Consider, for instance, additional regulations to which firms must now comply in the wake of many of the corporate scandals of the early 2000s. The Sarbanes-Oxley Act, passed in 2002, created additional reporting requirements in an attempt to prevent accounting abuses in the future. Estimates at the time of passage suggested that compliance would cost an average of $35 million per year for large firms with revenues in excess of $4 billion. According to one economist writing in 2007, firms affected by the Sarbanes-Oxley Act did in fact pay more in auditing fees, reduced their earnings through more conservative discretionary accruals, and experienced significantly lowered risk-adjusted stock returns over a three-year period. Obviously, then, neglecting non-owner stakeholders is not always in the best interest of shareholders even if managers take the separation perspective to stakeholder management. The significant reduction in corporate scandals in the mid and late 2000s, the mortgage crisis notwithstanding, suggests that some combination of new regulatory oversight, along with a shift away from the separation perspective, are having a positive effect on corporate governance.

The separation perspective can be traced at least as far back as 1776 when Adam Smith wrote *An Inquiry into the Nature and Causes of the Wealth of Nations.* Among Smith's most quoted lines is the work's preface, which states: "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest." This reference to what has come to be known as laissez faire capitalism positions self-interest as the most prominent feature of national industrial development. Yet, even though he did not specifically use the term, Smith also realized that stakeholders outside the firm have an important part to play in industrialization. By making provision for what he called the "public good," Smith disseminated the idea of owners' self-interest as a critical variable promoting economic growth, while also realizing that unchecked self-interest must be balanced against the greater good. In this respect, then, the separation perspective and the

integrated perspective, while not fully formed, both have their roots in early industrialism.

The ethical perspective stems at least back to the eighteenth-century writings of philosopher Immanuel Kant. The focus of the ethical perspective is the firm's responsibility to stakeholders from a normative view; that is, the ethically correct action should supersede actions based solely on self-interest, thus making managerial decisions and actions that impact stakeholders based on universal standards of right and wrong the rule that managers should follow. This standpoint, though, suffers from a shortcoming stemming from different standards of right and wrong. When right and wrong are apparent, decisions are easy, but management challenges are rarely so clear. Simply suggesting that managers do the "right thing" ignores conflicts of interest inherent in capitalistic competition, and doing the right thing can result in compromises that are not in the best interests of any of the stakeholders, but rather a way to "satisfy," or make decisions and take actions that are "good enough," but not optimal. The ethical view of stakeholders can result in managers overemphasizing the greater good to the point that they ignore the reality of self-interest, particularly as it pertains to maximize shareholder wealth.

Integrating the broad categorizations of separation and ethics allows room for both self-interest of owners and corporate responsibility to non-owner stakeholders. An integrated perspective of stakeholders positions the self-interests of managers as a key driver of economic growth, but tempers this with social responsibility toward non-owner stakeholders. Maytag, for instance, found that by balancing a plant closure with adequate notice, the reputation of the firm was held intact—a benefit to owners—at the same time that competing stakeholder interests were considered. In this situation, Maytag's Galesburg, Illinois refrigeration assembly plant announced it would be moving operations to a location with less expensive labor and other operational costs, but took the unusual move of giving the firm's one thousand employees, its local suppliers, and the small Galesburg community two years to prepare. Maytag allowed local employment agencies to set up job training within the Maytag plant to prepare its employees for employment after the plant closure. This illustrates how integration of multiple stakeholder interests can move beyond only self-interest or only ethics by integrating both of these.

It is overly simplistic to suggest that managers should just do the right thing in all situations, because the "right thing" to do is not always clear. On the other hand, acting solely in the financial interests of shareholders can result in unintended consequences that ultimately cause shareholders harm. Integrating multiple perspectives allows room for managers to balance the interests of multiple stakeholders. Such stakeholder perspectives allow for competing dimensions, thus providing a framework to help managers harmonize the interests of multiple parties.

SEE ALSO *Corporate Governance; Ethics; Shareholders*

BIBLIOGRAPHY

Crane, Andrew, Dirk Matten, and Jeremy Moon. "Stakeholders as Citizens? Rethinking Rights, Participation, and Democracy." *Journal of Business Ethics* 53, no. 1-2 (2004): 107–123.

David, H., and A. Borrus. "No Escaping Sarbanes-Oxley." *Business Week* Online. Available from: www.businessweek.com.

Dubbink, W. "The Fragile Structure of Free Market Society." *Business Ethics Quarterly* 14, no. 1 (2004): 23–47.

Heath, J., and W. Norman. "Stakeholder Theory, Corporate Governance and Public Management: What Can the History of State-Run Enterprises Teach Us in the Post-Enron Era?" *Journal of Business Ethics* 53, no. 3 (2004): 247–266.

Iliev, Peter. "The Effect of the Sarbanes-Oxley Act (Section 404)." *Social Science Research Network*, 25 December 2007. Available from: http://ssrn.com/abstract=983772.

Keep, W. "Adam Smith's Imperfect Invisible Hand: Motivations to Mislead." *Business Ethics: A European Review* 12, no. 4 (2003): 343–354.

Lea, D. "The Imperfect Nature of Corporate Social Responsibilities to Stakeholders." *Business Ethics Quarterly* 14, no. 2 (2004): 201–218.

Molyneaux, D. "Saints and CEOs: An Historical Experience of Altruism, Self-Interest and Compromise." *Business Ethics: A European Review* 12, no. 2 (2003): 133–144.

Reynolds, S.J., and N.E. Bowie. "A Kantian Perspective on the Characteristics of Ethics Programs." *Business Ethics Quarterly* 14, no. 2 (2004): 275–293.

Roberts, R.W., and L. Mahoney. "Stakeholder Conceptions of the Corporation: Their Meaning and Influence in Accounting Research." *Business Ethics Quarterly* 14, no. 3 (2004): 399–332.

Rodgers, W., and S. Gago. "Stakeholder Influence on Corporate Strategies over Time." *Journal of Business Ethics* 52, no. 4 (2004): 349–364.

Wei-Skillern, J. "The Evolution of Shell's Stakeholder Approach: A Case Study." *Business Ethics Quarterly* 14, no. 4 (2004): 713–729.

Whetstone, J. Thomas. "A framework for organizational virtue: the interrelationship of mission, culture and leadership." *Business Ethics: A European Review* 14, no. 4 (2005): 367–378.

STATISTICAL PROCESS CONTROL AND SIX SIGMA

The term Six Sigma (6σ) originated as a performance measure or a measure of quality. Using Six Sigma, process goals are set in parts per million (PPM) in all areas of the production process. Since its origin, Six Sigma has now evolved into a methodology for improving business

efficiency and effectiveness by focusing on productivity, cost reduction, and enhanced quality.

ORIGINS AND DEVELOPMENT OF SIX SIGMA

Six Sigma has its roots back with the efforts of Joseph Juran and W. Edwards Deming. Their programs for zero defects and total quality management, utilized in Japan, led to the adoption of the Six Sigma philosophy by Motorola. Motorola was able to achieve a 200-fold improvement in production quality and as of 2006, has reported over $17 billion in savings from the use of this tool. General Electric (GE) has also become a strong proponent of Six Sigma where it claims extensive successes. GE used Six Sigma during the reign of Jack Welch, where he made it the biggest corporate initiative in GE's history and received global recognition. Other early users include Texas Instruments and Allied Signal. Allied took Six Sigma to an even higher level by incorporating it not just in production but by making it a system of leadership.

The name Six Sigma comes from the statistical use of the sigma (σ) symbol, which denotes standard deviations. The six identifies the number of standard deviations around the mean. Hence, Six Sigma says that you have to go out beyond six standard deviations around the mean before you find failure. With a high enough number of sigmas (beyond six), you would approach the point of "zero defects." For example, a move from 3σ to 4σ represents an 11-fold improvement; a move from 4σ to 5σ represents another 27-fold improvement; and a move from 5σ to 6σ represents an additional 69-fold improvement. Thus the overall improvement from 3σ to 6σ is more than 20,000-fold.

At the 3σ level, the number of defects per million totals 66,807 (or 93.3 percent accuracy). At the 4σ level the number of defects drops to 6,210 (or 99.4 percent accuracy). At the 5σ level the number of defects drops still further to 233 (or 99.97 percent accuracy). At the 6σ level the number of defects would be 3.4 per million. This equates to a 99.9997 percent accuracy. In today's world, where 98 percent or 99 percent accuracy is considered excellent, 6σ is now becoming the universally recognized standard of quality.

Beginning in the early 2000s, the tools of Six Sigma were combined with lean manufacturing techniques to yield a hybrid methodology known as Lean Six Sigma. A number of management books, such as *Lean Six Sigma* and *Lean Six Sigma Demystified*, came out during the mid-2000s to tout the compatibility of the Lean and Six Sigma and to recommend the use of this management tool. The popularity of both Six Sigma and Lean Six Sigma remains unabated today and appears to continue to be gaining strength among managers and management

gurus. As of 2008, a number of large firms in the United States employ Six Sigma in some form or another. These include: Amazon.com, Bank of America, Boeing, DuPont, Ford, Merrill Lynch, and the Samsung Group. Six Sigma is also used by the U.S. Army, Navy, Marine Corps, and Air Force. Today, Six Sigma is branded as a management methodology that utilizes measures as a foundational tool for business process reengineering.

THE PRINCIPLES OF SIX SIGMA

A key principle of Six Sigma is measurement. Unfortunately that also means that if you measure the wrong things, you'll get the wrong results. For example, measuring throughput may speed up production, but at the cost of quality. Measuring quality may increase quality, but decrease customer service. So one of the toughest challenges in Six Sigma measurement is to identify the measurement system that will trigger the correct collection of responses.

A second key principle of measures in the Six Sigma environment is that all the measures should be openly visible. Openly displaying all measures on charts and graphs is a primary motivator toward the correct response.

A third principle to remember is that the change curve applies. When change happens, performance will initially go down before it recovers and goes back up. This drop in performance is often scary, but a little patience will soon see its recovery.

A principle of success or failure in the Six Sigma world is the requirement for cultural change or change readiness. If the organization is not primed for change, then an environment for change must be instilled prior to starting Six Sigma, or the project is doomed to failure. This requires training, team bonding, and team-based goal setting. The resistance that exists because of a lack of understanding of what the Six Sigma process is attempting to achieve can be avoided with proper training.

Six Sigma concentrates on measuring and improving those outputs that are critical to the customer. The tools to accomplish this include a range of statistical methodologies that are focused on continuous improvement using a statistical thinking paradigm. This paradigm includes the following principles:

- Everything is a process.
- All processes have variations that are inherent within them.
- Data analysis is a key tool in understanding the variations in the process and in identifying improvement opportunities.

It is in the management methodology where the key, underlying benefits of Six Sigma can be found; these

include a problem solving and process optimization methodology. Six Sigma creates a leadership vision utilizing a set of metrics and goals to improve business results by using a systematic five-phased problem solving methodology. There are two common problem-solving project-management methodologies that are commonly associated with Six Sigma. The first is DMAIC (Define, Measure, Analyze, Improve, Control), and the second is DMADV (Define, Measure, Analyze, Design, Verify). We will discuss the most common, DMAIC.

Six Sigma is a measurement-based strategy that focuses on reducing variations through monitoring and measurement tools. It is based on a philosophy that holds that every process can and should be repeatedly evaluated and significantly improved, with a focus on time required, resources, quality, cost, etc. The philosophy prepares employees with the best available problem-solving tools and methodologies using the five-phased DMAIC process. Explaining each of the steps in the process in more detail we have:

- Define—At the first stages of the process we look for and identify poorly performing areas of a company. We then target the projects with the best return and develop articulated problem and objective statements that have a positive financial impact on the company.

- Measure—At this stage we are trying to tie down the process under consideration. Where does it start and end? What should we be measuring to identify the deviation? What data characteristics are repeatable and identifiable? What is the capability of the process? We use tools like process mapping, flow charting, and FMEA (Failure Model Effects Analysis). We develop a baseline for the targeted area and implement an appropriate measurement system.

- Analyze—Having identified the who and what of this problem, we now target the where, when, and why of the defects in the process. We use appropriate statistical analysis tools, scatter plots, statistical process control (SPC) and statistical quality control (SQC), Input/Output matrixes, hypothesis testing, etc., and attempt to accurately understand what is happening in the process.

- Improve—At this point we should have identified the critical factors that are causing failure in the process. And, through the use of experiments, we can systematically design a corrective process that should generate the desired level of improvement. This improvement will then be monitored to assure success.

- Control—In the control phase we implement process control tools that can manage and monitor the process on an ongoing basis. The DMAIC process is now in full operation, but it does not stop here. The continuous monitoring of the process will not only assure the success of this change process, but it will also identify future opportunities for improvement.

Six Sigma is an organization-wide strategy that develops employees and gives them the tools and capabilities to solve complex problems in a rapid fashion. Employees now have the capabilities to improve overall performance through their step-by-step improvements, always from a customer and financial perspective. Six Sigma helps employees use statistical and measurement tools to deliver breakthrough results throughout the organization.

Six Sigma requires full participation, from senior management to the factory floor workers. Each assumes a specific role in the Six Sigma process. At the top of the pecking order we find the champions. These individuals are responsible for coordinating the business goals and objectives, which are set towards achieving the Six Sigma standard within the organization. They are responsible for providing the logistics and informational resources that will be needed for the successful completion of the project. They also select the project and identify the scope of the projects to be worked on. They identify the team that should work on the project, and work to remove barriers that may block the success of the project.

Most companies go on to use a classification methodology similar to the one created by Motorola to describe the abilities of their Six Sigma user. For example, classifications like Green Belt (part-time user) or Black Belt (full-time user) are common. Each level requires an improved mastery of the Six Sigma tools and skill set, as well as the roles and responsibilities of the individual in the improvement process. The objective is to create a methodology for defining the skill set of the users.

The Master Black Belt is the guru of the Six Sigma methodology. This individual works as a coach, leader, and teacher for the other individuals on the team. The Black Belt is the change agent for the Six Sigma process. This individual is a high performer and has a dedicated position that is responsible for Six Sigma projects. The Green Belt is a specially trained member of the team and usually sits on a function-specific part of the organization. The Green Belt works under the Black Belt on specific aspects of the Six Sigma projects. The Yellow Belt represents the remainder of the organization, which has been trained on some of the basic skills. These individuals are working their way towards becoming knowledgeable in the Six Sigma process.

Each of the successful Six Sigma users have customized the process to fit their own culture and methodology. In order to accomplish this, it is important to identify the key business goals and objectives of the organization, and then to adapt the Six Sigma methodology and philosophy

to fit this goal set. We need to develop an action plan identifying how we are going to focus the Six Sigma tool so as to focus on the big returns and avoid any waste in investment. Hence, it is useful to identify the areas where Six Sigma performs well. These include:

- Transforms the level of customer awareness and expectation throughout all the employees of the organization.

- Improves customer-supplier relationship.

- Drives operational process improvements with savings in cost, improvements in service and productivity, and increased returns.

- Drives information flow improvements.

- Drives a deeper, organization-wide understanding of the organization's operation.

- Improves sales force effectiveness.

- Introduces all employees to new tools that will enhance performance.

- Provides a vehicle for the development of a training program.

Six Sigma is not an all or nothing venture. Six Sigma is a collection of tools and you pick selectively from those tools in order to gain the desired result. It is also not an increase in the level of organization bureaucracy. In fact, if use properly, it will reduce the level of bureaucracy within the organization.

STATISTICAL PROCESS CONTROL

Statistical process control, and its companion statistical quality control, are tools utilized by a Six Sigma process. They are not the invented creations of the Japanese or of Edward Deming. However, Ed Deming taught SPC techniques to Japanese manufacturing, and, as a result, has become the default father of the SPC process. The original objective of SPC is to provide productivity and quality information about a production process real-time. The focus was on process control and continuous improvement. The operators become their own inspectors and control their own processes.

The SPC process should collect data and report results as the process is occurring, so that immediate action can be taken. This should help a process, and its quality measures, avoid straying beyond acceptable limits and would avoid the production of bad parts. When appropriately applied, SPC can virtually eliminate the production of defective parts. Additionally, SPC creates visibility of the cause of the failure. Since an operator is able to immediately recognize that a failure is occurring, he or she would be able to react to that failure and observe the cause of the failure, and then take corrective action. As

Peter Drucker emphasizes, the "operators become the 'owners' of not just the process, but also the parts they produce."

Because of its success, SPC has found application in other industries, including service industries, transportation industries, delivery services, and can even be found in fast food and baggage handling. For example, on-time delivery performance can be monitored on an SPC chart.

Within the SPC process there are several tools. These tools include a change management process, the collection of data, and the display of the data. In the change management process we find the use of PDCA (Plan-Do-Check-Act). The objective is to solve problems by trial and error. The process includes (P) planning a work change, (D) executing the change, (C) monitoring the effects of the change to assure that the desired results are occurring, and taking corrective (A) action in the event that the desired results are not occurring—in effect repeating the PDCA cycle. The PDCA cycle is repeated until the error is reduced to zero.

In the SPC data collection process, the objective is to collect the necessary data that will be needed to validate that a specific process is occurring correctly. The methodology for measurement is established at the point where the appropriate data is collected. Only the data that is required for the monitoring of the process is collected. An analysis of the specific reasons for collection the data is important because any additional, unnecessary data collection is considered to be a waste. The accuracy of the measurement process is also confirmed.

There are several tools available for the display of SPC data. These include:

1. Graphs and charts are used to display trends or to summarize the data. These tend to be bar or line graphs that report on a specific parameter of performance.

2. Check sheets or tally sheets are used to take the raw data and reorganize it into specific categories that are being observed.

3. Histograms or frequency distribution charts are used to translate raw data into a pictorial display showing the performance of specific quality characteristics.

4. Pareto principles are used to prioritize the contribution effect of specific quality problems. This tool assists in identifying which problems have the largest impact on a specific quality problem under study.

5. Brainstorming is used to generate ideas by taking advantage of the synergistic power of a team of people.

6. Ishikawa diagrams (Fishbone charts) are used to create problem and solution visibility by grouping

Chart 1

X-Bar Chart
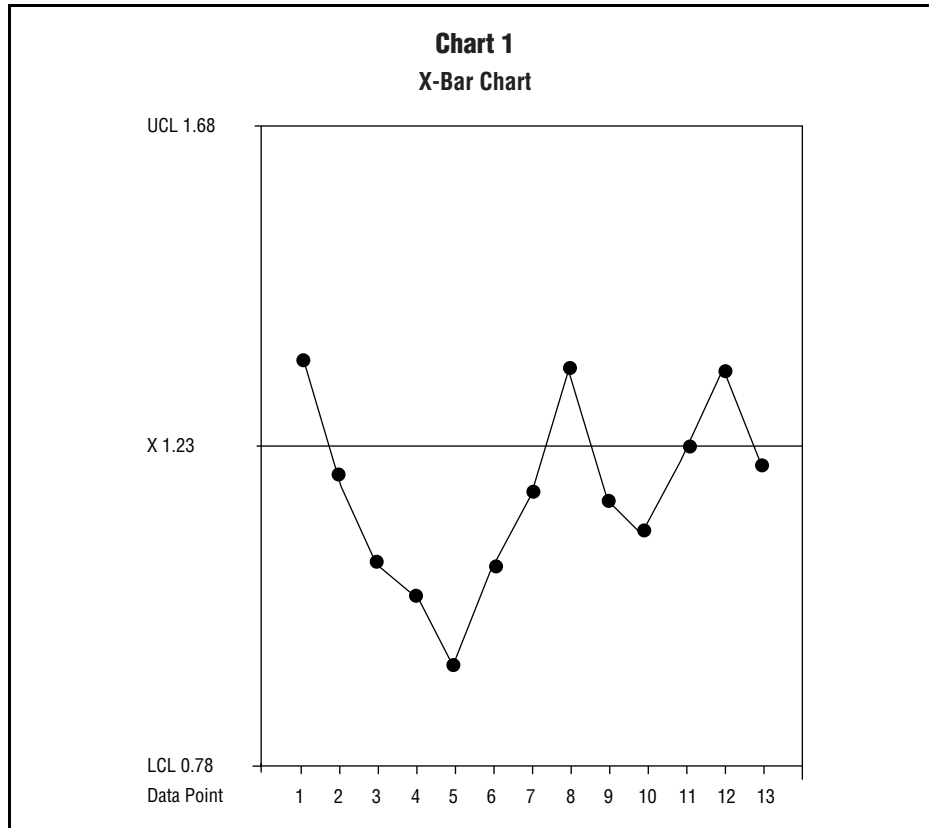
problem causes into branches. Often this is referred to as a cause and effect diagram. Using this tool in conjunction with the PDCA process helps to narrow down the root cause.

7. Control Charts are used to validate that the variation of measurement of a specific parameter is kept within a set of control limits.

In SPC, the most critical part of the process is the validation that you are measuring the right thing and thereby motivating the correct response. Additionally, if one measure can take the place of several measures, then that one measure should be identified, thereby simplifying the measurement process. Once a measurement has been selected, then we are ready to set up the data collection process and to establish control charts that will monitor the performance of this data.

The control charts are built around a specific product parameter that requires monitoring because of its impact on the overall quality of the product. The following discussion is an extremely basic overview of the SPC process, and should not be considered to be sufficient for implementing an SPC process. Rather, this discussion is simply intended to give the reader a basic overview of the process.

The next step in the SPC process is to establish a set of control variables that includes an average (X) and a range (R). These can be established by going to the drawings and reviewing the initial part specifications using the expected value as X and the tolerance range as R. Or, these variables can be established using historical values and calculating the historical average (X) and range (R) for the data.

Having established an X and R value, we can calculate an Upper Control Limit (UCL) and a Lower Control Limit (LCL).

$$UCL = X + R$$
$$LCL = X - R$$

From these values, a pair of control charts is created. These charts are used to plot the SPC data as it occurs. They are used as a visual tool to monitor the process. Chart 1 is an example of two basic SPC charts that are monitoring a process. For these charts we will use X = 1.23 and R = .45.

From Chart 1 we can see how the measurement data is recorded on the chart at the time each measurement occurs. The objectives behind this data collection process are several. One is to catch outliers in the data (anything above the UCL or below the LCL). These outliers are

Chart 2
R Chart
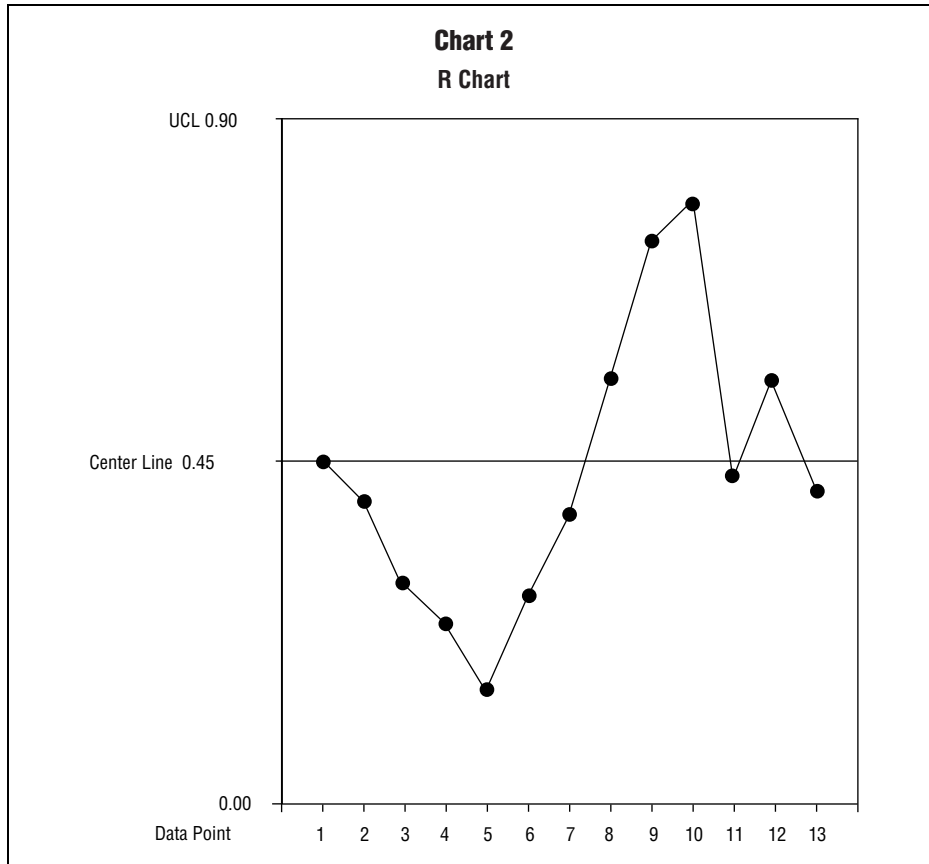
quality failures and must immediately stop the process. Another purpose for the measures is to identify trends. For example data points 1 through 5 indicate a strong trend to failure approaching the LCL. Corrective action should be taken immediately to avoid the possibility of producing bad parts. Another objective can be seen in data points 7 through 13, which indicates that perhaps our LCL and UCL are out too far and need to be brought in tighter, thereby giving us a higher level of performance and a higher level of quality.

Another methodology for applying SPC processes is by collecting data, not on every event, but on a random sampling of the event. This occurs when there is a large volume of activity and the time required to measure each event is too burdensome. A statistical sample is taken, and from that sample the average of the sample data (X) and the range of that sample (R = highest minus lowest measure) is calculated. For example, if our random sample size was 5 data points and our sample included the measures of 1.4, 1.45, 1.2, 1.3, and 1.65, then X = 1.4 and R = 1.65-1.2 = .45. This X value would then be the first data point plotted on Chart 1.

Using the statistical random sample, a range chart would also need to be created. Chart 2 is an example of a

range chart and the first data point of Chart would be the plot of the data corresponding to the example given. For this example, the lower limit is zero, which states that there is no deviation between each of the data points of that sample. The center point is R (.45) and the UCL is equal to 2 times R (.90).

In the example of the range chart (R chart), the lower the value is, the better. A lot of vibration all over the chart suggests that the process may be going out of control. Also, a trend moving upwards as we see from data points 5 through 10 would indicate that a process is starting to go out of control and corrective action should be taken immediately.

With the X-Bar and R charts, we can now create summarized reports, like the histograms and frequency distributions that were discussed earlier. This allows a long term, summarized perspective of the process, rather than the chronological time-line that the X-Bar and R charts offer.

There are systems and philosophies that go beyond SPC, which include "Design of Experiments (DOE)" and "Concept Management." In DOE the focus is on front-end design work, rather than on SPC problem solving as you go. And Concept Management utilizes total quality

management (TQM) methodologies to implement continuous improvement change processes, once again in an attempt to identify and resolve potential problems before they occur. Additionally, Concept Management uses breakthrough thinking techniques rather than root cause analysis to question the cause of problems.

Six Sigma, and one of its primary tools, SPC, have their roots in the Japanese manufacturing process. But they have since become a key quality standard for the United States and Europe through their use of management principles and effective measurement tools.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Quality and Total Quality Management; Quality Gurus*

BIBLIOGRAPHY

Antony, Jiju. "Key Ingredients for a Successful Six Sigma Program." *onesixsigma.com,* 1 October 2006. Available from: http://www.onesixsigma.com/node/638.

Arthur, Jay. *Lean Six Sigma Demystified.* Boston: McGraw-Hill, 2006.

Basu, Ron. *Implementing Six Sigma and Lean.* Butterworth-Heinemann, 2008.

Bothe, Keki R. *World Class Quality.* 2nd ed. NY: AMACOM, 2000.

Drucker, Peter. "The Emerging Theory of Manufacturing." *Harvard Business Review,* May/June 1990, 95.

George, Michael L. *Lean Six Sigma.* Boston: McGraw-Hill, 2002.

Plenert, Gerhard, and Shozo Hibino. *Making Innovation Happen: Concept Management Through Integration.* DelRay Beach, FL: St. Lucie Press, 1997.

Pyzdek, Thomas. "Cargo Cult Six Sigma." *Quality Digest,* December 2006.

Ross, Joel E., and Vincent K. Omachonu *Principles of Total Quality.* 3rd ed. Delray Beach, FL: St. Lucie Press, 2004.

STATISTICS

Statistics is a field of knowledge that enables an investigator to derive and evaluate conclusions about a population from sample data. In other words, statistics allow us to make generalizations about a large group based on what we find in a smaller group. The field of statistics deals with gathering, selecting, and classifying data; interpreting and analyzing data; and deriving and evaluating the validity and reliability of conclusions based on data.

Strictly speaking, the term "parameter" describes a certain aspect of a population, while a "statistic" describes a certain aspect of a sample (a representative part of the population). In common usage, most people use the word "statistic" to refer to research figures and calculations, either from information based on a sample or an entire population.

Statistics means different things to different people. To a baseball fan, statistics are information about a pitcher's earned run average or a batter's slugging percentage or home run count. To a plant manager at a distribution company, statistics are daily reports on inventory levels, absenteeism, labor efficiency, and production. To a medical researcher investigating the effects of a new drug, statistics are evidence of the success of research efforts. And to a college student, statistics are the grades made on all the exams and quizzes in a course during the semester. Today, statistics and statistical analysis are used in practically every profession, and for managers in particular, statistics have become a most valuable tool.

A set of data is a population if decisions and conclusions based on these data can be made with absolute certainty. If population data is available, the risk of arriving at incorrect decisions is completely eliminated.

But a sample is only part of the whole population. For example, statistics from the U.S. Department of Commerce state that the rental vacancy rate during the second quarter of 2006 was 9.6 percent. However, the data used to calculate this vacancy rate was not derived from all owners of rental property, but rather only a segment ("sample" in statistical terms) of the total group (or "population") of rental property owners. A population statistic is thus a set of measured or described observations made on each elementary unit. A sample statistic, in contrast, is a measure based on a representative group taken from a population.

QUANTITATIVE AND QUALITATIVE STATISTICS

Measurable observations are called quantitative observations. Examples of measurable observations include the annual salary drawn by a BlueCross/BlueShield underwriter or the age of a graduate student in an MBA program. Both are measurable and are therefore quantitative observations.

Observations that cannot be measured are termed qualitative. Qualitative observations can only be described. Anthropologists, for instance, often use qualitative statistics to describe how one culture varies from another. Marketing researchers have increasingly used qualitative statistical techniques to describe phenomena that are not easily measured, but can instead be described and classified into meaningful categories. Here, the distinction between a population of variates (a set of measured observations) and a population of attributes (a set of described observations) is important.

Values assumed by quantitative observations are called variates. These quantitative observations are further classified as either discrete or continuous. A discrete quantitative observation can assume only a limited number of

values on a measuring scale. For example, the number of graduate students in an MBA investment class is considered discrete.

Some quantitative observations, on the other hand, can assume an infinite number of values on a measuring scale. These quantitative measures are termed continuous. How consumers feel about a particular brand is a continuous quantitative measure; the exact increments in feelings are not directly assignable to a given number. Consumers may feel more or less strongly about the taste of a hamburger, but it would be difficult to say that one consumer likes a certain hamburger twice as much as another consumer.

DESCRIPTIVE AND INFERENTIAL STATISTICS

Managers can apply some statistical technique to virtually every branch of public and private enterprise. These techniques are commonly separated into two broad categories: descriptive statistics and inferential statistics. Descriptive statistics are typically simple summary figures calculated from a set of observations. Poll results and economic data are commonly-seen descriptive statistics. For example, when the American Automobile Association (AAA) reported in May 2008 that average gas prices had topped $4 per gallon in the United States, this was a statistic based on observations of gas prices throughout the United States.

Inferential statistics are used to apply conclusions about one set of observations to reach a broader conclusion or an inference about something that has not been directly observed. For example, inferential statistics could be used to show how strongly correlated gas prices and food prices are.

FREQUENCY DISTRIBUTION

Data is a collection of any number of related observations. A collection of data is called a data set. Statistical data may consist of a very large number of observations. The larger the number of observations, the greater the need to present the data in a summarized form that may omit some details, but reveals the general nature of a mass of data.

Frequency distribution allows for the compression of data into a table. The table organizes the data into classes or groups of values describing characteristics of the data. For example, students' grade distribution is one characteristic of a graduate class.

A frequency distribution shows the number of observations from the data set that fall into each category describing this characteristic. The relevant categories are defined by the user based on what he or she is trying to accomplish; in the case of grades, the categories might be each letter grade (A, B, C, etc.), pass/fail/incomplete, or grade percentage ranges. If you can determine the

Table 1

Frequency Distribution for a Class of 25 M.B.A. Students

Grade Scale	Student/ Grade Frequency	Relative Frequency
A	5	20%
B	12	48%
C	4	16%
D	2	8%
F	1	4%
I (Incomplete)	1	4%
TOTAL	**25**	**100%**

frequency with which values occur in each category, you can construct a frequency distribution. A relative frequency distribution presents frequencies in terms of fractions or percentages. The sum of all relative frequency distributions equals 1.00 or 100 percent.

Table 1 illustrates both a frequency distribution and a relative frequency distribution. The frequency distribution gives a break down of the number of students in each grade category ranging from A to F, including "I" for incomplete. The relative frequency distribution takes that number and turns it into a percentage of the whole number.

The chart shows us that five out of twenty-five students, or 25 percent, received an A in the class. It is basically two different ways of analyzing the same data. This is an example of one of the advantages of statistics. The same data can be analyzed several different ways.

PARAMETERS

Decisions and conclusions can often be made with absolute certainty if a single value that describes a certain aspect of a population is determined. As noted earlier, a parameter describes an entire population, whereas a statistic describes only a sample. The following are a few of the most common types of parameter measurements used.

Aggregate Parameter. An aggregate parameter can be computed only for a population of variates. The aggregate is the sum of the values of all the variates in the population. Industry-wide sales is an example of an aggregate parameter.

Proportion. A proportion refers to a fraction of the population that possesses a certain property. The proportion is the parameter used most often in describing a population of attributes, for example, the percentage of employees over age fifty.

Arithmetic Mean. The arithmetic mean is simply the average. It is obtained by dividing the sum of all variates

in the population by the total number of variates. The arithmetic mean is used more often than the median and mode to describe the average variate in the population. It best describes the values such as the average grade of a graduate student, the average yards gained per carry by a running back, and the average calories burned during a cardiovascular workout. It also has an interesting property: the sum of the deviations of the individual variates from their arithmetic mean is always equal to zero.

Median. The median is another way of determining the "average" variate in the population. It is especially useful when the population has a particularly skewed frequency distribution; in these cases the arithmetic mean can be misleading.

To compute the median for a population of variates, the variates must be arranged first in an increasing or decreasing order. The median is the middle variate if the number of the variates is odd. For example, if you have the distribution 1, 3, 4, 8, and 9, then the median is 4 (while the mean would be 5). If the number of variates is even, the median is the arithmetic mean of the two middle variates. In some cases (under a normal distribution) the mean and median are equal or nearly equal. However, in a skewed distribution where a few large values fall into the high end or the low end of the scale, the median describes the typical or average variate more accurately than the arithmetic mean does.

Consider a population of four people who have annual incomes of $2,000, $2,500, $3,500, and $300,000—an extremely skewed distribution. If we looked only at the arithmetic mean ($77,000), we would conclude that it is a fairly wealthy population on average. By contrast, in observing the median income ($3,000) we would conclude that it is overall a quite poor population, and one with great income disparity. In this example the median provides a much more accurate view of what is "average" in this population because the single income of $300,000 does not accurately reflect the majority of the sample.

Mode. The mode is the most frequently appearing variate or attribute in a population. For example, say a class of thirty students is surveyed about their ages. The resulting frequency distribution shows us that ten students are 18 years old, sixteen students are 19 years old, and four are 20 or older. The mode for this group would be the sixteen students who are 19 years old. In other words, the category with the most students is age 19.

MEASURE OF VARIATION

Another pair of parameters, the *range* and the *standard deviation,* measures the disparity among values of the various variates comprising the population. These param-

eters, called measures of variation, are designed to indicate the degree of uniformity among the variates.

The range is simply the difference between the highest and lowest variate. So, in a population with incomes ranging from $15,000 to $45,000, the range is $30,000 ($45,000 - $15,000 = $30,000).

The standard deviation is an important measure of variation because it lends itself to further statistical analysis and treatment. It measures the average amount by which variates are spread around the mean. The standard deviation is a versatile tool based on yet another calculation called the variance. The variance for a population reflects how far data points are from the mean, but the variance itself is typically used to calculate other statistics rather than for direct interpretation, such as the standard deviation, which is more useful in making sense of the data.

The standard deviation is a simple but powerful adaptation of the variance. It is found simply by taking the square root of the variance. The resulting figure can be used for a variety of analyses. For example, under a normal distribution, a distance of two standard deviations from the mean encompasses approximately 95 percent of the population, and three standard deviations cover 99.7 percent.

Thus, assuming a normal distribution, if a factory produces bolts with a mean length of 7 centimeters (2.8 inches) and the standard deviation is determined to be 0.5 centimeters (0.2 inches), we would know that 95 percent of the bolts fall between 6 centimeters (2.4 inches) and 8 centimeters (3.1 inches) long, and that 99.7 percent of the bolts are between 5.5 centimeters (2.2 inches) and 8.5 centimeters (3.3 inches). This information could be compared to the product specification tolerances to determine what proportion of the output meets quality control standards.

PROBABILITY

Modern statistics may be regarded as an application of the theory of probability. A set is a collection of well-defined objects called elements of the set. The set may contain a limited or infinite number of elements. The set that consists of all elements in a population is referred to as the universal set.

Statistical experiments are those that contain two significant characteristics. One is that each experiment has several possible outcomes that can be specified in advance. The second is that we are uncertain about the outcome of each experiment. Examples of statistical experiments include rolling a die and tossing a coin. The set that consists of all possible outcomes of an experiment is called a sample space, and each element of the sample space is called a sample point.

Each sample point or outcome of an experiment is assigned a weight that measures the likelihood of its occurrence. This weight is called the probability of the sample point.

Probability is the chance that something will happen. In assigning weights or probabilities to the various sample points, two rules generally apply. The first is that probability assigned to any sample point ranges from 0 to 1. Assigning a probability of 0 means that something can never happen; a probability of 1 indicates that something will always happen. The second rule is that the sum of probabilities assigned to all sample points in the sample space must be equal to 1 (e.g., in a coin flip, the probabilities are .5 for heads and .5 for tails).

In probability theory, an event is one or more of the possible outcomes of doing something. If we toss a coin several times, each toss is an event. The activity that produces such as event is referred to in probability theory as an experiment. Events are said to be mutually exclusive if one, and only one, can take place at a time. When a list of the possible events that can result from an experiment includes every possible outcome; the list is said to be collectively exhaustive. The coin toss experiment is a good example of collective exhaustion. The end result is either a head or a tail.

There are a few theoretical approaches to probability. Two common ones are the classical approach and the relative frequency approach. Classical probability defines the probability that an event will occur as the number of outcomes favorable to the occurrence of the event divided by the total number of possible outcomes. This approach is not practical to apply in managerial situations because it makes assumptions that are unrealistic for many real-life applications. It assumes away situations that are very unlikely, but that could conceivably happen. It is like saying that when a coin is flipped ten times, there will always be exactly five heads and five tails. But how many times do you think that actually happens? Classical probability concludes that it happens every time.

The relative frequency approach is used in the insurance industry. The approach, often called the relative frequency of occurrence, defines probability as the observed relative frequency of an event in a very large number of trials, or the proportion of times that an event occurs in the long run when conditions are stable. It uses past occurrences to help predict future probabilities that the occurrences will happen again.

Actuaries use high-level mathematical and statistical calculations in order to help determine the risk that some people and some groups might pose to the insurance carrier. They perform these operations in order to get a better idea of how and when situations that would cause customers to file claims and cost the company money

might occur. The value of this is that it gives the insurance company an estimate of how much to charge for insurance premiums. For example, customers who smoke cigarettes are in higher risk group than those who do not smoke. The insurance company charges higher premiums to smokers to make up for the added risk.

SAMPLING

The objective of sampling is to select that part which is representative of the entire population. Sample designs are classified into probability samples and nonprobability samples. A sample is a probability sample if each unit in the population is given some chance of being selected. The probability of selecting each unit must be known. With a probability sample, the risk of incorrect decisions and conclusions can be measured using the theory of probability.

A sample is a nonprobability sample when some units in the population are not given any chance of being selected, and when the probability of selecting any unit into the sample cannot be determined or is not known. For this reason, there is no means of measuring the risk of making erroneous conclusions derived from nonprobability samples. Since the reliability of the results of nonprobability samples cannot be measured, such samples do not lend themselves to statistical treatment and analysis. Convenience and judgment samples are the most common types of non-probability samples.

Among its many other applications, sampling is used in some manufacturing and distributing settings as a means of quality control. For example, a sample of 5 percent may be inspected for quality from a predetermined number of units of a product. That sample, if drawn properly, should indicate the total percentage of quality problems for the entire population, within a known margin of error (e.g., an inspector may be able to say with 95 percent certainty that the product defect rate is 4 percent, plus or minus 1 percent).

In many companies, if the defect rate is too high, then the processes and machinery are checked for errors. When the errors are found to be human errors, then a statistical standard is usually set for the acceptable error percentage for laborers.

In sum, samples provide estimates of what we would discover if we knew everything about an entire population. By taking only a representative sample of the population and using appropriate statistical techniques, we can infer certain things, not with absolute precision, but certainly within specified levels of precision.

SEE ALSO *Data Processing and Data Management; Forecasting; Models and Modeling; Planning; Statistical Process Control and Six Sigma*

BIBLIOGRAPHY

Anderson, David, Dennis Sweeney, and Thomas Williams. *Essentials of Statistics for Business and Economics.* 5th ed. Cincinnati, OH: South-Western College Publications, 2008.

Black, Ken. *Business Statistics: For Contemporary Decision Making.* 5th ed. Hoboken, NJ: Wiley, 2007.

Hogg, Robert, and Elliot Tanas. *Probability and Statistical Inference.* 7th ed. Upper Saddle River, NJ: Prentice Hall, 2005.

Lind, Douglas A. *Basic Statistics for Business & Economics.* Boston: McGraw-Hill, 2008.

STRATEGIC ALLIANCES

SEE *Joint Ventures and Strategic Alliances*

STRATEGIC INTEGRATION

Strategic integration is the gradual combination and transformation of independent components of business organizations into cohesive and synergistic entities. Strategic integration is an important element in the process of improving organizational performance because it facilitates the continuous alignment of business strategies within the ever changing business environment. Firms use strategic integration to confront the consequences of both predictable transitions and unpredictable challenges that are bound to occur at different levels of business operations. Business strategies, corporate strategies, and functional strategies are the three main levels of strategies that organizations seeking systematic integration adopt for purposes of creating sustainable competitiveness.

DELINEATING STRATEGIC INTEGRATION

Although strategic integration is closely related to strategic management, clear distinctions must be drawn between the two concepts of organizational strategy. Strategic integration aims at achieving synergy through creation of compatibility and interdependence across varied organizational groups, processes, and activities that are autonomous in nature. On the other hand, strategic management identifies long term goals and guides resource allocation and utilization for achieving sustainable competitive advantage either within independent organizational units or in the organization as a whole, without necessarily streamlining the variations across organizational groups, processes, and activities. Therefore, strategic management can be perceived as a component of strategic integration.

The process of strategic integration involves crafting and implementing strategic objectives from an informed perspective of an organization's competitive environment.

Therefore, it is important to begin the integration process by analyzing how the current mission, objectives, and values affect the interests of all the stakeholders in the organization. The current mission identifies the current underlying strategies that define an organization's approach to resource utility. Values express the institutional identity through organizational culture and practices, whereas organizational objectives define the scope of results that organizations seek to accomplish (such as profitability, increased market share, innovation, or financial efficiency).

A conclusive review of organizational structures, resources capabilities, industry trends, and the external environment of a business organization marks the starting point for efforts geared towards determining the weaknesses and competitive advantages of the organization. Upon the successful review of core competencies of an organization, strategic integration can be implemented and evaluated through appropriate corporate governance systems, strategic management practices, strategic leadership, and strategic control. The process of strategic integration must always be accompanied by subsequent adjustments in the management and coordination of functions and roles both external and internal to the organization.

INTERNAL INTEGRATION

Strategic approach to internal integration involves streamlining the internal operations of an organization (such as maintenance, sales, purchasing, advertising, manufacturing, marketing, and bookkeeping). All the staff of an organization should be involved in the strategic integration process and provided with adequate access to all the relevant information that pertains to the integrated approach to operations. In addition, individual responsibilities along the complex chain of production should be clearly defined.

Organizations can make use of both manual methods and information technology (IT) to link internal systems and communicate procedure modifications across all levels of the chain of production. For example, the Toyota Production System utilizes instructional manuals called *Kanbans* to relay product output specification instructions across the different sections of the production lines.

EXTERNAL INTEGRATION

Strategic approach to external integration involves streamlining functional activities that affect external stakeholders (such as suppliers, financial institutions, customers, distributors, and agents). Integration of strategies governing external stakeholders requires the implementation of effective networking and communication systems such as electronic data relay systems and internet to provide adequate links between external and internal organizational stakeholders. Successful strategic integration of external factors

facilitates effective sharing and interpretation of critical information among all the organization's stakeholders. Processes that govern activities of external stakeholders enable business organizations to initiate demand forecasts, determine inventory levels, and monitor the feedback of stakeholders.

IMPLICATIONS OF STRATEGIC INTEGRATION

The perpetually dynamic environments under which businesses operate require a gradual approach toward strategic integration in order to determine and pursue the appropriate organizational priorities. It is imperative for managers to adopt broad-based strategic integration methods that are suitable to particular needs of their organizations. This calls for integration of strategies by improving the existing organizational structures and processes as well as creating new structures to accommodate new organizational order. The adoption of strategic integration portends the following implications to business organizations:

- Adjusting structures and relationships that affect functional groups and related processes in organizations. For example, this could take the form of bundling individual products that achieve greater profit margins through shared organizational processes.

- Adjusting targets, reward systems, and metrics to reflect changes in procedures and approach to production. It may be necessary to increase staff incentives while modifying metrics for tracking shared cross-functional activities.

- Creating budgetary plans and supplements to cover any extra cross-functional estimates that may arise from the integration processes.

- Automating and upgrading communication structures across functional groups and processes within the organization to achieve efficiency through effective flow and sharing of information.

- Standardizing of business processes and data versions to incorporate the interests of both internal and external stakeholders.

In a 2008 article titled "Integration as a Strategy," John Schmidt contends that strategic integration can be perfected through continuous adaptation to change and linkage of complex organizational responsibilities without underestimating the significance of innovation at different levels of the end-to-end chain processes. As such, organizational resources should be mobilized to reinforce successful accomplishment of strategic objectives and achievement of optimum performance and results.

Strategic integration is a tactical approach to management that involves high initial investments on resource acquisition and employee training programs. However, the process carries long-term advantages that minimize costs of increasing business flexibility over time. Managers can achieve knowledge-based strategic integration by investing in advanced IT systems. For example, Wal-Mart's success in retaining its position as the largest retailer in the United States is credited to the company's successful strategic integration of IT in streamlining operations between the head office and Wal-Mart branches throughout the United States. Therefore, the significance of information technology can be realized fully if managers view information technology as a strategic function rather than simply a routine organizational function.

BIBLIOGRAPHY

Schmidt, John. "Integration as a Strategy." *Information Enterprise Data Management,* 23 June 2008. Available from: http://blogs.informatica.com/enterprise_data_management/index.php/2008/06/integration-as-strategy/.

Shermerhorn, John, R. *Personal Management Edition,* 8th ed. Wiley & Sons, Inc., 2008.

Srivastava, Abhishek, Kathryn M. Bartol, and Edwin A. Locke. "Empowering Leadership in Management Teams: Effects on Knowledge Sharing, Efficacy and Performance." *The Academy of Management Journal.* 49, no. 6, (2006): 1240–1251.

Tyagi, Rajesh, K., and Praveen Gupta. *A Complete and Balanced Scorecard: Creating Value Through Sustained Performance Improvement.* Upper Saddle River, NJ: FT Press, 2008.

Whitaker, Hugh, D., and Robert E. Cole, eds. *Recovering from Success: Innovation and Technology Management in Japan.* Oxford: University Press, 2006.

STRATEGIC PLANNING FAILURE

Strategic management is the process of defining the purpose and pursuits of an organization and the methods for achieving them. Robert Grant emphasizes that competition provides the rationale for strategy because strategy is about winning. It follows then that the interdependence of competitors is the essence of strategy—actions of individual competitors and teams of competitors affect outcomes for other participants. In other words, organizational leaders must "play the game" strategically because their organizations are involved in a game of strategy (e.g., chess) not simply a game of chance (e.g., bingo) or a game of skill (e.g., tennis). Of course, the necessary skills must exist, and at times things will happen that were not predictable. However, each organization must have a strategic focus if it intends to survive and flourish in the long term.

THE STRATEGIC MANAGEMENT MODEL

The overall strategic management model can be broken into two major phases: strategy development and strategy deployment. Strategy development is the creation and establishment of an organization's overall mission and vision and the means to achieve them. Strategic development includes the following elements of the strategic management model:

- Mission—Why does the organization exist?

- Internal and External Assessments—What are the internal strengths and weaknesses and external threats and opportunities?

- Vision—Where does the organization want to be in the future?

- Goals and Objectives—What are the overall, high-level desired results as well as specific, measurable outcomes required to achieve the mission and vision?

- Strategy Formulation—What is the plan of how and when to achieve the goals and objectives? This includes strategies, tactics, and action plans (Who will do what and when?)

Strategy deployment, or implementation, is the translation of strategic plans into actions and results. It is the execution of the strategic plan at all levels in the organization. Development and deployment are considered separately, because the best strategic plans will have no impact if not implemented well. Conversely, simple strategic plans that are deployed well can have major impact. The strategy deployment phase includes the following elements of the model:

- Strategy Implementation—execution or deployment of the strategic plans.

- Measurement and Feedback—the monitoring and feedback element answers the questions "How is the organization doing?" "What modifications and improvements are necessary?"

Other elements of strategic management that are required for strategic planning to be successful are:

- Core Competencies—What are our best capabilities?

- Distinctive Competencies—Which of our competencies are unique and not easily replicated?

- Core Values—What do we care about as an organization? What are our shared values?

- Critical Success Factors—What do we have to do right to be successful?

- Leadership Competencies—What leadership characteristics and competencies do we require of our managers and non-managers?

RECENT HISTORY OF STRATEGIC PLANNING

In the 1960s and 1970s, strategic planning was viewed by executives as the best way to ensure productivity and profits. The assumption was that everything that was of potential value to decision making and strategic planning could be measured, and that after subjecting those measurements to various quantitative models, results would show executives the best strategies.

In the early 1960s, professors Ken Andrews and C. Roland Christensen of the Harvard Business School contended that strategy could be a potentially powerful tool for linking business functions and assessing a company's weaknesses and strengths in relationship to its competitors' strengths and weaknesses. General Electric (GE) emerged as a pioneer in the area of corporate strategic planning and developed a high-powered staff of full-time strategic planners to direct GE's planning efforts. With the assistance of McKinsey and Company, GE was organized into strategic business units (SBUs) and strategic plans were developed for each SBU.

In 1963, the Boston Consulting Group (BCG) pioneered a variety of strategic approaches that became popular with executives. Two of BCG's approaches were the "experience curve" and the "growth and market-share matrix." The trust of executives in strategic planning models increased throughout the 1970s, and perhaps peaked with the publication of *Competitive Strategy,* by Harvard professor Michael E. Porter in 1980. Porter's books and articles continue to have a tremendous influence on many executives, university students, and professors.

By the early 1980s, some executives began to feel that the return on their investment in the development of large strategic planning departments had been a disappointment. Also, the increase in computer technology and globalization of industries caused increased complexity in those industries, and the strategic models of the 1960s and 1970s could not deal with the complex dynamics of the new marketplace.

The death knell for strategic planning began when General Electric chairman Jack Welch significantly downsized the GE operating units' planning departments. Many other executives followed Welch's example during the 1980s and 1990s. Strategic planning was replaced in the minds of executives with thoughts of improving quality and productivity through operational innovation. The most prominent of these approaches included total quality management (TQM) and the quality philosophies of Deming, Juran, and Crosby. In the 1990s, corporations

began to focus on process reengineering and downsizing as a way of increasing operational effectiveness even more. Process reengineering, an idea authors Hammer and Champy espoused, was accepted by many as an additional strategy toward increased productivity.

In the 1990s, strategic planning was reborn. New approaches for strategy focused on growth through mergers/acquisitions and joint ventures, generation of innovative ideas through decentralized strategic efforts within the company, emergent strategy, and the leveraging of core competencies to create strategic intent. By the late-1990s, the concept of strategic planning was once again a mainstream organizational concern. The Association for Strategic Planning (ASP) was formed in 1999, and in 2001, it began holding an annual conference on strategic planning issues attended by a growing number of students and professionals and featuring appearances by top-ranked business gurus.

The dominant theme for organizations in the twenty-first century is strategic and organizational innovation, and issues include reconciling size with flexibility and responsiveness. New alliances mean cooperative strategies, complexity, changes in commitments of corporate social responsibility, etc. Today's strategic planning requires new models of leadership, less formal structures, and more commitment to self direction. Also, past strategic failures relating to ethical problems require renewed commitments to ethical standards. Strategic management has evolved from the 1950s when its theme was budgetary planning and control to the twenty-first century when its theme is strategic and organizational innovation. See Table 1.

Table 1

The Evolution of Strategic Management/Strategic Planning

Period	1950s	1960s and Early 1970s	Late 1970s and early 1980s	Late 1980s and early 1990s	2000+
Dominant Theme	Budgetary planning & control.	Corporate planning.	Strategic positioning. Analysis of industry & competition.	Strategic competitive advantage.	Strategic and organizational innovation.
Main Focus and Issues	Financial control, especially through operating budgets.	Planning growth, especially diversification and portfolio planning.	Selecting industries and markets. Positioning for market leadership.	Focusing strategy around sources of competitive advantage. Dynamic aspects of strategy.	Reconciling size with flexibility & responsiveness.
Principal Concepts & Techniques	Financial budgeting. Investment planning. Project appraisal.	Medium- and long-term forecasting. Corporate planning techniques. Synergy.	Industry analysis. Competitor analysis. Segmentation. Experience curves. PIMS analysis. SBU's (Strategic Business Units). Portfolio planning.	Resources and capabilities. Shareholder value. Knowledge management. Information technology. Analysis of speed, responsiveness & first-mover advantage.	Cooperative strategies. Competing for standards. Complexity & self-organization. Corporate social responsibility. Renewed commitment to ethics.
Organizational Implications	Systems of operational and capital budgeting become key mechanisms of coordination and control.	Creation of corporate planning departments & long-term planning processes. Mergers & acquisitions.	Multidivisional & multinational structures. Greater industry & market selectivity. Divestment of unattractive business units.	Restructuring. Continuous improvement & process reengineering. Refocusing. Outsourcing. E-business.	Alliances and networks. New models of leadership. Informal structures. Less reliance on direction, more on emergence.

Adapted from: Robert M. Grant, *Contemporary Strategy Analysis,* 5th and 2nd eds., Blackwell Publishers, Inc., Cambridge, Massachusetts, 2005 and 1995.

WHY DID TRADITIONAL STRATEGIC MANAGEMENT/ STRATEGIC PLANNING FAIL?

Sydney Finkelstein maps four circumstances in which strategic planning failure is most likely to occur: launching new ventures; promoting innovation and change; managing mergers and acquisitions; and responding to new environmental pressures. So in this era of dramatic change, global alliances, and a variety of environmental pressures, the potential for failure is very real.

Henry Mintzberg believes that the strategic planning models of the 1960s and 1970s ultimately failed because they did not distinguish between strategic planning and strategic thinking. Traditional strategic planning models were heavily oriented to quantitative analysis, the results of which directed the executive towards what strategy should be taken. These planning models actually subverted strategic thinking that involves the synthesis of one's experience, intuition, and creativity, in addition to analysis. Traditional strategic planning was not useless, but it should have been done after strategic thinking and vision development had taken place.

Another problem with traditional strategic planning was that it did not include in the planning process those who had to implement the strategic plan. The strategic planning was done at the very top of the organization, or by expert consultants, and the strategic plan was handed down to managers in bound, published documents. People often felt less than committed to such plans, and the documents themselves often did not take into account the actual business challenges these managers faced on a day-to-day basis. At lower levels in the hierarchy, the problem was even more severe because planning was often used to exercise blatant control over people.

Mintzberg notes that another reason traditional strategic planning failed was because it was based on some fundamental flaws: (1) the fallacy of prediction; (2) the fallacy of detachment; and (3) the fallacy of formalization.

The Fallacy of Prediction. Traditional strategic planning was based on the assumption that one could measure all of the variables that were relevant to the future of a business, analyze the results, and construct strategies based upon the results that, if followed, would ensure future success. However, even the best strategies experience unforeseen economic, industry, social, and market shifts. The fallacy of prediction inevitably led to the downfall of traditional strategic planning, because the strategies could not deliver what they promised: predictable success.

The Fallacy of Detachment. Traditional strategic planning assumed that it was better to be detached from the workers and from middle managers when analyzing data, in order to prevent bias in the planning process. However, this simply separated the strategy makers from the strategy implementers, which turned out to be a fatal mistake. When problems of implementation arose, both sides pointed fingers at each other as the cause for the failure. Additionally, traditional strategic planning was often based on inappropriately aggregated data, data that was no longer current, or data that did not have important contextual information linked to it. Also strategic planners often ignored qualitative data, thus creating huge blind spots in the final strategic plan.

The Fallacy of Formalization. This fallacy is based on the notion that formal systems are superior to human systems in terms of information processing and decision making. Mintzberg believes that though formal systems might be able to process larger amounts of data than humans can, formal systems cannot integrate, synthesize, or create new directions from such analyses—only humans can perform the latter processes. We think in order to act, but we also act in order to think. Our experiments that work converge gradually into viable strategies.

THE ICARUS PARADOX

Danny Miller offers another perspective as to why strategies often fail. In his landmark study, Miller investigated the decline of powerful corporations, and his findings have done much to help managers understand the causes of strategic and organizational failure.

Miller named the model he developed from his findings, the *Icarus Paradox* after the tragic figure from Greek mythology. Icarus's father, Daedalus, was an inventor who was asked to build a labyrinth for King Minos. Upon completion of his task, King Minos would not allow Daedalus to leave. Determined to escape, Daedalus built wings for himself and his son, Icarus, by adhering the feathers of birds onto long boards with wax. Icarus was fascinated with the invention and was eager to try flying. Daedalus taught Icarus how to fly using his invention, but cautioned Icarus to fly only at a moderate height—neither too low nor too high. The escape was a success, but Icarus, ignoring the advice of his father, began gaining confidence in his ability to fly and grew more daring. He ultimately flew too high—too close to the sun—and the heat from the sun caused the wax to melt. His wings disintegrated and he plummeted helplessly to his death. The paradox of Icarus was that his skill and technology, which led him to freedom, ultimately also led to his death.

Miller found in his research that the victories and strengths of companies can often be the cause of their future strategic failure. Miller delineated four major causes of strategic failure: leadership traps, monolithic cultures

and skills, power and politics, and structural memories. All of these causes emerge while an organization is experiencing success—especially in its strategic initiatives.

Leadership Traps. Success can be a trap in and of itself. Miller found that consistent success tends to reinforce leaders' world views and ties them rigidly to the strategies and processes that brought about past successes. This causes, in turn, these same leaders to become:

- Overconfident

- Prone to excess and neglect

- Prone to shape strategies based on their preferences rather than what data, changing business circumstances, customers, and technological shifts dictate

- Conceited—true believers in the adulation heaped upon them by the press, subordinates, shareholders, and other admirers

- Obstinate—prone to resent challenges to their way of thinking

- Isolated from the reality of the marketplace

The impact of those tendencies on strategy making is very negative when strategy is developed from ego, preconceptions of what causes success, stubbornness, and old, worn conceptual models.

Monolithic Cultures and Skills. Miller found that another reason for strategic failure in organizations that have been successful is that these organizations tend to rely on "star" departments and the culture that builds up around them. When certain functions take precedence over others in an imbalanced manner, other business functions are seen as less important, and perhaps even unimportant, to the success of the organization. Over time, the evolution of organizational cultures in successful companies usually becomes monolithic, intolerant, and focused on a single goal or very limited goals. Additionally, the star department attracts the best and the brightest managers away from other departments, so that the organization has an imbalance of managerial talent throughout the organization. Conversely, talented managers in departments outside the star department usually join companies that can appreciate their skills. Over time, managerial talent is diluted (excepted for within the star department) and becomes imbalanced throughout the organization. The "star" departments have more power, and people in these departments are able to use their power to play politics and gain even more resources and success.

Power and Politics. As managers in the star departments increase their power, they become less inclined to adjust the way they have always conducted business. Programs, policies, and practices that in the past have proven successful and given these managers such high status are loyally adhered to, and the ability to make organizational adjustments becomes limited. The ultimate consequence of this type of power build-up in a company is that past strategies are perpetuated, often without a careful evaluation of their current effectiveness.

Structural Memories. Past successful strategies engender policies, routines, systems, and programs in a company, and the institutionalization of these processes within a company creates a powerful organizational culture. Miller notes that "the more established and successful the strategy, the more deeply imbedded it will be in such programs, and the more it will be implemented routinely, automatically, and unquestioningly. Managers will rely on ingrained habits and reflex actions rather than deliberating and reflecting on new problems." In these situations, the past fashions how one sees the present, and is a powerful force for continually choosing the same, or similar, strategic courses of action, both within the organization and outside the organization.

DISRUPTIVE TECHNOLOGIES AS A CAUSE OF STRATEGIC FAILURE

Clayton M. Christensen, in his book *The Innovator's Dilemma* reported research findings that suggest that even when companies do follow sound management practices they still are exposed to events and problems that can cause strategic failure. The innovator's dilemma is that "the logical, competent decisions of management that are critical to the success of their companies are also the reasons why they lose their positions of leadership." He contends that good management involves sustaining the success of products and processes, and that companies are generally good at this. However, such companies can be blindsided by the emergence of disruptive technologies. These disruptive technologies are products or processes that appear in the marketplace, but that look harmless to the successful company.

In the short term, they do not seem to pose much of threat, and thus they are ignored. However, over time, disruptive technologies can become a powerful force, and when they do, successful companies are not organized or prepared to respond to what essentially is a new competitor in the market. Examples of disruptive technologies are the small, off-road motorcycles that were introduced by Japanese manufacturers into the United States. Over time, they threatened the product lines of Harley-Davidson and BMW. Health maintenance organizations (HMOs) strategically hurt traditional health insurers, and transistors killed the vacuum tube industry.

Successful companies miss seeing the threat of disruptive technologies because they are essentially caught in the routine of maintaining the status quo, i.e., their current success. To spot future disruptive technologies and plan for combat against them, a company would need to invest resources in the scanning for, and development of, disruptive technologies; be willing to enter into the market when a potentially disruptive technology emerges; be adept at developing new ways of analyzing emerging markets; and be aware that improving their product, and increasing its price, creates vacuums at the lower price range for emerging technologies to enter. The goal is to be able to both sustain successful products and processes, yet at the same time be able to see, evaluate, and develop disruptive technologies.

Strategic planning often fails for a variety of reasons such as:

1. Failure of merging organizations to understand either or both complementary competencies and synergies as well as areas that are not complementary and synergistic

2. Failure to understand the culture of the organization

3. Failure to adequately execute the strategic plans

4. Failure to function as a team at the executive level or other levels

5. Failure to develop values and culture to support the plans

6. Failure to expeditiously do what is needed to be done

7. Failure to trust and support each other at the various levels of the organization

8. Failure to prevent ethical and legal problems

EXAMPLES OF STRATEGIC PLANNING FAILURE

Hewlett Packard. CEO Carly Fiorina positioned HP as perhaps the widest-ranging technology company in the world, with offerings from digital cameras, to printers, to supercomputers. She staked her career on HP's acquisition of Compaq in 2002, and she lost. She was fired on February 7, 2005. The acquisition had been bitterly opposed by major shareholders including Walter Hewlett. Under Fiorina's direction, HP unsuccessfully battled IBM, Dell, Sony, EMC, and others.

Fiorina faced a difficult battle. Wall Street analysts argued that HP's pieces/divisions would be worth far more separately than they were together as a company. Fiorina fiercely resisted breaking up HP, and the Board of Directors insisted that it would keep HP intact. HP had problems in enterprise computing. It was losing ground to EMC Corp. in storage and to Dell and IBM in servers. So

much more was needed than simply replacing one or more top executives. How much HP energy was lost as Walter Hewlett and numerous employees and shareholders fought Fiorina's vision? How much more was lost as Hewlett was pushed off the board of the company his father founded? Fiorina was a decisive, gifted communicator. However, she fired or lost many executives, and she rigorously resisted changing strategies even as she made dramatic changes. She merged HP's 80-plus autonomous business units into a more centralized, four-division giant and eventually laid off thousands of workers. She had to also battle two cultures, HP and Compaq, both of which were very reluctant to change.

Why did the strategic planning based on the company vision fail? It was difficult for HP executives to rapidly understand complementary and non-complementary competencies, strategies, and synergies as well as differences in the respective cultures. From the outside, it would appear that most of the failure can be traced to lack of trust and support among the players—the board members, some members of the board and Fiorina, the employees and the company, the shareholders and the board, and the shareholders and Fiorina. Also, Fiorina never had the loyalty of the employees. Some insist it was the failure of Fiorina to execute her ambitious strategic plan, and that is the reason she was fired. One *Business Week* article says Fiorina broke three key rules that CEO's must follow: place the company's well-being above all else, including yourself; know your company from the inside out—some say that Fiorina did not fully comprehend the impact on operations of her vision to transform HP's structure and strategy; and hold people accountable, including yourself.

Ultimately, Fiorina's methods may be vindicated. HP made a comeback under its new CEO, Mark Hurd, who took over in 2005; as of 2008, HP's profits had grown 17% to over $7 billion. One of many things that Hurd was able to accomplish was keeping HP together as Carly Fiorina envisioned. As for Fiorina herself, she became a high-level advisor for John McCain during his 2008 presidential election campaign, and was even at one point mentioned as a potential vice-presidential candidate.

Xerox. The Xerox Board of Directors suddenly promoted Anne Mulcahy to president in May, 2000, after ousting G. Richard Thoman, who lasted thirteen months, and reinstalling Chairman Paul A. Allaire as CEO. The company was floundering after years of weak sales and high costs. Employees and customers were disgruntled. Then in October, Xerox reported its first quarterly loss in sixteen years. Debt was piling up, and the Securities & Exchange Commission began investigating whether Xerox used accounting tricks to boost income. Insiders and those outside of Xerox felt that Mulcahy had the strategic

mind and toughness to serve as CEO. On July 26, 2004, Mulcahy was named CEO of Xerox. When Anne Mulcahy took over as CEO, Xerox was in terrible shape. It was fighting the Securities and Exchange Commission over accounting practices. It was over $17 billion in debt, and bankruptcy was a real possibility. She was relentless in her efforts to stabilize Xerox. She made dramatic staff and business cuts. She brought in a new CFO. She met with numerous customers. Also, she got her people focused on turnaround and growth, which she says is the job of leadership. As a result, she was able to engineer what *Money* magazine called "the greatest turnaround story of the post crash era," and by 2007, she ranked number two on *Fortune*'s list of the most powerful women in business.

What caused strategic plans prior to Mulcahy to fail? Six former senior executives of Xerox settled an SEC enforcement action charging them with fraud and agreed to pay over $22 million in penalties, disgorgement, and interest. Specific charges included securities fraud and aiding and abetting Xerox's violations of the reporting, books and records, and internal control provisions of the federal securities laws. In other words, instead of relying on strategic plans to work (or changing the strategic plans) Xerox's senior management had apparently substituted accounting manipulations for the company's actual operational performance. Certainly there was a failure to develop values and culture to support the strategic plans, and there were legal and ethical problems related to the lack of appropriate shared core values. Apparently the strategic plans were also not appropriate, or they had not been fully executed since both customers and employees were unhappy, sales were weak, and costs were high.

SEE ALSO *Strategic Planning Tools; Strategy Formulation; Strategy Implementation; Strategy in the Global Environment; Strategy Levels*

BIBLIOGRAPHY

"The Accidental CEO." *Fortune,* 23 June 2003, 58–65.

Baldrige, Malcolm. *National Quality Award Criteria.* Washington, DC: National Institute of Standards and Technology, 2004.

"The Best Managers." *Business Week,* 10 January 2005, 56–67.

Christensen, Clayton M. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail.* Cambridge, Boston, Massachusetts: Harvard Business School Press, 1997.

Christensen, Clayton M., and Michael E. Raynor. *The Innovator's Solution: Creating and Sustaining Successful Growth.* Boston: Harvard Business School Press, 2003.

Christensen, Clayton M., Scott D. Anthony, and Erik A Roth. *Seeing What's Next: Using the Theories of Innovation to Predict Industry Change.* Boston, MA: Harvard Business School Press, 2005.

Collis, David J., and Cynthia A. Montgomery. *Corporate Strategy.* New York: McGraw-Hill/Irwin, 2005.

Finkelstein, Sydney. *Why Smart Executives Fail and What You Can Learn from Their Mistakes.* New York: Penguin Group USA, 2003.

Grant, Robert M. *Contemporary Strategy Analysis: Concepts, Techniques, and Applications.* 6th ed. Cambridge, MA: Wiley-Blackwell, 2007.

Graves, Suzanne, and John Moran. "The Pitfalls Associated with Strategic and Operational Planning." *The Quality Management Forum* 20, no. 4 (Winter 1994): 1–4.

Henderson, Bruce. "The Origin of Strategy." *Harvard Business Review,* November-December 1989, 139–143.

Hitt, Michael A., R. Duane Ireland, and Robert E. Hoskisson. *Strategic Management: Competitiveness and Globalization, Concepts and Cases.* 8th ed. Cincinnati: South-Western College Publications, 2008.

Hofer, C.W., and D. Schendel. *Strategy Formulation: Analytical Concepts.* St. Paul, MN: West, 1978.

Kipp, Mike. "Why Head-in-the-Sand Leadership Sinks the Ship." *Journal of Business Strategy* 25, no. 5 (2004): 63–64.

Miller, Danny. *The Icarus Paradox: How Exceptional Companies Bring About Their Own Downfall.* New York: HarperCollins, 1990.

Mintzberg, Henry. "The Fall and Rise of Strategic Planning." *Harvard Business Review,* January-February 1994, 107–114.

Neff, Thomas J., and James M. Citrin. *Lessons from the Top: The Search for America's Best Leaders.* New York: Doubleday, A Division of Random House, Inc., 2001.

Porter, Michael. *Competitive Advantage.* New York: The Free Press, 1985.

———. *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* New York: The Free Press, A Division of McMillen, Inc., 1980 and 1998.

Pryor, Mildred Golden, J. Chris White, and Leslie A. Toombs. *Strategic Quality Management: A Strategic, Systems Approach to Continuous Improvement.* Thomson Learning, 1998.

"The Story of Kiely & Carly," *McClean's* 118, no. 9 (2005): 29.

"Three Simple Rules Carly Ignored." *Business Week,* 28 February 2005, 46.

U.S. Securities and Exchange Commission. *Litigation Release No. 18174.* and *Accounting and Auditing Enforcement Release No. 1796* 5 June 2003. Available from: http://www.sec.gov/litigation/litreleases/lr18174.htm.

STRATEGIC PLANNING TOOLS

Strategic planning may be characterized as a systematic effort to produce fundamental decisions and actions that shape and guide what a business organization is, what it does, and why it does it. The objective of strategic planning is to develop a map by which to manage an organization's positioning.

Although some would suggest that strategic planning has lost some of its effectiveness, most managers continue to recognize the need for effective strategic planning and implementation. While strategic planning requires a significant amount of time and can be quite frustrating, if

Figure 1
Market Growth/Share Matrix

	Market Share	
	High	Low
Market Growth Rate High	STARS	QUESTION MARKS
Low	CASH COWS	DOGS
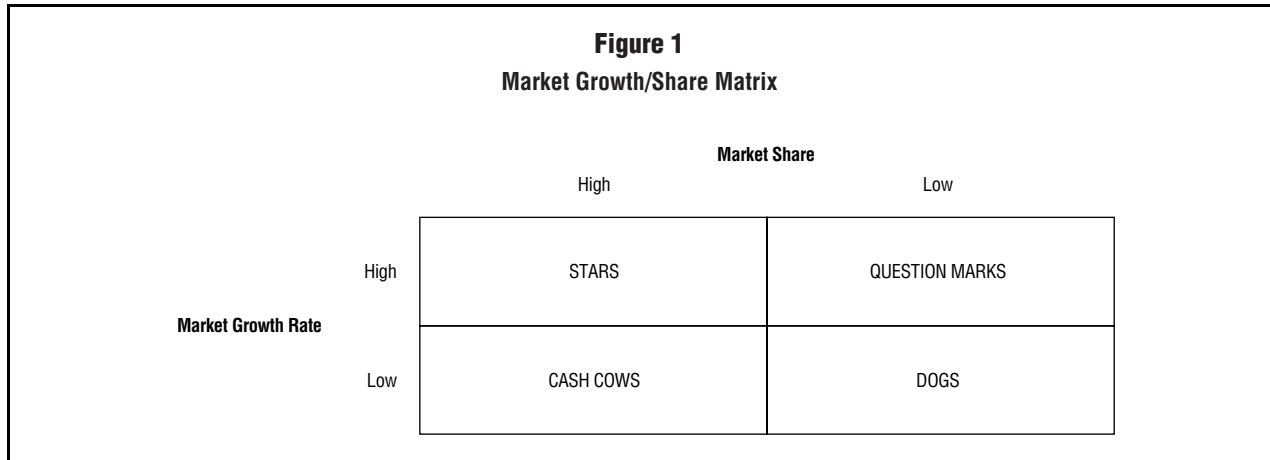
done properly it can enable a firm to recognize its most effective position within its industry.

There are a variety of perspectives, models, and approaches used in strategic planning. The development and implementation of these different tools depend on a large number of factors, such as size of the organization, nature and complexity of the organization's environment, and the organization's leadership and culture.

Several strategic planning tools are presented below: the Boston Consulting Group Matrix; the GE Market Growth/Market Share Matrix; Porter's Five Forces Model; and PEST Analysis. Additionally, this entry briefly discusses SWOT Analysis and Porter's Generic Competitive Strategies, each of which has its own entry.

SWOT ANALYSIS MATRIX

One of the most widely used strategic planning tools is a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. In one form or another, most companies use SWOT analysis as a basic guide for strategic planning. The worth of a SWOT analysis is often dependent on the insight of those management individuals who conduct the SWOT analysis. If managers or consultants are able to provide objective, relevant information for the analysis, the results are extremely useful for the company.

A SWOT analysis involves a company's assessment of its internal position by identifying the company's strengths and weaknesses. In addition, the company must determine its external position by defining its opportunities and threats.

Strengths represent those skills in which a company exceeds and/or the key assets of the firm. Examples of strengths are: a core group of highly skilled employees, cutting-edge technology, and high-quality products. Weaknesses are those areas in which a firm does not perform well;

examples include continued conflict between functional areas, high production costs, and a poor financial position.

Opportunities are those current or future circumstances in the environment that might provide favorable conditions for the firm. Examples of opportunities include an increase in the market population, a decrease in competition, and legislation that is favorable to the industry. Threats are those current or future circumstances in the environment which might provide unfavorable conditions for the firm. Examples of threats include increased supplier costs, a competitor's new product-development process, and legislation unfavorable to the industry.

Careful determination and classification of a company's strengths, weaknesses, opportunities, and threats provides an excellent way for a company to analyze its current and future situation. It is not necessary for a company to take advantage of all opportunities, nor is it necessary for a company to develop methods to deal with all threats. Additionally, a company need not strengthen all of its weaknesses or be too smug about all its strengths. All of these factors should be evaluated in the context of each other in order to provide the company with the most useful planning information.

PORTER'S GENERIC COMPETITIVE STRATEGIES

Michael Porter suggested a method of categorizing the various types of competitive strategies. He identified three generic competitive strategies: overall lower cost, differentiation, and market niche. These strategies are termed "generic" because they can be applied to any size or form of business. Overall lower cost refers to companies that can develop, manufacture, and distribute products more efficiently than their competitors. Differentiation refers to companies that are able to provide superior products based on some factor other than low cost. Differentiation

Figure 2
GE Business Strength/Market Attractiveness
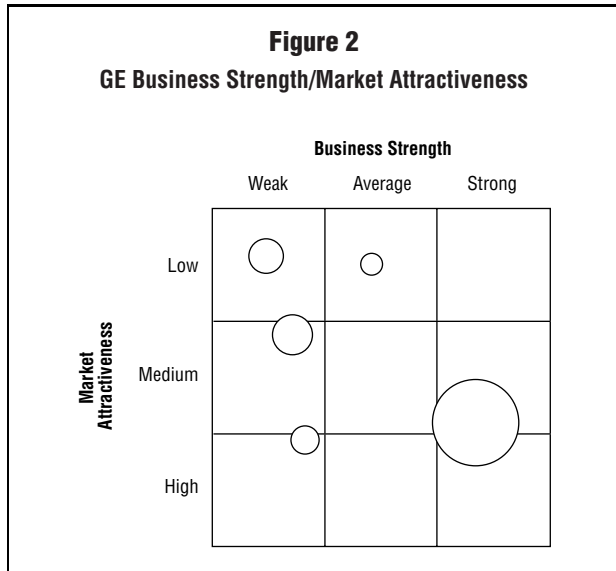
can be based on customer service, product quality, unique style, and so on. Competitive scope defines the breadth of a company's target market. A company can have a broad (mass market) competitive scope or a narrow (niche market) competitive scope. The combination of broad scope and narrow scope with a low-cost strategy and differentiation results in the following generic competitive strategies: cost leadership, cost focus, differentiation, and focused differentiation (see Figure 4).

The implementation of these strategies requires different organizational arrangements and control processes. Larger firms with greater access to resources typically select a cost leadership or a differentiation strategy, whereas smaller firms often compete on a focus basis.

None of these competitive strategies is guaranteed to achieve success, and some companies that have successfully implemented one of Porter's generic strategies have found that they could not sustain the strategy. Several risks associated with these strategies are based on evolved market conditions (such as buyer perceptions and competitor practices).

Some researchers argue that both cost-leadership and differentiation strategies can be simultaneously achieved. The principal condition for this situation is superior quality, which may lead to increased customer commitment on the one hand and minimized quality costs (through learning effects, economies of scale, etc.) on the other.

Though SWOT Analysis and Porter's Generic Competitive Strategies are widely used strategic planning tools, they are far from the only methods of strategic analysis that a company has its disposal.

BOSTON CONSULTING GROUP MATRIX

In the late 1960s the Boston Consulting Group, a leading management consulting company, designed a four-cell matrix known as BCG Growth/Share Matrix. This tool was developed to aid companies in the measurement of all their company businesses according to relative market share and market growth. The BCG Matrix made a significant contribution to strategic management and continues to be an important strategic tool used by companies today. The matrix provides a composite picture of the strategic position of each separate business within a company so that the management can determine the strengths and the needs of all sectors of the firm. The development of the matrix requires the assessment of a business portfolio, which includes an organization's autonomous divisions (activities, or profit centers).

The BCG Matrix presents graphically the differences among these business units in terms of relative market share and industry growth rate. The vertical axis represents in a linear scale the growth rate of the market in which the business exists (see Figure 1). This is generally viewed as the expected growth rate for the next five years of the market in which a particular business competes. The values of the vertical axis are the relevant market growth rates (i.e., 5 percent, 10 percent, 15 percent, 20 percent, etc.). Usually a 10 percent cut-off level is selected in order to distinguish high from low market growth rate (a 10 percent value corresponds to doubling current experience in the next five to seven years).

The horizontal axis represents in a logarithmic scale the market share of a business within a firm relative to the market share of the largest competitor in the market. For example, Company A may have a 10 percent market share and Company B, the leading competitor, holds 40 percent of the market. Company A's market share relative to Company B's market share is 25 percent, or .25×. If Company A has a 40 percent share and Company B has a 10 percent share, Company A's market share is 400 percent, or 4.0×.

Relative market share is an indicator of an organization's competitive position within the industry and underlies the concept of experience curve. Thus, business organizations with high relative market share tend to have a cost leadership position.

Each of a company's products or business units is plotted on the matrix and classified as one of four types: question marks, stars, cash cows, and dogs. Question marks, located in the upper-right quadrant, have low relative market share in a high-growth market. These businesses are appropriately called question marks because it is often uncertain what will happen to them. Careful examination by management can help determine how

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Figure 3

Classification of Strengths and Weaknesses

Performance Level

	Poor	Good
Important	CELL 1	CELL 2
Not Important	CELL 3	CELL 4

Importance

---

many resources (if any) should be invested in these businesses. If significant change can increase relative market share for a question mark, it can become a star and eventually gain cash-cow status. If relative market share cannot be increased, the question mark becomes a dog.

The upper-left quadrant contains stars, businesses with high relative market share in high-growth markets. These businesses are very important to the company because they generate a high level of sales and are quite profitable. However, because they are in a high growth market that is very attractive to competitors, they require a lot of resources and investments to maintain a high market share. Often the cash generated by stars must be reinvested in the products in order to maintain market share.

When the market growth slows down, stars can take different paths, depending on their abilities to hold (or gain) market share or to lose market share. If a star holds or gains market share when the growth rate slows, stars become more valuable over time, or cash cows. However, if a star loses market share, it becomes a dog and has significantly less value (if any) to the company.

The lower-left quadrant contains businesses that have high relative market share in low-growth markets. These businesses are called cash cows and are highly profitable leaders in their industries. The funds received from cash cows are often used to help other businesses within the company, to allow the company to purchase other businesses, or to return dividends to stockholders.

Dogs generate low relative market share in a low-growth market. They generate little cash and frequently result in losses. Management should carefully consider their reasons for maintaining dogs. If there is a loyal consumer group to which these businesses appeal, and if the businesses yield relatively consistent cash that can cover their expenses, management may choose to continue their exis-

tence. However, if a dog consumes more resources than it's worth, it will likely be deleted or divested.

Strategic business units, which are often used to describe the products grouping or activities, are represented with a circle in the BCG Matrix. The size of the circle indicates the relative significance of each business unit to the organization in terms of revenue generated (or assets used).

Although the BCG Matrix is not used as often as it was in past years, one big advantage of the matrix is its ability to provide a comprehensive snapshot of the positions of a company's various business concerns. Furthermore, an important benefit of the BCG Matrix is that it draws attention to the cash flow, investment characteristics, and needs of an organization's business units, helping organizations to maintain a balanced portfolio.

Unfortunately, the BCG Matrix, like all analytical techniques, also has some important limitations. It has been criticized for being too simplistic in its use of growth rate and market share. Market growth rate is only one variable in market attractiveness and market share is only one variable in a business's competitive position. Furthermore, viewing every business as a star, cash flow, dog, or question mark is not always realistic. A four-cell matrix is too simple because strategic competitive positions are more complicated than "high" and "low."

Another disadvantage of using the BCG Matrix is that it is often difficult for a company to sufficiently divide its business units or product lines. Consequently, it is difficult to determine market share for the various units of concern.

GENERAL ELECTRIC MATRIX

In the 1980s, General Electric, along with the McKinsey and Company Consulting group, developed a more involved method for analyzing a company's portfolio of

Figure 4
Porter's Generic Competition

	Competitive Advantage	
	Lower Cost	Differentiation
Broad Target	Cost Leadership	Differentiation
Narrow Target	Cost Focus	Focused Differentiation

Competitive Scope
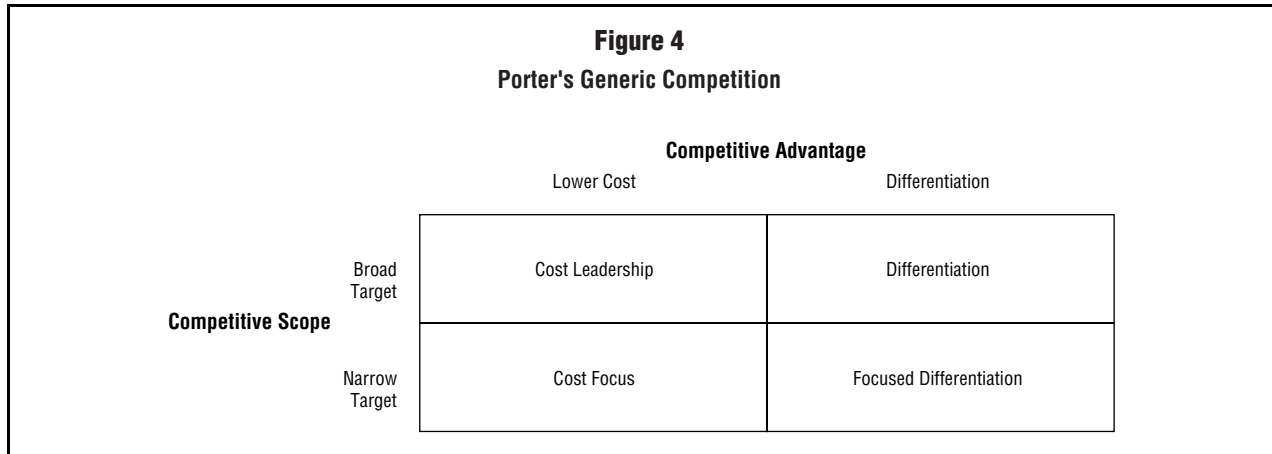
businesses or product lines. This nine-cell matrix considers the attractiveness of the market situation and the strength of the particular business of interest. These two dimensions allow a company to use much more data in determining each business unit's position.

The key to the successful implementation of this strategic tool is the identification and measurement of the appropriate factors that define market attractiveness and business strength. Those individuals involved in strategic planning are responsible for determining the factors. The attractiveness of the market may be based on such factors as market growth rate, barriers to entry, barriers to exit, industry profitability, power of the suppliers and customers, availability of substitutes, negotiating power of both customers and members of the channel of distribution, as well as other opportunities and threats.

The strength of a particular business may be based on such factors as market-share position, cost placement in the industry, brand equity, technological position, and other possible strengths and weaknesses. The development of General Electric (GE) Matrix requires assessing the criteria to evaluate both industry attractiveness and business strength. The calculation of scores for these dimensions is frequently based on a simple weighted sum formula.

To consider this approach as a matrix analysis, market attractiveness is placed on the vertical axis with the possible values of low, medium, and high (see Figure 2). Business strength is placed on the horizontal axis with the possible values of weak, average, and strong. A circle on the matrix represents each business unit (or product line). The size (area) of each circle represents the size of the relevant market in terms of sales. A portion of the circle is shaded to represent the market share of each business unit or product line within the market.

The nine cells of this matrix define three general zones of consideration for the strategic manager. According to this approach, the first zone contains businesses that are the best investments. These are units high in

market attractiveness and strong in business strength, followed by those that are strong in business strength and medium in market attractiveness, and those that are medium in business strength and high in market attractiveness. Management should pursue investment and growth strategies for these units. Management should be very careful in determining the appropriate strategy for those business units located in any of the three cells in the diagonal of this matrix.

The second zone includes those business units that have moderate overall attractiveness and those units that have medium business strength and market attractiveness, weak business strength and high market attractiveness, and strong business strength and low market attractiveness. These businesses should be managed according to their relative strengths and the company's ability to build on those strengths. Moreover, possible changes in market attractiveness should be carefully considered.

Those businesses that fall in the last zone are low in overall attractiveness; these are a good investment only if additional resources can move the business from a low overall attractiveness position to a moderate or strong overall attractiveness position. If not, these businesses should be considered for deletion or harvest.

The GE Matrix may be considered as an improvement over the BCG Matrix. The major advantage of using this matrix design is that both a business' strength and an industry's attractiveness are considered in the company's decision. Generally, it considers much more information than BCG Matrix, it involves the judgments of the strategic decision-makers, and it focuses on competitive position.

A major disadvantage, however, is the difficulty in appropriately defining business strength and market attractiveness. Also, the estimation of these dimensions is a subjective judgment that may become quite complicated. Another disadvantage lies in the lack of objective measures available to position a company; managers

Figure 5

Five Forces Model
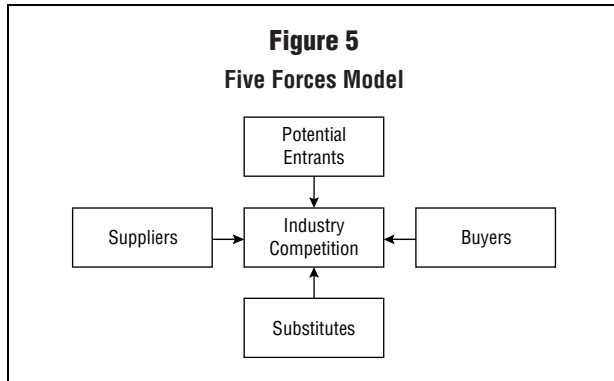
making these strategic decisions may have difficulty determining their unit's proper placement. Too, some argue that the GE Matrix cannot effectively depict the positions of new products or business units in developing industries.

PORTER'S FIVE FORCES MODEL

Before a company enters a market or market segment, the competitive nature of the market or segment is evaluated. Porter suggests that five forces collectively determine the intensity of competition in an industry: threat of potential entrants, threat of potential substitutes, bargaining power of suppliers, bargaining power of buyers, and rivalry of existing firms in the industry. By using the model shown in Figure 5, a firm can identify the existence and importance of the five competitive forces, as well as the effect of each force on the firm's success.

The threat of new entrants deals with the ease or difficulty with which new companies can enter an industry. When a new company enters an industry, the competitive climate changes; there is new capacity, more competition for market share, and the addition of new resources. Entry barriers and exit barriers affect the entrance of new companies into a marketplace. If entry barriers (capital requirements, economies of scale, product differentiation, switching costs, access to distribution channels, cost of promotion and advertising, etc.) are high, a company is less likely to enter a market. The same holds true for exit barriers.

The threat of substitutes affects competition in an industry by placing an artificial ceiling on the prices companies within an industry can charge. A substitute product is one that can satisfy consumer needs also targeted by another product; for example, lemonade can be substituted for a soft drink. Generally, competitive pressures arising from substitute products increase as the relative price of substitute products declines and as consumer's switching costs decrease.

The bargaining power of buyers is affected by the concentration and number of consumers, the differentiation of products, the potential switching costs, and the potential of buyers to integrate backwards. If buyers have strong bargaining power in the exchange relationship, competition can be affected in several ways. Powerful buyers can bargain for lower prices, better product distribution, higher-quality products, as well as other factors that can create greater competition among companies.

Similarly, the bargaining power of suppliers affects the intensity of competition in an industry, especially when there is a large number of suppliers, limited substitute raw materials, or increased switching costs. The bargaining power of suppliers is important to industry competition because suppliers can also affect the quality of exchange relationships. Competition may become more intense as powerful suppliers raise prices, reduce services, or reduce the quality of goods or services.

Competition is also affected by the rivalry among existing firms, which is usually considered as the most powerful of the five competitive forces. In most industries, business organizations are mutually dependent. A competitive move by one firm can be expected to have a noticeable effect on its competitors, and thus, may cause retaliation or counter-efforts (e.g. lowering prices, enhancing quality, adding features, providing services, extending warranties, and increasing advertising).

The nature of competition is often affected by a variety of factors, such as the size and number of competitors, demand changes for the industry's products, the specificity of assets within the industry, the presence of strong exit barriers, and the variety of competitors.

Recently, several researchers have proposed a sixth force that should be added to Porter's list in order to include a variety of stakeholder groups from the task environment that wield over industry activities. These groups include governments, local communities, creditors, trade associations, special interest groups, and shareholders.

PEST ANALYSIS

Another type of strategic analysis is what is known as PEST Analysis. PEST analysis considers a company's external environment, focusing on Political, Economic, Social, and Technological factors. This type of framework can be particularly useful for companies operating across national borders.

A PEST analysis begins with a consideration of an area's political climate. This can include laws that may impact businesses, various regulations, tax policies, and in some cases, a region's political stability.

Next, a PEST analysis considers economic conditions. Factors as diverse as: a region's general economic health; whether or not an area is operating under a free

market or not; the quality of an area's workforce; the overall levels of unemployment; and the area's infrastructure are all considered.

A PEST Analysis will also evaluate an area's social conditions. This can include general cultural considerations and attitudes, as well as the type and level of education of the populace. Additionally, this part of a PEST Analysis will take into account attitudes towards work and even a population's composition, such as age and gender.

Finally, a PEST Analysis will consider technological changes and how this might benefit or hamper a business. This element of a PEST Analysis will take into account issues such as the amount of technology research a government might be involved in, the cost of energy, and the amount of technology transfer in an area.

Obviously, a PEST Analysis differs from other strategic planning tools—such as a SWOT Analysis—in that it focuses on an organization's external environment. A SWOT Analysis, by contrast, can be used to examine both internal and external conditions. Because of this, a PEST Analysis might best be used in conjunction with other strategic planning tools. PEST Analysis can also be expanded to include other factors, which implies that the acronym will change as well. For example, the incorporation of legal considerations means that the name changes to a SLEPT Analysis, while further adding environmental and ethic issues transforms the name to a STEEPLE Analysis. Additionally, *NetMBA* notes that PEST Analysis can sometimes be referred to as a STEP Analysis.

ADDITIONAL STRATEGIC PLANNING TOOLS

By no means are these the only strategic planning tools available to an organization. Another tool is scenario planning, which attempts to determine the range of possible future scenarios a company might face and how best to address them. Another type of analysis is an OODA loop, which stands for observation, orientation, decision, and action. *Fast Company* has praised the OODA loop for allowing an organization to respond to sudden changes in its competitive environment. (Interestingly, both of these tools were originally developed for military use.)

The implementation of strategic planning tools serves a variety of purposes in firms, including the clear definition of an organization's purpose and mission, and the establishment of a standard base from which progress can be measured and future actions can be planned. Furthermore, the strategic planning tools should communicate those goals and objectives to the organization's constituents. Thus, the worth of these tools, as well as others, is often dependent on the objective insight of those who participate in the planning process. It is also important for those individuals who will implement the strategies to

play a role in the strategic-planning process; this often requires a team effort that should allow a variety of inputs and should result in a better overall understanding of the company's current and future industry position.

SEE ALSO *Generic Competitive Strategies; Strategic Planning Failure; Strategy Formulation; Strategy Implementation; Strategy in the Global Environment; Strategy Levels; SWOT Analysis*

BIBLIOGRAPHY
"Competitor Analysis." *NetMBA,* 2007. Available from: http://www.netmba.com/strategy/competitor-analysis/.

Costin, Harry. *Readings in Strategy and Strategic Planning.* Fort Worth, TX: The Dryden Press, 1998.

David, R. Fred. *Strategic Management: Concepts and Cases.* Upper Saddle River, NJ: Prentice Hall, 2003.

Hammonds, Keith H. "The Strategy of the Fighter Pilot." *Fast Company,* 59 (May 2002). Available from: http://www.fastcompany.com/magazine/59/pilot.html?page=0%2C0.

Houlden, Brian. *Understanding Company Strategy: An Introduction to Analysis and Implementation.* Cambridge, MA: Blackwell Publishers, Inc., 1996.

Hunger, J. David, and Thomas L. Wheelen. *Essentials of Strategic Management.* Reading, MA: Addison Wesley, 1997.

"PEST Analysis." *NetMBA,* 2007. Available from: http://www.netmba.com/strategy/pest/.

"PEST Analysis." *Value Based Management,* 2008. Available from: http://www.valuebasedmanagement.net/methods_PEST_analysis.html.

Porter, Michael E. *Competitive Strategy.* New York: The Free Press, 1980.

———. *Competitive Strategy of Nations.* New York: The Free Press, 1990.

"Scenario Planning." *NetMBA,* 2007. Available from: http://www.netmba.com/strategy/scenario/.

Stahl, J. Michael, and David W. Grigsby. *Strategic Management for Decision Making.* Massachusetts: PWS-KENT Publishing, 1992.

Wheelen, L. Thomas, and David J. Hunger. *Strategic Management and Business Policy: Entering 21st Century Global Society.* Reading, MA: Addison Wesley, 1998.

STRATEGY FORMULATION

Strategy is a road map or guide by which an organization moves from a current state of affairs to a future desired state. It is not only a template by which daily decisions are made, but also a tool with which long-range future plans and courses of action are constructed. Strategy allows a company to position itself effectively within its environment to reach its maximum potential, while constantly monitoring that environment for changes that can affect it so as to make changes in its strategic plan accordingly.

Figure 1
Strategic Planning Process
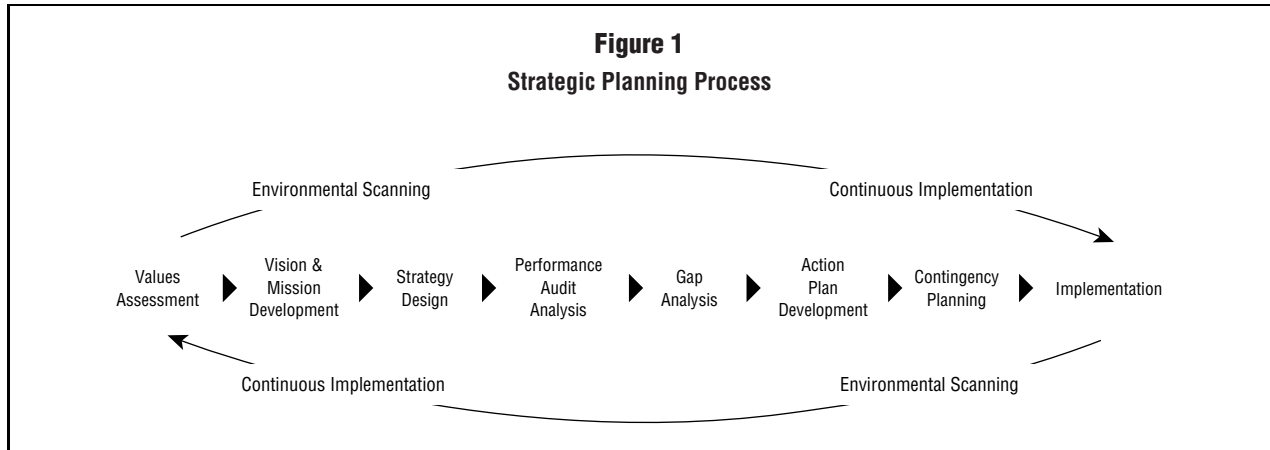
STRATEGY FORMULATION

Basic strategic planning is comprised of several components that build upon the previous piece of the plan and operates much like a flow chart. However, prior to embarking on this process, it is important to consider the players involved. There must be a commitment from the highest office in the organizational hierarchy. Without this support, it is unlikely that other members will be supportive in the planning and eventual implementation process, thereby dooming the plan before it ever takes shape. Commitment and support of the strategic-planning initiative must spread from the president and/or CEO, permeating all levels in an organization.

Just as importantly, the strategic-planning team should be composed of top-level managers who are capable of representing the interests, concerns, and opinions of all members of the organization. Generally, strategic-planning teams should be small. In fact, some organizational theories suggest twelve members as the maximum number for such a team.

Strategic planning is a sequential process, with each part building upon the previous one.

Components of the strategic-planning process include: environmental scanning, continuous implementation, values assessment, vision and mission formulation, strategy design, performance audit analysis, gap analysis, action-plan development, contingency planning, and final implementation.

ENVIRONMENTAL SCANNING

This element of strategy formulation is one of the two continuous processes. A company must consistently scan its business and competitive environment—including factors that can affect performance—in order to conduct subsequent pieces of the planning process. Environmental scanning should consider a firm's overall environment,

the specific industry, competition, and the firm's internal environment. The resulting consequence of regular inspection of the environment is that an organization readily notes changes and is able to adapt its strategy accordingly. This leads to the development of a advantage in the form of accurate responses to internal and external stimuli so as to keep pace with the competition.

CONTINUOUS IMPLEMENTATION

Each step of the planning process requires some degree of implementation before the next stage can begin. This naturally dictates that all implementation cannot be postponed until completion of the plan, but must be initiated along the way. Implementation procedures specific to each phase of planning must be completed during that phase in order for the next stage to be started.

VALUES ASSESSMENT

All business decisions are fundamentally based on some set of values, whether they are personal or organizational values. The implication here is that since the strategic plan is to be used as a guide for daily decision making, the plan itself should be aligned with those personal and organizational values. To delve even further, a values assessment should include an in-depth analysis of several elements: personal values, organizational values, operating philosophy, organization culture, and stakeholders. This provides the planning team with a complete view of the organization and how it functions.

Strategic planning that does not integrate a values assessment into the process is sure to encounter severe implementation and functionality problems if not outright failure. If any party feels that his or her values have been neglected, he or she is less likely to adopt the plan into daily work procedures.

VISION AND MISSION FORMULATION

Vision and mission formulation serves as the foundation upon which the remainder of the plan is built. A vision is a statement that identifies where an organization wants to be at some point in the future. It functions to provide a company with direction, stress management, justification and quantification of resources, enhancement of professional growth, motivation, standards, and succession planning. Porrus and Collins (1996) point out that a well-conceived vision consists of two major components: a core ideology and the envisioned future.

A core ideology, the enduring character of an organization, is composed of an organization's core values and a core purpose. The core purpose is the organization's entire reason for being. The envisioned future involves a conception of the organization at a specified future date inclusive of its aspirations and ambitions. It includes the BHAG (big, hairy, audacious goal), which a company typically reaches only 50 to 70 percent of the time. This envisioned future describes specific goals for the organization to reach.

The strategic results of a well-formulated vision include the survival of the organization, the focus on productive effort, vitality through the alignment of the individual employees and the organization as a whole, and, finally, success. Likewise, a well-formulated vision can aid in the creation of a successful mission statement.

An explicit mission statement ensures the unanimity of purpose, provides the basis for resource allocation, guides organizational climate and culture, establishes organizational boundaries, facilitates accountability, and facilitates control of cost, time, and performance. When formulating a mission statement, it is vital that it specifies six specific elements, including the basic product or service, employee orientation, primary market(s), customer orientation, principle technologies, and standards of quality. With all of these elements incorporated, a mission statement should still remain short and memorable. For example, Google's mission statement reads:

> "Google's mission is to organize the world's information and make it universally accessible and useful."

Other functions of a mission statement include setting the bounds for development of company philosophy, values, aspirations, and priorities (policy); establishing a positive public image; justifying business operations; and providing a corporate identity for internal and external stakeholders.

STRATEGY DESIGN

This section of strategy formulation involves the preliminary layout of the detailed paths by which the company plans to fulfill its mission and vision. This step involves four major elements: identification of the major lines of business (LOBs), establishment of critical success indicators (CSIs), identification of strategic thrusts to pursue, and the determination of the necessary culture.

A line of business is an activity that produces products or services that either are dramatically different or are geared towards very different markets. When considering the addition of a new line of business, it should be based on existing core competencies of the organization, its potential contribution to the bottom line, and its fit with the firm's value system.

The establishment of critical success factors must be completed for the organization as a whole as well as for each line of business. A critical success indicator is a gauge by which to measure the progress toward achieving the company's mission. In order to serve as a motivational tool, critical success indicators must be accompanied by a target year (i.e. 2008, 2008–2012, etc.). This also allows for easy tracking of the indicated targets. These indicators are typically a mixture of financial figures and ratios (i.e. return on investment, return on equity, profit margins, etc.) and softer indicators such as customer loyalty, employee retention/turnover, and so on.

Strategic thrusts are the most well-known methods for accomplishing the mission of an organization. Generally speaking, there are a handful of commonly used strategic thrusts, which are termed *grand strategies.* They include the concentration on existing products or services; market/product development; concentration on innovation/technology; vertical/horizontal integration; the development of joint ventures; diversification; retrenchment/turnaround (usually through cost reduction); and divestment/liquidation (usually a last option).

Finally, in designing strategy, it is necessary to determine the necessary culture with which to support the achievement of the lines of business, critical success indicators, and strategic thrusts. Harrison and Stokes (1992) defined four major types of organizational cultures: power orientation, role orientation, achievement orientation, and support orientation. Power orientation is based on the inequality of access to resources, and leadership is based on strength from those individuals who control the organization from the top. Role orientation carefully defines the roles and duties of each member of the organization; it is a bureaucracy. The achievement orientation aligns people with a common vision or purpose. It uses the mission to attract and release the personal energy of organizational members in the pursuit of common goals. With a support orientation, the organizational climate is based on mutual trust between the individual and the organization. More emphasis is placed on people being valued more as human beings rather than employees. Typically an organization

Figure 2
SWOT Analysis

Internal strengths should be matched or paired with external opportunities →	Opportunities (External)
Weaknesses (Internal)	Threats (External)

tegic profile; listing the available resources for implementing the strategic thrusts that have been selected for achieving the newly defined mission; and an examining the current organizational culture. The external investigation should look closely at competitors, suppliers, markets and customers, economic trends, labor-market conditions, and governmental regulations. In conducting this query, the information gained and used must reflect a current state of affairs as well as directions for the future. Additionally, some have begun to argue that an increasingly global and dynamic business climate necessitates the incorporation of change into such an analysis.

will choose some mixture of these or other predefined culture roles that it feels is suitable in helping it to achieve its mission and the other components of strategy design.

PERFORMANCE AUDIT ANALYSIS

Conducting a performance audit allows the organization to take inventory of what its current state is. The main idea of this stage of planning is to take an in-depth look at the company's internal strengths and weaknesses and its external opportunities and threats. This is commonly called a SWOT analysis.

Developing a clear understanding of resource strengths and weaknesses, an organization's best opportunities, and its external threats allows the planning team to draw conclusions about how to best allocate resources in light of the firm's internal and external situation. This also produces strategic thinking about how to best strengthen the organization's resource base for the future.

Internally, there are several key areas that must be analyzed and addressed. These include identifying the status of each existing line of business and unused resources for prospective additions; identifying the status of current tracking systems; defining the organization's stra-

GAP ANALYSIS

The result of a performance audit should be the establishment of a performance gap, that is, the resultant gap between the current performance of the organization in relation to its performance targets. To close this gap, the planning team must conduct what is known as a gap analysis, the next step in the strategic planning process.

A gap analysis is a simple tool by which the planning team can identify methods with which to close the identified performance gap(s). All too often, however, planning teams make the mistake of making this step much more difficult than need be. Instead, the planning team must look at the current state of affairs and the desired future state. The first question that must be addressed is whether or not the gap can feasibly be closed. If so, there are two simple questions to answer: "What are we doing now that we need to stop doing?" and "What do we need to do that we are not doing?" In answering these questions and reallocating resources from activities to be ceased to activities to be started, the performance gap is closed. If there is doubt that the initial gap cannot be closed, then the feasibility of the desired future state must be reassessed.

Figure 3
Gap Analysis

What are we doing now that we need to stop doing?

Current State of Affairs

Performance Gap

$$ Reallocate Resources $$

Desired State of Affairs at a Point in the Envisioned Future

What do we need to do that we are not doing?
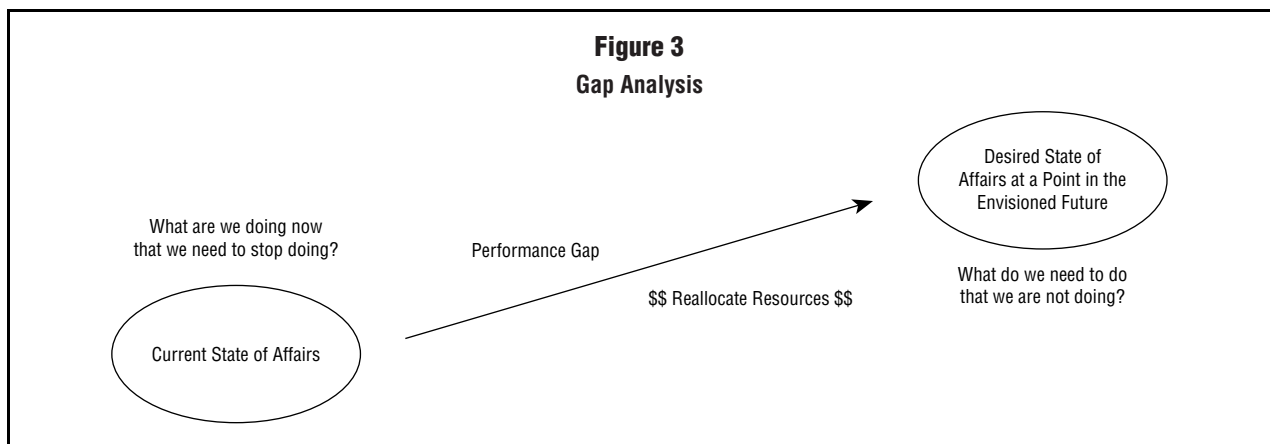
ACTION PLAN DEVELOPMENT

This phase of planning ties everything together. First, an action plan must be developed for each line of business, both existing and proposed. It is here that the goals and objectives for the organization are developed.

Goals are statements of desired future end-states. They are derived from the vision and mission statements and are consistent with organizational culture, ethics, and the law. Goals are action oriented, measurable, standard setting, and time bounded. In strategic planning, it is essential to concentrate on only two or three goals rather than a great many. The idea is that a planning team can do a better job on a few rather than on many. There should never be more than seven goals. Ideally, the team should set one, well-defined goal for each line of business.

Successful goal statements typically incorporate the following elements:

- Accomplishment/target (e.g., to be number one in sales on the East Coast by 2005)

- A measure (e.g., sales on the East Coast)

- Standards (e.g., number one)

- Time frame (e.g., long-term)

Objectives are near-term goals that link each long-term goal with functional areas, such as operations, human resources, finance, etc., and to key processes such as information, leadership, etc. Specifically, each objective statement must indicate what is to be done, what will be measured, the expected standards for the measure, and a time frame less than one year (usually tied to the budget cycle). Objectives are dynamic in that they can and do change if the measurements indicate that progress toward the accomplishment of the goal at hand is deficient in any manner. Simply, objectives spell out the step-by-step sequences of actions necessary to achieve the related goals.

With a thorough understanding of how these particular elements fit and work together, an action plan is developed. If carefully completed, it will serve as the implementation tool for each established goal and its corresponding objectives as well as a gauge for the standards of their completion.

CONTINGENCY PLANNING

The key to contingency planning is to establish a reactionary plan for high impact events that cannot necessarily be anticipated. Contingency plans should identify a number of key indicators that will create awareness of the need to reevaluate the applicability and effectiveness of the strategy currently being followed. When a red flag is raised, there should either be a higher level of monitoring established or immediate action should be taken.

IMPLEMENTATION

Implementation of the strategic plan is the final step for putting it to work for an organization. To be successful, the strategic plan must have the support of every member of the firm. A company's leader is its most influential member. Positive reception and implementation of the strategic plan into daily activities at this level greatly increases the likelihood that others will do the same.

Communication is key to successful implementation of the strategic plan. The more often employees hear about the plan, its elements, and ways to measure its success, the greater the possibility that they will undertake it as part of their daily work lives. It is especially important that employees are aware of the measurement systems and that significant achievements be rewarded and celebrated. This positive reinforcement increases support of the plan and belief in its possibilities.

HOSHIN PLANNING

Hoshin management was developed in Japan as part of the overall refinement of quality programs in that country after World War II. At one time, "made in Japan" was synonymous with shoddy quality, but with the encouragement of the American occupation force, the Japanese Union of Scientists and Engineers (JUSE) made great efforts to improve Japanese manufacturing. An important element of the JUSE program between 1950 and 1960 was inviting W. Edwards Deming and Joseph M. Juran to train managers and scholars in statistical process control (SPC) and quality management. So significant were these visits, especially Deming's, that the highest Japanese award for quality is called the Deming Prize. Each company developed its own planning methodology, but the Deming Prize system involves the sharing of best practices, and common themes developed. In 1965 Bridgestone Tire published a report describing the planning techniques used by Deming Prize winners, which were given the name *hoshin kanri*. By 1975, hoshin planning was widely accepted in Japan.

In the early 1980s, hoshin planning began to gain acceptance in the United States. Hewlett-Packard, Xerox, and Texas Instruments were all early U.S. adopters. Interestingly, all three companies had divisions or subsidiaries in Japan which won the Deming Prize: Yokagawa Hewlett-Packard, Fuji Xerox, and Texas Instruments' Oita plant. During the 1990s the practice spread. In 1994 Noriaki Kano, professor of management science at the University of Tokyo and member of the Deming Prize Committee, gave a presentation on the topic at the meeting of the American Society of Quality Control (now the American Society for Quality).

Hoshin planning, or "hoshin kanri" in Japanese (also known in the United States as policy deployment,

management by policy, and hoshin management), is a careful and deliberate process by which the few most important organizational goals are deployed throughout the organization. It consists of five major steps:

1. Development at the executive level of a long-term vision

2. Selection of a small number of annual targets that will move the organization toward the vision

3. Development of plans at all levels of the organization that will together achieve the annual targets

4. Execution of the plans

5. Regular audits of the plans

THE CONTEXT FOR HOSHIN PLANNING

Hoshin planning should be seen in the context of total quality management (TQM). Several elements of TQM are especially important for the effectiveness of hoshin planning. Most basic is a customer-driven master plan that encapsulates the company's overall vision and direction. Hoshin planning also assumes an effective system of daily management that keeps the company moving on course, including an appropriate business structure and the use of quality tools such as SPC. A third important element of TQM is the presence of cross-functional teams. Experience in problem solving and communications across and between levels of the organization are vital for hoshin planning.

A number of general principles underlie this method. Of utmost importance is participation by all managers in defining the vision for the company as well as in implementing the plans developed to reach the vision. Related to this is what the Japanese call "catchball," which means a process of lateral and vertical communication that continues until understanding and agreement is assured. Another principle is individual initiative and responsibility. Each manager sets his own monthly and yearly targets and then integrates them with others. Related to this principle is a focus on the process rather than strictly on reaching the target and a dedication to root cause analysis. A final principle that is applied in Japan—but apparently not in the United States—is that when applying hoshin planning, there is no tie to performance reviews or other personnel measures.

STEPS OF POLICY DEPLOYMENT

In its simplest form, hoshin planning consists of a plan, execution, and audit. In a more elaborated form it includes a long-range plan (five to ten years), a detailed one-year plan, deployment to departments, execution, and regular diagnostic audits, including an annual audit by the CEO.

Five- to Ten-Year Vision. The long-range vision begins with the top executive and his staff, but is modified with input from all managers. The purpose is to determine where the company wants to be at that future point in time, given its current position, its strengths and weaknesses, the voice of the customer, and other aspects of the business environment in which it operates. Beyond stating the goal, this long-range plan also identifies the steps that must be taken to reach it. It focuses on the vital few strategic gaps that must be closed over the time period being planned.

Once the plan has been drafted, it is sent to all managers for their review and critique. The objective is to get many perspectives on the plan. The review process also has the effect of increasing buy-in to the final plan. This process is easier in Japanese companies than in most U.S. firms because most Japanese companies have only four layers of management.

Annual Plan. Once the long-range vision is in place, the annual plan is created. The vital few areas for change that were identified in the vision are translated into steps to be taken this year. Again, this process involves lateral and vertical communication among managers. The targets are selected using criteria such as feasibility and contribution to the long-term goals. The targets are stated in simple terms with clearly measurable goals. Some companies and authors refer to such an annual target as a hoshin. Though most companies set no more than three such targets, some establish as many as eight. Not all departments are necessarily involved in every hoshin during a given year. The targets are chosen for the sake of the long-term goals, not for involvement for its own sake.

Deployment to Lower Levels. Once the targets, including the basic metrics for each, are established, the plan is deployed throughout the company. This is the heart of hoshin planning. Each hoshin has some sort of measurable target. Top-level managers, having discussed it with their subordinates earlier in the process, commit to a specific contribution to that target, and then their subordinates develop their own plans to reach that contribution, including appropriate metrics. Plans are deployed to lower levels in the same way (see Figure 4). An important principle here is that those who have to implement the plan design the plan. In addition to the lower-level targets, the means and resources required are determined. Catchball plays an important role here. A key element of the hoshin discipline is the horizontal and vertical alignment of the many separate plans that are developed. All

Figure 4

Long-range goal:
Be recognized as the industry leader in customer responsiveness.

Annual Goal:
Improve Customer
Approval Rate by 5%

Means

Operations Target:
Customer Delivery
Performance > 90%

Means

Materials Target:
"Out of Stock" < 10%

Means

Increase vendor
audits by 25%

Mfg Cell 1 Target:
Reduce "MQA Hold"
by 20%

Means

Training on
paperwork. Task
force on labeling

Shipping Target:
Increase lines per
day by 10%

Means

Add one UPS pick up
per day

Maintenance Target:
Reduce "machine
down" by 10%

Means

Institute TPM.
Develop rapid
response procedure

MQA Target:
Increase training
offered by 25%

Means

Quality records
training

ambiguities are clarified, and conflicting targets or means are negotiated.

The final step in deploying the hoshin is rolling up the separate plans and targets to ensure that they are sufficient to reach the company-wide target. If not, more work is done to reconcile the difference.

Execution. Of course, the best-laid plans can come to naught if they are not properly executed. In terms of TQM, the execution phase is where hoshin management hands responsibility over to daily management. The strategies identified in the plan become part of the daily operation of the company. If the process has been done properly, all employees know what has to be done at their level to reach the top-level goals and thereby move the company toward the future described in the long-term vision.

Auditing the Plan. Essential to hoshin planning is the periodic diagnostic audit, most often done on a monthly basis. Each manager evaluates the progress made toward his own targets, and these reports are rolled up the organization to give feedback on the process to the highest levels. Successes and failures are examined at every level, and corrective action is taken as necessary. If it becomes apparent that something is seriously amiss in the execution, because of a significant change in the situation or perhaps a mistake in the planning phase, the plan may be adjusted and the change communicated up and down the organizational structure as necessary. The audit is a diagnostic review, an opportunity for mid-course corrections and not a time for marking up a scorecard. At the end of the year, the CEO makes an annual diagnostic review of the entire plan, focusing not only on the overall success or failure, but also on the entire process, including the

planning phase. The results of this audit become part of the input for the next annual plan, along with the five-to-ten-year plan and changes in the internal or external business environment.

EVALUATION

Although full implementation of hoshin planning in a large organization takes considerable effort, it is recognized as having many advantages over traditional business planning. The discipline of hoshin planning uncovers the vital few changes that need to be made and ties them to strategic action. It transmits the signals from top management to the rest of the organization in a form that can bring about change at every level. It is inclusive and collaborative: the individuals that have to implement the plans have input into their design. Perhaps most importantly, it focuses on the process rather than just the result. This includes continual improvement of the hoshin planning process itself. Organizations that persist in this method over a period of a few years report great benefits from its use.

SEE ALSO *Continuous Improvement; Mission and Vision Statements; Strategic Planning Failure; Strategic Planning Tools; Strategy Implementation; Strategy in the Global Environment; Strategy Levels*

BIBLIOGRAPHY
Babich, Peter. *Hoshin Handbook.* 2nd ed. Poway, CA: Total Quality Engineering, Inc., 1996.

Bechtell, Michele L. *The Management Compass: Steering the Corporation Using Hoshin Planning.* New York: AMACOM, 1995.

———. "Navigating Organizational Waters with Hoshin Planning." *National Productivity Review,* Spring 1996.

Collins, Brendan, and Ernest Huge. *Management by Policy: How Companies Focus Their Total Quality Efforts to Achieve Competitive Advantage.* Milwaukee: ASQC Quality Press, 1993.

Collins, James C., and Jerry I. Porras. "Building Your Company's Vision." *Harvard Business Review,* September–October 1996, 65–90.

"Company Overview." Google. Available at http://www.google.com/corporate/.

Goldstein, Leonard D., Timothy M. Nolan, and J. William Pfeiffer. *Applied Strategic Planning: How to Develop a Plan that Really Works.* New York: McGraw-Hill, Inc., 1993.

Harrison, Roger, and Herb Stokes. *Diagnosing Organizational Culture.* San Francisco: Pfeiffer, 1992.

King, Bob. *Hoshin Planning: the Developmental Approach.* Methuen, MA: GOAL/QPC, 1989.

Mayer, Peter and Robert B. Vambery. "Aligning Global Business Strategy Planning Models with Accelerating Change." *Journal of Global Business & Technology* 4, no. 1 (March 2008): 31–48.

Mellum, Mara Minerva, and Casey Collett. *Breakthrough Leadership: Achieving Organizational Alignment through Hoshin Planning.* Chicago: American Hospital Publishers, Inc., 1995.

Plenert, Gerhard. *The eManager: Value Chain Management in an eCommerce World.* Dublin, Ireland: Blackhall Publishing, 2001.

———. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

"Total Quality Engineering." *Hoshin Planning.* Poway, CA: Total Quality Engineering, Inc. Available from: http://www.tqe.com/hoshin.html.

STRATEGY IN THE GLOBAL ENVIRONMENT

Though global economic activity has existed for centuries, globalization in its current form began in earnest in the 1970s. Essentially, globalization refers to growth of trade and investment, accompanied by the growth in international businesses, and the integration of economies around the world. According to Punnett the globalization concept is based on a number of relatively simple premises:

- Technological developments have increased the ease and speed of international communication and travel.

- Increased communication and travel have made the world smaller.

- A smaller world means that people are more aware of events outside of their home country and are more likely to travel to other countries.

- Increased awareness and travel result in a better understanding of foreign opportunities.

- A better understanding of opportunities leads to increases in international trade and investment, and the number of businesses operating across national borders.

- These increases mean that the economies and financial markets around the world are more closely integrated.

Managers must be conscious that markets, supplies, investors, locations, partners, and competitors can be anywhere in the world. Successful businesses will take advantage of opportunities wherever they are and will be prepared for downfalls. Successful managers, in this environment, need to understand the similarities and differences across national boundaries, in order to utilize the opportunities and deal with the potential downfalls.

The globalization of business is easy to recognize in the spread of many brands and services throughout the world. For example, Japanese electronics and automobiles are common in Asia, Europe, and North America, while U.S. automobiles, entertainment, and financial services are also common in Asia, Europe, and North America.

Moreover, companies have become transnational or multinational—that is, they are based in one country but have operations in others. For example, many Japan-based automakers now operate factories in the United States and elsewhere, while U.S.-based Coca-Cola operates plants in other countries.

In developing appropriate global strategies, managers need to take the benefits and drawbacks of globalization into account. A global strategy must take into account the events around the globe, as well as those at home.

International strategy is the continuous and comprehensive management technique designed to help companies operate and compete effectively across national boundaries. While companies' top managers typically develop global strategies, they rely on all levels of management in order to implement these strategies successfully. The methods companies use to accomplish the goals of these strategies take a host of forms. For example, some companies form partnerships with companies in other countries, others acquire companies in other countries, others still develop products, services, and marketing campaigns designed to appeal to customers in other countries. Some rudimentary aspects of international strategies mirror domestic strategies in that companies must determine what products or services to sell, where and how to sell them, where and how they will produce or provide them, and how they will compete with other companies in the industry in accordance with company goals.

The development of international strategies entails attention to other details that seldom, if ever, come into play in the domestic market. These other areas of concern stem from cultural, geographic, and political differences. Consequently, while a company only has to develop a strategy taking into account known governmental regulations, one language (generally), and one currency in a domestic market, it must consider and plan for different levels and kinds of governmental regulation, multiple currencies, and several languages in the global market.

Though multinational corporations have been a mainstay of the business scene for some time, the most recent wave of globalization by U.S. companies began in the 1980s, as companies began to realize that concentrating on the domestic market alone would lead to stagnant sales and profits and that emerging markets offered many opportunities for growth. Part of the motivation for this globalization stemmed from the lost market share in the 1970s to multinational companies from other countries, especially those from Japan. Initially, these U.S. companies tried to emulate their Japanese counterparts by implementing Japanese-style management structures and quality circles. After adapting these practices to meet the needs of U.S. companies and recapturing market share, these companies began to move into new markets to spur

growth, enable the acquisition of resources (often at a cost advantage), and gain competitive advantage by achieving greater economies of scale.

The globalization of U.S. companies has not been without concerns and detractors. Exporting U.S. jobs, exploiting child labor, and contributing to poverty have all been charges laid at the doors of U.S. companies. These charges have been accompanied by demonstrations and consumer boycotts.

Nor have U.S. companies been the only ones affected. Companies in the rest of the developed world have globalized along with U.S. companies, and they have also faced the sometimes negative consequences.

Interestingly, in the late twentieth and early twenty-first century, there has also been a growth in international companies from developing and transitional countries, and this trend can be expected to continue and increase. Exports and investment from the People's Republic of China are a notable example, but companies from Southeast Asia, India, South Africa, and Latin America, to name some countries and regions, are making themselves known around the world.

TYPES OF GLOBAL BUSINESS ACTIVITIES

Businesses may choose to globalize or operate in different countries in four distinct ways: through trade, investment, strategic alliances, and licensing or franchising. Companies may decide to trade tangible goods such as automobiles and electronics (merchandise exports and imports). Alternatively, companies may decide to trade intangible products such as financial or legal services (service exports and imports).

Companies may enter the global market through various kinds of international investments. Companies may choose to make foreign direct investments, which allow them to control companies and assets in other countries. In addition, companies may elect to make portfolio investments, by acquiring the stock of companies in other countries in order to gain control of these companies.

Another way companies tap into the global market is by forming strategic alliances with companies in other countries. While strategic alliances come in many forms, some enable each company to access the home market of the other and thereby market their products as being affiliated with the well-known host company. This method of international business also enables a company to bypass some of the difficulties associated with internationalization such as different political, regulatory, and social conditions. The home company can help the multinational company address and overcome these difficulties because it is accustomed to them.

Finally, companies may participate in the international market by either licensing or franchising. Licensing involves granting another company the right to use its brand names, trademarks, copyrights, or patents in exchange for royalty payments. Franchising, on the other hand, is when one company agrees to allow a company in another country to use its name and methods of operations in exchange for royalty payments.

OVERVIEW OF INTERNATIONAL STRATEGY DEVELOPMENT

Generally, a company develops its international strategy by considering its overall strategy, which includes its operations at home and abroad. We can consider four aspects of strategy: (1) scope of operations, (2) resource allocation, (3) competitive advantage, and (4) synergy. The first component encompasses the geographic locations—countries and regions—of possible operations as well as possible markets or niches in various regions. Since companies have limited resources and since different regions offer different advantages, managers must select the markets that offer the company the optimal opportunities.

The second component of the global strategy focuses on use of company resources so that a company can compete successfully in the chosen markets. This component of strategy planning also determines the relative importance of various company functions and bases the allocation of resources on the relative importance of each function. For instance, a company may decide to allocate its resources based on product lines or geographical locations.

Next, management must decide where the company can achieve competitive advantage over other companies in the industry. Management can identify their competitive advantage by determining what the company does better (or can do better) than its competitors. Companies may realize this advantage through a host of techniques such as using superior technology, implementing more efficient organizational practices and distribution systems, and cultivating well-known brands. This component of the strategy involves not only identifying existing or potential areas of competitive advantage but also developing a plan for sustaining areas of competitive advantage. Finally, global strategy should involve establishing a plan for the company that enables its various functions and operations to benefit one another. For example, a company can use one line of products to encourage sales of another line of products, thereby enabling different parts of a business to benefit from each other.

Some have argued that internal operations can also be global in scope. For example, a 2002 article in the *Academy of Management Executive* emphasizes the importance of sourcing at a global level. The authors note that coordinating and integrating a company's sourcing and purchasing on a global scale can result in competitive advantages by making an organization more efficient. Likewise, Thomas Friedman has written about the importance of global supply chains. Friedman uses Wal-Mart as an example of a company with a sophisticated global supply chain. The company has achieved a remarkable degree of efficiency in its supply chain by having an IT system that allows for speedy communication with its suppliers. General Motors is another company that has used IT systems to improve its global supply chain.

In general, recent innovations in technology have aided in all aspects of conducting business operations in a global environment. For example, Colgate Palmolive has used Web-based training materials across its organization instead of in-person training.

Many companies are now outsourcing many of their operations internationally. For example, if you call to get information on your credit card, you may well be talking to someone in India or Mexico. Equally, manufacturers often outsource production to low labor-cost countries. Concerns over ethical issues, such as slave and child labor, have led to companies outsourcing under controlled conditions—offshore production may be subject to surprise visits and searches and outsourced factories are required to conform to specific criteria. Unfortunately, outsourcing and subcontracting can make oversight a very difficult task.

However, there are other steps a company can take towards becoming more globally competitive. For example, one *BusinessWeek* article pointed out that while many U.S. companies are pursuing a global strategy, this is not reflected in the composition of directors. The article argues that companies need to add foreign nationals to their board of directors to help promote global strategies. While this may present some practical problems (such as travel to board meetings and culture clashes), the "internationalizing" of a board of directors can help cement a company's commitment to a global strategy.

STAGES OF INTERNATIONAL STRATEGY DEVELOPMENT

Strategy development itself generally takes places in two stages: strategy formulation and strategy implementation. When planning a strategy, companies identify their international objectives and put together a strategy that will enable them to realize their goals. During the planning stage managers propose, revise, and finally ratify plans for entering new markets and competing in them.

After a strategy has been agreed on, managers must take steps to have it implemented. Consequently, this stage involves determining when to begin global operations as well as actually starting operations and putting into action the other components of the global strategy.

More specifically, the first stage—strategy formulation—entails analysis of the company and its environment, establishing strategic goals, and developing plans to achieve goals as well as a control framework. By assessing itself and the global business environment, a company can determine what markets, products, services, etc. offer opportunities for growth. This process involves the collection of data on a company and its environment, including information on global markets, regulation, productivity, costs, and competitors. Therefore, the collection of data should supply managers with economic, financial, political, legal, and social information on various countries and their markets for different products or services. Based on this information, managers can determine what markets and products offer economically feasible opportunities for global expansion.

In a 2008 article in *The Journal of Global Business and Technology,* Peter Mayer and Robert G. Vambery argued that traditional models for strategic analysis were not sufficient for operating in a global environment. Specifically, they proposed adding elements of change into the Product Life Cycle and SWOT (strengths, weakness, opportunities, threats) analyses. In the case of SWOT analysis, they point out that incorporating various types of change as elements for consideration can result in more than one strategy going forward.

Regardless of whether this is done or not, once this analysis is complete, managers must establish strategic goals, which are the significant goals a company seeks to achieve through a particular pursuit such as entering a new regional market. These goals must be practicable, measurable, and limited to a specific time frame. After the strategic goals have been established, companies should develop plans that allow them to accomplish their goals, and these plans should concentrate on how to implement strategic plans. Finally, strategy formulation involves a control framework, which is a process management uses to help ensure that a company remains on the right course when implementing its strategic plans. The control framework essentially responds to various developments while the strategic plans are being implemented. For example, if sales are lower than the projected sales that are part of the strategic goals, then a company might increase its marketing efforts and temporarily lower its prices to stimulate additional sales.

INTERNATIONAL MARKET EVALUATION

While many aspects of international strategy and its formulation are similar to their domestic counterparts, some key aspects are not, and hence call for different methods and different kinds of information. Gaining knowledge of international markets is one of these key differences—and

a crucial part of developing an international strategy. In order for a company to enter a new market, capture market share, and thereby increase sales and profits, it must know what that market is like. At a basic level, a company must examine different markets, evaluate the advantages and disadvantages of entering each, and select only the markets that show the greatest potential for entry and growth.

When examining different international markets, a company should consider the market potential, competition, regulation, and cultural factors of each. Company managers can assess market potential by collecting data on the gross domestic product (GDP), per capita GDP, population, transportation, and other figures of various countries. This kind of information will enable managers to determine the spending power of the consumers in each country and determine if that spending power allows them to purchase a company's products or services. Managers also should consider the currency stability of the different markets, which can be done by using documents from the home countries to determine currency value and fluctuation over a period of years.

To select the best markets for entry, managers also should consider the degree of competition within different markets and should anticipate future competition in them as well. Determining the degree of competition involves the identification of all the companies competing in the prospective markets as well as their sizes, market shares, and prices. Managers then should evaluate a prospective market by considering the number of competitors and their characteristics as well as the market conditions—that is, whether the market is saturated with competition and cannot support any new entrants.

Next, managers should evaluate the regulatory environment of the prospective markets, since knowing tax, trade, and other related policies is essential for a successful international business. This step entails determining the respective tariffs and trade barriers of prospective markets. Different types of trade barriers may influence the kind of business activity a company chooses for a particular market. For example, if a prospective market has trade barriers that restrict the entry of foreign-made goods, a company might decide to access the market through foreign direct investment and manufacture its products in that country itself. Ownership restrictions also may limit a company's interest in a particular market; some countries permit foreign companies to set up local operations only if they establish a partnership with a local company. In addition, managers should find out if prospective countries charge foreign companies higher taxes or if they offer tax breaks and incentive to encourage economic development. A final consideration companies must make concerning government is stability. Since some countries have rough

government transitions resulting from coups and uprisings, companies must countenance the possibility of political turmoil that could substantially disrupt business.

The last step in international market evaluation is the assessment of cultural factors. To avoid difficulties associated with cultural differences, some managers look for new markets that have cultural similarities to their home market, especially for initial international market penetration endeavors. Unlike market potential, competition, and regulation, cultural differences are more difficult to evaluate. Nevertheless, managers must try to determine the consumer needs and preferences in the prospective markets. Managers must also account for cultural differences in labor relations such as worker motivation, compensation, hours, etc. if planning foreign direct investment in an overseas company. Moreover, a thorough understanding of a prospective country's culture will greatly facilitate any kind of global business enterprise. This cultural knowledge should include a basic understanding of a prospective country's beliefs and attitudes, language and communication styles, dress, food preferences and customs, time and time consciousness, relationships, values, and work ethic. This kind of cultural information is essential for developing an effective and realistic global strategy.

Since conducting primary research is labor intensive and time consuming, managers may obtain preliminary information on prospective markets from books such as Dun & Bradstreet's *Guide to Doing Business Around the World* and *Business Protocol: How to Survive and Succeed in Business,* or *The Economist*'s "Doing Business in . . ." series, which list potential trade opportunities, policies, etiquette, taxes, and so on for various countries.

After examining the prospective markets in this manner, managers are ready to evaluate the advantages and disadvantages of each potential market. One way of doing so is the determination of costs, advantages, and disadvantages of each prospective market. The costs of each market include direct costs and opportunity costs. Direct costs are those a company pays when establishing a business in a new market, such as costs associated with purchasing property and equipment and producing and shipping goods. Opportunity costs, on the other hand, refer to the costs associated with the loss of other opportunities, since entering one market rules out or postpones entering another because of a company's limited resources. Hence, the profits that could have been earned in the alternative market constitute the opportunity costs.

Each prospective market usually has a variety of advantages, such as the possibility for growth, which will lead to greater revenues and profits. Other advantages include relatively low material and labor costs, new technology gaining strategic advantage over competitors, and matching competitors' actions. However, each prospec-

tive market also usually has a number of disadvantages, including opportunity costs, greater business complexity, and potential losses stemming from unforeseen aspects of prospective markets and from currency fluctuations. Other disadvantages might result from potential losses associated with unstable political conditions.

ANALYSIS OF INTERNATIONAL STRATEGIES

After a significant amount of globalization had taken place, business analysts began to examine the success of various strategies for doing business in other countries. This examination led to the distinction between various orientations of international strategies. The main distinction was between multi-domestic (also called multi-local) international strategies and global strategies. Multi-domestic international strategies refer to those that address competition in each country or region on an individual basis, whereas global strategy refers to addressing competition in an integrated and holistic manner across country and regional boundaries. Hence, multi-domestic international strategies attempt to appeal to the needs of customers in different countries or regions, while global strategies attempt to standardize products and marketing to work across boundaries. Instead of relying on one of these strategies, multinational companies might adopt a different strategy for different products or services. For example, a company might use a global strategy for its electronics and a multi-domestic strategy for its appliances.

Critics of the standardization approach argue that it makes two questionable assumptions: that consumers' needs are becoming more homogenous throughout the world and that consumers prefer high quality and low prices over advanced features and functions. Nevertheless, standardized global strategies have some significant benefits. Companies can reduce their marketing expenditures, for example, if they use the same ads in all their markets. Besides marketing savings, global strategies can lead to other kinds of benefits and advantages in areas such as design, packaging, manufacturing, distribution, customer service, and software development. Some have noted that standardization has the traditional benefits associated with many large organizations, such as efficiencies of speed and scale.

On the other hand, some people argue that companies must customize their products or services to meet the needs of various international markets, and hence must use a multi-domestic strategy at least in part. For example, KFC planned a standardized approach to its foray into the Japanese market, but the company soon realized it had to change its strategy to meet the needs of Japanese consumers and customize its operations in Japan. Consequently,

KFC introduced smaller pieces of foods to cater to a Japanese preference, and located restaurants in crowded areas along with other restaurants, moving away from independent sites. As a result of these changes, the fast-food restaurant experienced stronger demand in Japan. In another example, News Corporation originally relied on a global strategy with its STAR-TV satellite television network, attempting to provide the same television shows across Asia in English. The company quickly switched to a multi-domestic strategy, providing programming in local languages after receiving low ratings and advertising dollars with its first approach.

However, as Inkpen and Ramaswamy argue, real world strategies are more likely to be a mix of standardization and localization. In fact, they go so far as to assert that real world circumstances simply may not allow for a purely standardized global strategy. They also point out that even within an industry different firms may develop different combinations and degrees of standardized and localized approaches. As an example, they report that some automobile manufacturers try to tailor their cars for each market (which might have different regulatory environments, national tastes, and economies), while others seek to offer as standardized a product as possible across national borders. It is also important to note that markets may favor one approach over the other.

Finally, some management scholars have advocated a hybrid strategy of the two, arguing that companies must have a high degree of competency in both standardization and localization. Management scholars Bartlett and Ghoshal identified one such organizational model they termed a "transnational organization." These organizations are highly decentralized, allowing for effective localization strategies, but they also involve a high degree of knowledge sharing throughout, allowing a company to also draw on many of the advantages of standardization.

However, a variety of corporate collapses, and the revelation of unethical and illegal practices in many international companies, has led to a focus on Corporate Governance and Ethics in the early twenty-first century. Issues of what constitutes socially responsible behavior are likely to be a major part of global strategy for the coming years. In a 2008 opinion piece, a Hewlett Packard employee also noted that business ethics were and should be a significant concern for companies with global reach. He cites the need to grow responsibly, particularly in countries that are still developing, as well as maintaining an ethical internal culture and having high standards for vendors.

SEE ALSO *International Business; International Management; Macroenvironmental Forces; Management Information Systems; Multinational Corporations; Strategic Planning Failure; Strategic Planning Tools; Strategy Formulation; Strategy Implementation; Strategy Levels; Sweatshops; Transnational Organization*

BIBLIOGRAPHY

Bartlett, C.A. and S. Ghoshal. "What is a Global Manager?" In *Annual Editions: International Business.* Dubuque, IL: Dushkin Publishers.

Feffer, J. *Power Trip: U.S. Unilateralism and Global Strategy after September 11.* New York: Seven Stories Press, 2003.

Florini, A. "Business and Global Governance." *Brookings Review,* Spring 2003, 5–8.

Friedman, Thomas. *The World Is Flat.* New York: Farrar, Straus and Giroux, 2005.

Gupta, A.K., and V. Gorindarajan. *Global Strategy and the Organization.* John Wiley & Sons Publishers, 2003.

Inkpen, Andrew C. and Kannan Ramaswamy. *Global Strategy: Creating and Sustaining Advantage Across Borders.* Oxford: Oxford University Press, 2006.

Mayer, Peter, and Robert B. Vambery. "Aligning Global Business Strategy Planning Models with Accelerating Change." *Journal of Global Business & Technology* 4, no. 1 (March 2008): 31-48.

Novia, Jack. "Global Ethics 101." *Business Week Online,* 25 June 2008. Available from: http://www.businessweek.com/technology/content/jun2008/tc20080624_622859.htm?campaign_id=rss_topStories.

Punnett, B.J. *International Perspectives on Organizational Behavior and Human Resource Management.* Armonk, NY: MESharpe Inc., 2004.

Trent, Robert J., and Robert M. Monczka, "Pursuing competitive advantage through integrated global sourcing." *Academy of Management Executive* 16, no.2 (May 2002): 66-80.

Weekes, Sue. "Internet helps to speed up global strategy." *Training Magazine,* November 2003, 13.

STRATEGY IMPLEMENTATION

One of a CEO's key roles is to communicate a vision and to guide strategic planning. Those who have successfully implemented strategic plans have often reported that involving teams at all levels in strategic planning helps to build a shared vision, and increases individuals' motivation to see plans succeed.

Clarity and consistent communication, from mapping desired outcomes to designing performance measures, are essential to success. Successful leaders have often engaged their teams by simply telling the story of their shared vision and publicly celebrating large and small wins, such as the achievement of milestones. To ensure that the vision is shared, teams need to know that they can test the theory, voice opinions, challenge premises, and suggest alternatives without fear of reprimand.

Implementing strategic plans may require leaders who lead through inspiration and coaching rather than command and control. Recognizing and rewarding success, inspiring, and modeling behaviors is more likely to result in true commitment than use of authority, which can lead to passive resistance and hidden rebellion.

IMPLEMENTING STRATEGIC PLANS

Once strategies have been agreed on, the next step is implementation; this is where most failures occur. It is not uncommon for strategic plans to be drawn up annually and to have no impact on the organization as a whole.

A common method of implementation is hoopla—a total communication effort. This can involve slogans, posters, events, memos, videos, Web sites, etc. A critical success factor is whether the entire senior team appears to buy into the strategy and models appropriate behaviors. Success appears to be more likely if the CEO, or a very visible leader, is also a champion of the strategy.

Strategic measurement can help in implementing the strategic plan. Appropriate measures show the strategy is important to the leaders, provide motivation, and allow for follow-through and sustained attention. Measures can increase the focus of the strategy, aligning the workforce around specific issues. The results can include faster changes (both in strategic implementation and in everyday work); greater accountability (since responsibilities are clarified by strategic measurement, people are naturally more accountable); and better communication of responsibilities (because the measures show what each group's primary responsibility is), which may reduce duplication of effort.

Creating a strategic map (or causal business model) helps identify focal points; showing the cause and effect linkages between key components. The map can simultaneously express both the vision and mission and the plan for achieving desired goals. If tested through statistical-linkage analysis, the map also allows the organization to leverage resources on the primary drivers of success.

The senior team can create a strategic map (or theory of the business) by identifying and mapping the critical few ingredients that will drive overall performance. This can be tested (sometimes immediately, with existing data) through a variety of statistical techniques; regression analysis is frequently used, because it is fairly robust and requires relatively small data sets.

This map can lead to an instrument panel covering a few areas that are of critical importance. The panel does not include all of the areas an organization measures, rather the few that the top team can use to guide decisions, knowing that greater detail is available if they need to drill down for more intense examination. These critical few are typically within six strategic performance areas:

financial, customer/market, operations, environment (which includes key stakeholders), people, and partners/suppliers. Each area may have three or four focal points; for example, the people category may include leadership, common values, and innovation.

Once the strategic map is defined, organizations must create measures for each focal point. The first step is to create these measures at an organizational level. Once these are defined, each functional area should identify how they contribute to the overall measures, and then define measures of their own. Ideally, this process cascades downward through the organization until each individual is linked with the strategy and understands the goals and outcomes they are responsible for and how their individual success will be measured and rewarded.

Good performance measures identify the critical focus points for an organization and reward their successful achievement. When used to guide an organization, performance measures can be a competitive advantage because they drive alignment and common purpose across an organization, focusing everyone's best efforts at the desired goal. But defining measures can be tricky. Teams must continue to ask themselves, "If we were to measure performance this way, what behavior would that motivate?" For example, if the desired outcome is world-class customer service, measuring the volume of calls handled by representatives could drive the opposite behavior.

CASCADING THE PLAN

In larger organizations, cascading the strategic plan and associated measures can be essential to everyday implementation. To a degree, hoopla, celebrations, events, and so on can drive down the message, but in many organizations, particularly those without extremely charismatic leaders, this is not sufficient.

Cascading is often where the implementation breaks down. For example, only 16 percent of the respondents in a 1999 Metrus Group survey believed that associates at all levels of their company could describe the strategy. In a 1998 national survey of Quality Progress readers, cascading was often noted as being a serious problem in implementing strategic measurement systems.

Organizations have found it to be helpful to ask each functional area to identify how they contribute to achieving the overall strategic plan ("functional area" designating whatever natural units exist in the organization—functions, geographies, business units, etc.). Armed with the strategic map, operational definitions and the overall organizational strategic performance measures, each functional area creates their own map of success and defines their own specific performance measures. They can follow the model outlined above starting with their own SWOT analysis.

For example, in the 1990s, Sears cascaded its strategic plan to all of its stores through local store strategy sessions involving all employees. The plan was shown graphically by a strategy map and reinforced through actions (such as the sale of financial businesses like Allstate). Online performance measures helped store managers to gain feedback on their own performance, and also let them share best practices with other managers.

Functional area leaders may be more successful using a cascade team to add input and take the message forward to others in the area. Developing ambassadors or process champions throughout the organization to support and promote the plan and its implementation can also enhance the chances of success. These champions may be candidates for participation on the design or cascade teams, and should be involved in the stakeholder review process.

EXTERNAL CONSULTANTS

External consultants can play an important role in building and implementing strategic plans if they are used appropriately. Rather than creating or guiding an organization's strategy, the primary role of a consultant should be that of a facilitator, a source of outside perspective, and perhaps as a resource for guiding the process itself. This allows each member of the internal team to participate fully without having to manage the agenda and keep the team focused on the task at hand. Consultants can keep the forum on track by directing the discussion to ensure objective, strategic thinking around key issues; tapping everyone's knowledge and expertise; raising pertinent questions for discussion and debate; managing conflict; and handling groupthink and other group dynamics issues.

Consultants can extract the best thinking from the group, and ensure that the vision and mission are based on a sound, critical review of the current state and anticipated future opportunities. Once this is accomplished, consultants can facilitate the identification of desired outcomes and the drivers needed to achieve them. They can also help to assure that a true consensus is actually reached, rather than an appearance of a consensus due to fear, conformity, or other group effects.

During the cascading phase, consultants can help to avoid failure by facilitating the linkage from the overarching corporate strategy, through the departmental and or functional level to the team and individual level. This is a point where turf interests can invade the thought process, coloring local measurement design to ensure local rewards. This may not align with the overall strategic intent, so care must be taken to continually link back to the over-arching vision of the organization.

Building and implementing winning strategic plans is a continuous journey, requiring routine reviews and refinement of the measures and the strategic plans themselves. By partnering with internal teams, stakeholders, and trusted external consultants, leaders can develop better strategic plans and implement them more successfully.

STRATEGY IMPLEMENTATION ISSUES

Strategy implementation almost always involves the introduction of change to an organization. Managers may spend months, even years, evaluating alternatives and selecting a strategy. Frequently this strategy is then announced to the organization with the expectation that organization members will automatically see why the alternative is the best one and will begin immediate implementation. When a strategic change is poorly introduced, managers may actually spend more time implementing changes resulting from the new strategy than was spent in selecting it. Strategy implementation involves both macro-organizational issues (e.g., technology, reward systems, decision processes, and structure), and micro-organizational issues (e.g., organization culture and resistance to change).

MACRO-ORGANIZATIONAL ISSUES OF STRATEGY IMPLEMENTATION

Macro-organizational issues are large-scale, system-wide issues that affect many people within the organization. Galbraith and Kazanjian argue that there are several major internal subsystems of the organization that must be coordinated to successfully implement a new organization strategy. These subsystems include technology, reward systems, decision processes, and structure. As with any system, the subsystems are interrelated, and changing one may impact others.

Technology can be defined as the knowledge, tools, equipment, and work methods used by an organization in providing its goods and services. The technology employed must fit the selected strategy for it to be successfully implemented. Companies planning to differentiate their product on the basis of quality must take steps to assure that the technology is in place to produce superior quality products or services. This may entail tighter quality control or state-of-the-art equipment. Firms pursuing a low-cost strategy may take steps to automate as a means of reducing labor costs. Similarly, they might use older equipment to minimize the immediate expenditure of funds for new equipment.

Reward systems or incentive plans include bonuses and other financial incentives, recognition, and other intangible rewards such as feelings of accomplishment and challenge. Reward systems can be effective tools for motivating individuals to support strategy implementation efforts. Commonly used reward systems include stock options, salary raises, promotions, praise, recognition, increased job autonomy, and awards based on successful

strategy implementation. These rewards can be made available only to managers or spread among employees throughout the organization. Profit sharing and gain sharing are sometimes used at divisional or departmental levels to more closely link the rewards to performance.

Questions and problems will undoubtedly occur as part of implementation. Decisions pertaining to resource allocations, job responsibilities, and priorities are just some of the decisions that cannot be completely planned until implementation begins. Decision processes help the organization make mid-course adjustments to keep the implementation on target.

Organizational structure is the formal pattern of interactions and coordination developed to link individuals to their jobs and jobs to departments. It also involves the interactions between individuals and departments within the organization. Current research supports the idea that strategies may be more successful when supported with structure consistent with the new strategic direction. For example, departmentalizations on the basis of customers will likely help implement the development and marketing of new products that appeal to a specific customer segment and could be particularly useful in implementing a strategy of differentiation or focus. A functional organizational structure tends to have lower overhead and allows for more efficient utilization of specialists, and might be more consistent with a low-cost strategy.

MICRO-ORGANIZATIONAL ISSUES OF STRATEGY IMPLEMENTATION

Micro-organizational issues pertain to the behavior of individuals within the organization and how individual actors in the larger organization will view strategy implementation. Implementation can be studied by looking at the impact organization culture and resistance to change has on employee acceptance and motivation to implement the new strategy.

Peters and Waterman focused attention on the role of culture in strategic management. Organizational culture is more than emotional rhetoric; the culture of an organization develops over a period of time and is influenced by the values, actions, and beliefs of individuals at all levels of the organization.

Persons involved in choosing a strategy often have access to volumes of information and research reports about the need for change in strategies. They also have time to analyze and evaluate this information. What many managers fail to realize is that the information that may make one strategic alternative an obvious choice is not readily available to the individual employees who will be involved in the day-to-day implementation of the chosen strategy. These employees are often comfortable with the old way of doing things and see no need to change. The result is that management sees the employee as resisting change.

Employees generally do not regard their response to change as either positive or negative. An employee's response to change is simply behavior that makes sense from the employee's perspective. Managers need to look beyond what they see as resistance and attempt to understand the employee's frame of reference and why they may see the change as undesirable.

FORCE FIELD ANALYSIS

One technique for evaluating forces operating in a change situation is force field analysis. This technique uses a concept from physics to examine the forces for and against change. The length of each arrow as shown in Figure 1 represents the relative strength of each force for and against change. An equilibrium point is reached when the sum of each set of forces is equal. Movement requires that forces for the change exceed forces resisting the change. Reducing resisting forces is usually seen as preferable to increasing supporting forces, as the former will likely reduce tension and the degree of conflict.

Figure 1
Forces Operating in Strategy Change

Forces for Change	Forces Resisting Change
External	**External**
Sociocultural changes →	← Prior commitments
Government regulations →	← Obligations to consumers
Competitive pressures →	← Government regulations
Internal	**Internal**
Changes in market share →	← Limited resources
Changing rates of return →	← Employee/labor relations
Production economics →	← Organization culture

This model is useful for identifying and evaluating the relative power of forces for and against change. Likewise, it is helpful in visualizing salient forces and may allow management to better assess the probable direction and speed of movement in implementing new strategies. Forces for change can come from outside the organization or from within. External forces for change may result from sociocultural factors, government regulations, international developments, technological changes, and entry or exit of competitors. Internal forces for change come from within the organization and may include changes in market share, rising production costs, changing financial conditions, new product development, and so on.

Similarly, forces resisting change may result from external or internal sources. Common external pressures opposing change are contractual commitments to other businesses (suppliers, union), obligations to customers and investors, and government regulations of the firm or industry. Internal forces resisting change are usually abundant; limited organizational resources (money, equipment, personnel) is usually one of the first reasons offered as to why change cannot be implemented. Labor agreements limit the ability of management to transfer and, sometimes, terminate employees. Organization culture may also limit the ability of a firm to change strategy.

The total elimination of resistance to change is unlikely because there will almost always remain some uncertainty associated with a change. Techniques that have the potential to reduce resistance to change when implementing new strategies include participation, education, group pressure, management support, negotiation, co-optation, and coercion.

Participation is probably the most universally recommended technique for reducing resistance to change. Allowing affected employees to participate in both the planning and implementation of change can contribute to greater identification with the need for and understanding of the goals of the new strategy. Participation in implementation also helps to counteract the disruption in communication flows, which often accompanies implementation of a change. But participation has sometimes been overused. Participation does not guarantee acceptance of the new strategy, and employees do not always want to participate. Furthermore, participation is often time consuming and can take too long when rapid change is needed.

POTENTIAL PROBLEMS AND SOLUTIONS FOR STRATEGY IMPLEMENTATION

Though strategy implementation can be important for a company, there can be a number of factors that hamper implementation. One study of strategy implementation listed six factors that could harm the process. According to Beer and Eisenstat, who term them "silent killers," these factors include: either hands-off or "top-down" management, "conflicting priorities," bad senior management, insufficient communication, and inadequate "coordination across functions." Importantly, the majority of these issues concern senior management, thus highlighting the importance of this level of an organization in strategy implementation.

A 2008 article in *Business Horizons* also highlights the perils associated with inadequate implementation. The authors point out that bad strategy implementation can lead to future faulty strategy formulation, potentially creating a vicious circle.

However, the authors of this article also identify eight "levers" of implementation. They divide these levers into two categories: structural and managerial.

The four "structural levers" are actions, programs, systems, and policies. In the case of actions, the authors stress the importance of involving all levels of the company in strategy implementation. "Programs" refers to the need to place innovation throughout a company, particularly with regards to how an organization learns. "Systems" emphasizes the importance of information technology to strategy implementation. The final structural lever, "policies," points to the need for companies to have formal policies that are in harmony with the overall strategy.

The remaining four "levers" are classified as managerial. They are: interacting, allocating, monitoring, and organizing. As this category suggests, the role of good management is essential to strategy implementation. Likewise, specific levers, such as "organizing," highlight the role of a firm's culture in strategy implementation.

Ultimately, the authors of this article intend the levers to be used as analytical tools. An organization can use these levers to identify deficient areas of an organization that might hamper strategy implementation.

ROLE OF TOP MANAGEMENT

Top management is essential to the effective implementation of strategic change. Top management provides a role model for other managers to use in assessing the salient environmental variables, their relationship to the organization, and the appropriateness of the organization's response to these variables. Top management also shapes the perceived relationships among organization components.

Top management is largely responsible for the determination of organization structure (e.g., information flow, decision-making processes, and job assignments). Management must also recognize the existing organization culture and learn to work within or change its parameters. Top management is also responsible for the design and control of the organization's reward and incentive systems.

Finally, top management is involved in the design of information systems for the organization. In this role, managers influence the environmental variables most likely to receive attention in the organization. They must also make certain that information concerning these key variables is available to affected managers. Top-level managers must also provide accurate and timely feedback concerning the organization's performance and the performance of individual business units within the organization. Organization members need information to maintain a realistic view of their performance, the performance of the organization, and the organization's relationship to the environment.

SEE ALSO *Managing Change; Strategic Planning Failure; Strategic Planning Tools; Strategy Formulation; Strategy in the Global Environment; Strategy Levels*

BIBLIOGRAPHY
Anthanassiou, N., and D. Nigh. "The Impact of U.S. Company Internationalization on Top Management Team Advice Networks." *Strategic Management Journal,* January 1999, 83–92.

Crittenden, Victoria L., and William F. Crittenden. "Building a Capable Organization: The Eight Levers of Strategy Implementation." *Business Horizons,* 51, no. 4 (July 2008): 201-309.

Galbraith, J., and R. Kazanjian. *Strategy Implementation: Structure, Systems and Process.* 2nd ed. St. Paul, MN: West, 1986.

Harris, L. "Initiating Planning: The Problem of Entrenched Cultural Values." *Long Range Planning* 32, no. 1 (1999): 117–126.

Heskitt, J.L., W.E. Sasser, Jr., and L.A. Schlesinger. *The Service Profit Chain.* New York: The Free Press, 1997.

Hillman, A., A. Zardkoohi, and L. Bierman. "Corporate Political Strategies and Firm Performance." *Strategic Management Journal,* January 1999, 67–82.

Kaplan, R.S., and D.P. Norton. *The Balanced Scorecard: Translating Strategy into Action.* Boston: The Harvard Business School Press, 1996.

Kotter, J., and L. Schlesinger. "Choosing Strategies for Change." *Harvard Business Review,* March–April 1979, 106–114.

Kouzes, J.M., and B.Z. Posner. *The Leadership Challenge: How to Keep Getting Extraordinary Things Done in Organizations.* New York: Jossey-Bass Publishers, 1995.

Lewin, K. Field. *Theory in Social Sciences.* New York: Harper & Row, 1951.

Morgan, B.S., and W.A. Schiemann. "Measuring People and Performance: Closing the Gaps." *Quality Progress* 1 (1999): 47–53.

Munk, N. "How Levi's Trashed a Great American Brand." *Fortune,* 12 April 1999, 83–90.

Peters, T., and R. Waterman. *In Search of Excellence.* New York: Harper & Row 1982.

Plenert, Gerhard, *The eManager: Value Chain Management in an eCommerce World.* Dublin, Ireland: Blackhall Publishing, 2001.

———. *International Operations Management.* Copenhagen, Denmark: Copenhagen Business School Press, 2002.

Rucci, A.J., S.P. Kirn, and R.T. Quinn. "The Employee-Customer-Profit Chain at Sears." *Harvard Business Review* 76, no. 1 (1998): 83–97.

Schiemann, W.A., and J.H. Lingle. *Bullseye: Hitting Your Strategic Targets Through Measurement.* Boston: The Free Press, 1999.

Thomas, J. "Force Field Analysis: A New Way to Evaluate Your Strategy." *Long Range Planning,* 1 December 1985, 54–59.

STRATEGY LEVELS

Although alignment of strategic initiatives is a corporate-wide effort, considering strategy in terms of levels is a convenient way to distinguish among the various responsibilities involved in strategy formulation and implementation. A convenient way to classify levels of strategy is to view corporate-level strategy as responsible for market definition, business-level strategy as responsible for market navigation, and functional-level strategy as the foundation that supports both of these (see Table 1).

CORPORATE-LEVEL STRATEGY

Corporate-level strategies address the entire strategic scope of the enterprise. This is the "big picture" view of the organization and includes deciding in which product or service markets to compete and in which geographic regions to operate. For multi-business firms, the resource allocation process—how cash, staffing, equipment and other resources are distributed—is typically established at the corporate level. In addition, because market definition is the domain of corporate-level strategists, the responsibility for diversification, or the addition of new products or services to the existing product/service line-up, also falls within the realm of corporate-level strategy. Similarly, whether to compete directly with other firms or to selectively establish cooperative relationships—strategic

Table 1

Corporate, Business, and Functional Strategy

Level of Strategy	Definition	Example
Corporate strategy	Market definition	Diversification into new product or geographic markets
Business strategy	Market navigation	Attempts to secure competitive advantage in existing product or geographic markets
Functional strategy	Support of corporate strategy and business strategy	Information systems, human resource practices, and production processes that facilitate achievement of corporate and business strategy

alliances—falls within the purview corporate-level strategy, while requiring ongoing input from business-level managers. Critical questions answered by corporate-level strategists thus include:

1. What should be the scope of operations, i.e., what businesses should the firm be in?

2. How should the firm allocate its resources among existing businesses?

3. What level of diversification should the firm pursue, i.e., which businesses represent the company's future? Are there additional businesses the firm should enter or are there businesses that should be targeted for termination or divestment?

4. How diversified should the corporation's business be? Should we pursue related diversification (i.e., similar products and service markets) or is unrelated diversification (i.e., dissimilar products and service markets) a more suitable approach given current and projected industry conditions? If we pursue related diversification, how will the firm leverage potential cross-business synergies? In other words, how will adding new product or service businesses benefit the existing product/service line-up?

5. How should the firm be structured? Where should the boundaries of the firm be drawn and how will these boundaries affect relationships across businesses, with suppliers, customers, and other constituents? Do the organizational components such as research and development, finance, marketing, customer service, etc. fit together? Are the responsibilities for each business unit clearly identified and is accountability established?

6. Should the firm enter into strategic alliances—cooperative, mutually-beneficial relationships with other firms? If so, for what reasons? If not, what impact might this have on future profitability?

As the previous questions illustrate, corporate strategies represent the long-term direction for the organization. Issues addressed as part of corporate strategy include those concerning diversification, acquisition, divestment, strategic alliances, and formulation of new business ventures. Corporate strategies deal with plans for the entire organization and change as industry and specific market conditions warrant.

Top management has primary decision-making responsibility in developing corporate strategies and these managers are directly responsible to shareholders. The role of the board of directors is to ensure that top managers actually represent these shareholder interests. With information from the corporation's multiple businesses and a view of the entire scope of operations and markets,

corporate-level strategists have the most advantageous perspective for assessing organization-wide competitive strengths and weaknesses, although as a subsequent section notes, corporate strategists are paralyzed without accurate and up-to-date information from managers at the business-level.

CORPORATE PORTFOLIO ANALYSIS

One way to think of corporate-level strategy is to compare it to an individual managing a portfolio of investments. Just as the individual investor must evaluate each individual investment in the portfolio to determine whether or not the investment is currently performing to expectations and what the future prospects are for the investment, managers must make similar decisions about the current and future performances of various businesses constituting the firm's portfolio. The Boston Consulting Group (BCG) matrix is a relatively simple technique for assessing the performance of various segments of the business.

The BCG matrix classifies business-unit performance on the basis of the unit's relative market share and the rate of market growth as shown in Figure 1. Products and their respective strategies fall into one of four quadrants. The typical starting point for a new business is as a question mark. If the product is new, it has no market share, but the predicted growth rate is good. What typically happens in an organization is that management is faced with a number of these types of products but with too few resources to develop all of them. Thus, the strategic decision-maker must determine which of the products to attempt to develop into commercially viable products and which ones to drop from consideration. Question marks are cash users in the organization. Early in their life, they contribute no revenues and require expenditures for market research, test marketing, and advertising to build consumer awareness.

If the correct decision is made and the product selected achieves a high market share, it becomes a BCG matrix star. Stars have high market share in high-growth markets. Stars generate large cash flows for the business, but also require large infusions of money to sustain their

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Figure 1

BCG Model of Portfolio Analysis

	Market Share		
	High		**Low**
High	STARS	(Cash Users)	QUESTION MARKS
Market Growth Rate			
Low	CASH COWS	(Cash Generators)	DOGS

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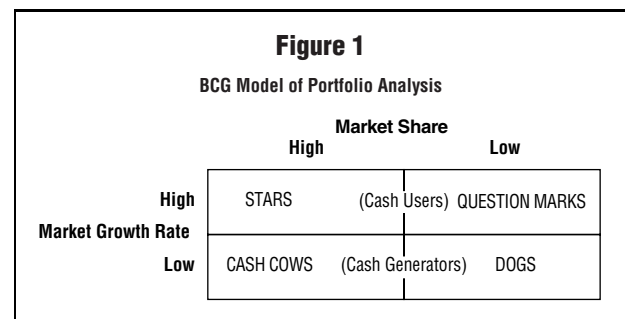
growth. Stars are often the targets of large expenditures for advertising and research and development to improve the product and to enable it to establish a dominant position in the industry.

Cash cows are business units that have high market share in a low-growth market. These are often products in the maturity stage of the product life cycle. They are usually well-established products with wide consumer acceptance, so sales revenues are usually high. The strategy for such products is to invest little money into maintaining the product and divert the large profits generated into products with more long-term earnings potential, i.e., question marks and stars.

Dogs are businesses with low market share in low-growth markets. These are often cash cows that have lost their market share or question marks the company has elected not to develop. The recommended strategy for these businesses is to dispose of them for whatever revenue they will generate and reinvest the money in more attractive businesses (question marks or stars).

Despite its simplicity, the BCG matrix suffers from limited variables on which to base resource allocation decisions among the business making up the corporate portfolio. Notice that the only two variables composing the matrix are relative market share and the rate of market growth. Now consider how many other factors contribute to business success or failure. Management talent, employee commitment, industry forces such as buyer and supplier power and the introduction of strategically-equivalent substitute products or services, changes in consumer preferences, and a host of others determine ultimate business viability. The BCG matrix is best used, then, as a beginning point, but certainly not as the final determination for resource allocation decisions as it was originally intended. Consider, for instance, Apple Computer. With a market share for its Macintosh-based computers below 10 percent in a market notoriously saturated with a number of low-cost competitors and growth rates well-below that of other technology pursuits such as biotechnology and medical device products, the BCG matrix would suggest Apple divest its computer business and focus instead on the rapidly growing iPod business (its music download business). Clearly, though, there are both technological and market synergies between Apple's Macintosh computers and its fast-growing iPod business. Divesting the computer business would likely be tantamount to destroying the iPod business.

A more stringent approach, but still one with weaknesses, is a competitive assessment. A competitive assessment is a technique for ranking an organization relative to its peers in the industry. The advantage of a competitive assessment over the BCG matrix for corporate-level strategy is that the competitive assessment includes critical

success factors, or factors that are crucial for an organizational to prevail when all organizational members are competing for the same customers. A six-step process that allows corporate strategists to define appropriate variables, rather than being locked into the market share and market growth variables of the BCG matrix, is used to develop a table that shows a business's ranking relative to the critical success factors that managers identify as the key factors influencing failure or success. These steps include:

1. Identifying key success factors. This step allows managers to select the most appropriate variables for its situation. There is no limit to the number of variables managers may select; the idea, however, is to use those that are key in determining competitive strength.

2. Weighing the importance of key success factors. Weighting can be on a scale of 1 to 5, 1 to 7, or 1 to 10, or whatever scale managers believe is appropriate. The main thing is to maintain consistency across organizations. This step brings an element of realism to the analysis by recognizing that not all critical success factors are equally important. Depending on industry conditions, successful advertising campaigns may, for example, be weighted more heavily than after-sale product support.

3. Identifying main industry rivals. This step helps managers focus on one of the most common external threats; competitors who want the organization's market share.

4. Managers rating their organization against competitors.

5. Multiplying the weighted importance by the key success factor rating.

6. Adding the values. The sum of the values for a manager's organization versus competitors gives a rough idea if the manager's firm is ahead or behind the competition on weighted key success factors that are critical for market success.

A competitive strength assessment is superior to a BCG matrix because it adds more variables to the mix. In addition, these variables are weighted in importance in contrast to the BCG matrix's equal weighting of market share and market growth. Regardless of these advantages, competitive strength assessments are still limited by the type of data they provide. When the values are summed in step six, each organization has a number assigned to it. This number is compared against other firms to determine which is competitively the strongest. One weakness is that these data are ordinal: they can be ranked, but the differences among them are not meaningful. A firm with a

score of four is not twice as good as one with a score of two, but it is better. The degree of "betterness," however, is not known.

CORPORATE GRAND STRATEGIES

As the previous discussion implies, corporate-level strategists have a tremendous amount of both latitude and responsibility. The myriad decisions required of these managers can be overwhelming considering the potential consequences of incorrect decisions. One way to deal with this complexity is through categorization; one categorization scheme is to classify corporate-level strategy decisions into three different types, or grand strategies. These grand strategies involve efforts to expand business operations (growth strategies), decrease the scope of business operations (retrenchment strategies), or maintain the status quo (stability strategies).

Growth Strategies. Growth strategies are designed to expand an organization's performance, usually as measured by sales, profits, product mix, market coverage, market share, or other accounting and market-based variables. Typical growth strategies involve one or more of the following:

1. With a concentration strategy the firm attempts to achieve greater market penetration by becoming highly efficient at servicing its market with a limited product line. McDonald's in the fast food industry is a good example of this strategy; as of 2007, McDonald's held 19 percent of the fast food market, the largest share and nearly double its nearest competitor.

2. By using a vertical integration strategy, the firm attempts to expand the scope of its current operations by undertaking business activities formerly performed by one of its suppliers (backward integration) or by undertaking business activities performed by a business in its channel of distribution (forward integration). Although this can be an expensive strategy to pursue, corporations often look for opportunities to vertically integrate. For example, in 2008, Apple took a step toward vertical integration by acquiring a chip-designing company, leading some industry analysts to predict that the computer industry as a whole would be heading back toward a greater use of the vertical integration strategy.

3. A diversification strategy entails moving into different markets or adding different products to its mix. If the products or markets are related to existing product or service offerings, the strategy is called concentric diversification. If expansion is into products or services unrelated to the firm's existing business, the diversification is called conglomerate diversification. The Novartis pharmaceutical company's 2008

acquisition of ophthalmology company Alcon for $39 billion represented a diversification strategy by a company facing increasing competition from generic brands in its core business.

Stability Strategies. When firms are satisfied with their current rate of growth and profits, they may decide to use a stability strategy. This strategy is essentially a continuation of existing strategies. Such strategies are typically found in industries having relatively stable environments. The firm is often making a comfortable income operating a business that they know, and see no need to make the psychological and financial investment that would be required to undertake a growth strategy.

Retrenchment Strategies. Retrenchment strategies involve a reduction in the scope of a corporation's activities, which also generally necessitates a reduction in number of employees, sale of assets associated with discontinued product or service lines, possible restructuring of debt through bankruptcy proceedings, and in the most extreme cases, liquidation of the firm.

- Firms pursue a turnaround strategy by undertaking a temporary reduction in operations in an effort to make the business stronger and more viable in the future. These moves are popularly called downsizing or rightsizing. The hope is that going through a temporary belt-tightening will allow the firm to pursue a growth strategy at some future point.

- A divestment decision occurs when a firm elects to sell one or more of the businesses in its corporate portfolio. Typically, a poorly performing unit is sold to another company and the money is reinvested in another business within the portfolio that has greater potential.

- Bankruptcy involves legal protection against creditors or others allowing the firm to restructure its debt obligations or other payments, typically in a way that temporarily increases cash flow. Such restructuring allows the firm time to attempt a turnaround strategy. For example, since the airline hijackings and the subsequent tragic events of September 11, 2001, a number of major U.S. airlines filed for bankruptcy to avoid liquidation as a result of stymied demand for air travel. The 2008 fuel-price crisis, with fuel prices going up 74 percent in one year, led to another round of bankruptcy filings in the airline industry, with Frontier Airlines, ATA Airlines, Skybus Airlines, and Aloha Airlines all filing for bankruptcy within a few weeks of each other. Major airlines, such as American and Delta, were also teetering on the edge of bankruptcy. Nearly all of the major airlines have gone through at least one bankruptcy proceeding to

help them adjust to changing conditions in the industry.

- Liquidation is the most extreme form of retrenchment. Liquidation involves the selling or closing of the entire operation. There is no future for the firm; employees are released, buildings and equipment are sold, and customers no longer have access to the product or service. This is a strategy of last resort and one that most managers work hard to avoid.

BUSINESS-LEVEL STRATEGIES

Business-level strategies are similar to corporate-strategies in that they focus on overall performance. In contrast to corporate-level strategy, however, they focus on only one rather than a portfolio of businesses. Business units represent individual entities oriented toward a particular industry, product, or market. In large multi-product or multi-industry organizations, individual business units may be combined to form strategic business units (SBUs). An SBU represents a group of related business divisions, each responsible to corporate headquarters for its own profits and losses. Each strategic business unit will likely have its own competitors and its own unique strategy. A common focus of business-level strategies are sometimes on a particular product or service line and business-level strategies commonly involve decisions regarding individual products within this product or service line. There are also strategies regarding relationships between products. One product may contribute to corporate-level strategy by generating a large positive cash flow for new product development, while another product uses the cash to increase sales and expand market share of existing businesses. Given this potential for business-level strategies to impact other business-level strategies, business-level managers must provide ongoing, intensive information to corporate-level managers. Without such crucial information, corporate-level managers are prevented from best managing overall organizational direction. Business-level strategies are thus primarily concerned with:

1. Coordinating and integrating unit activities so they conform to organizational strategies (achieving synergy).

2. Developing distinctive competencies and competitive advantage in each unit.

3. Identifying product or service-market niches and developing strategies for competing in each.

4. Monitoring product or service markets so that strategies conform to the needs of the markets at the current stage of evolution.

In a single-product company, corporate-level and business-level strategies are the same. For example, a furniture manufacturer producing only one line of furniture has its corporate strategy chosen by its market definition, wholesale furniture, but its business is still the same, wholesale furniture. Thus, in single-business organizations, corporate and business-level strategies overlap to the point that they should be treated as one united strategy. The product made by a unit of a diversified company would face many of the same challenges and opportunities faced by a one-product company. However, for most organizations, business-unit strategies are designed to support corporate strategies. Business-level strategies look at the product's life cycle, competitive environment, and competitive advantage much like corporate-level strategies, except the focus for business-level strategies is on the product or service, not on the corporate portfolio.

Business-level strategies thus support corporate-level strategies. Corporate-level strategies attempt to maximize the wealth of shareholders through profitability of the overall corporate portfolio, but business-level strategies are concerned with (1) matching their activities with the overall goals of corporate-level strategy while simultaneously (2) navigating the markets in which they compete in such a way that they have a financial or market edge-a competitive advantage-relative to the other businesses in their industry.

PORTER'S GENERIC STRATEGIES.

Harvard Business School's Michael Porter developed a framework of generic strategies that can be applied to strategies for various products and services, or the individual business-level strategies within a corporate portfolio. The strategies are (1) overall cost leadership, (2) differentiation, and (3) focus on a particular market niche. The generic strategies provide direction for business units in designing incentive systems, control procedures, operations, and interactions with suppliers and buyers, and with making other product decisions.

Cost-leadership strategies require firms to develop policies aimed at becoming and remaining the lowest cost producer and/or distributor in the industry. Note here that the focus is on cost leadership, not price leadership. This may at first appear to be only a semantic difference, but consider how this fine-grained definition places emphasis on controlling costs while giving firms alternatives when it comes to pricing (thus ultimately influencing total revenues). A firm with a cost advantage may price at or near competitors' prices, but with a lower cost of production and sales, more of the price contributes to the firm's gross profit margin. A second alternative is to price lower than competitors and accept slimmer gross profit margins, with the goal of gaining market share and thus increasing sales volume to offset the decrease in gross margin. Such strategies concentrate on construction of

efficient-scale facilities, tight cost and overhead control, avoidance of marginal customer accounts that cost more to maintain than they offer in profits, minimization of operating expenses, reduction of input costs, tight control of labor costs, and lower distribution costs. The low-cost leader gains competitive advantage by getting its costs of production or distribution lower than the costs of the other firms in its relevant market. This strategy is especially important for firms selling unbranded products viewed as commodities, such as beef or steel.

Cost leadership provides firms above-average returns even with strong competitive pressures. Lower costs allow the firm to earn profits after competitors have reduced their profit margin to zero. Low-cost production further limits pressures from customers to lower price, as the customers are unable to purchase cheaper from a competitor. Cost leadership may be attained via a number of techniques. Products can be designed to simplify manufacturing. A large market share combined with concentrating selling efforts on large customers may contribute to reduced costs. Extensive investment in state-of-the-art facilities may also lead to long run cost reductions. Companies that successfully use this strategy tend to be highly centralized in their structure. They place heavy emphasis on quantitative standards and measuring performance toward goal accomplishment.

Efficiencies that allow a firm to be the cost leader also allow it to compete effectively with both existing competitors and potential new entrants. Finally, low costs reduce the likely impact of substitutes. Substitutes are more likely to replace products of the more expensive producers first, before significantly harming sales of the cost leader unless producers of substitutes can simultaneously develop a substitute product or service at a lower cost than competitors. In many instances, the necessity to climb up the experience curve inhibits a new entrants ability to pursue this tactic.

Differentiation strategies require a firm to create something about its product that is perceived as unique within its market. Whether the features are real, or just in the mind of the customer, customers must perceive the product as having desirable features not commonly found in competing products. The customers also must be relatively price-insensitive. Adding product features means that the production or distribution costs of a differentiated product will be somewhat higher than the price of a generic, non-differentiated product. Customers must be willing to pay more than the marginal cost of adding the differentiating feature if a differentiation strategy is to succeed.

Differentiation may be attained through many features that make the product or service appear unique. Possible strategies for achieving differentiation may include warranty

(Sears tools have lifetime guarantee against breakage), brand image (Coach handbags, Tommy Hilfiger sportswear), technology (Hewlett-Packard laser printers), features (Jenn-Air ranges, Whirlpool appliances), service (Makita hand tools), and dealer network (Caterpillar construction equipment), among other dimensions. Differentiation does not allow a firm to ignore costs; it makes a firm's products less susceptible to cost pressures from competitors because customers see the product as unique and are willing to pay extra to have the product with the desirable features.

Differentiation often forces a firm to accept higher costs in order to make a product or service appear unique. The uniqueness can be achieved through real product features or advertising that causes the customer to perceive that the product is unique. Whether the difference is achieved through adding more vegetables to the soup or effective advertising, costs for the differentiated product will be higher than for non-differentiated products. Thus, firms must remain sensitive to cost differences. They must carefully monitor the incremental costs of differentiating their product and make certain the difference is reflected in the price.

Focus, the third generic strategy, involves concentrating on a particular customer, product line, geographical area, channel of distribution, stage in the production process, or market niche. The underlying premise of the focus strategy is that the firm is better able to serve its limited segment than competitors serving a broader range of customers. Firms using a focus strategy simply apply a cost-leader or differentiation strategy to a segment of the larger market. Firms may thus be able to differentiate themselves based on meeting customer needs through differentiation or through low costs and competitive pricing for specialty goods.

A focus strategy is often appropriate for small, aggressive businesses that do not have the ability or resources to engage in a nation-wide marketing effort. Such a strategy may also be appropriate if the target market is too small to support a large-scale operation. Many firms start small and expand into a national organization. Wal-Mart started in small towns in the South and Midwest. As the firm gained in market knowledge and acceptance, it was able to expand throughout the South, then nationally, and now internationally. The company started with a focused cost-leader strategy in its limited market and was able to expand beyond its initial market segment.

Firms utilizing a focus strategy may also be better able to tailor advertising and promotional efforts to a particular market niche. Many automobile dealers advertise that they are the largest-volume dealer for a specific geographic area. Other dealers advertise that they have the highest customer-satisfaction scores or the most awards

for their service department of any dealer within their defined market. Similarly, firms may be able to design products specifically for a customer. Customization may range from individually designing a product for a customer to allowing the customer input into the finished product. Tailor-made clothing and custom-built houses include the customer in all aspects of production from product design to final acceptance. Key decisions are made with customer input. Providing such individualized attention to customers may not be feasible for firms with an industry-wide orientation.

FUNCTIONAL-LEVEL STRATEGIES.

Functional-level strategies are concerned with coordinating the functional areas of the organization (marketing, finance, human resources, production, research and development, etc.) so that each functional area upholds and contributes to individual business-level strategies and the overall corporate-level strategy. This involves coordinating the various functions and operations needed to design, manufacturer, deliver, and support the product or service of each business within the corporate portfolio. Functional strategies are primarily concerned with:

- Efficiently utilizing specialists within the functional area.

- Integrating activities within the functional area (e.g., coordinating advertising, promotion, and marketing research in marketing; or purchasing, inventory control, and shipping in production/operations).

- Assuring that functional strategies mesh with business-level strategies and the overall corporate-level strategy.

Functional strategies are frequently concerned with appropriate timing. For example, advertising for a new product could be expected to begin sixty days prior to shipment of the first product. Production could then start thirty days before shipping begins. Raw materials, for instance, may require that orders are placed at least two weeks before production is to start. Thus, functional strategies have a shorter time orientation than either business-level or corporate-level strategies. Accountability is also easiest to establish with functional strategies because results of actions occur sooner and are more easily attributed to the function than is possible at other levels of strategy. Lower-level managers are most directly involved with the implementation of functional strategies.

Strategies for an organization may be categorized by the level of the organization addressed by the strategy. Corporate-level strategies involve top management and address issues of concern to the entire organization. Business-level strategies deal with major business units or divisions of the corporate portfolio. Business-level strategies are generally developed by upper- and middle-level managers and are intended to help the organization achieve its corporate strategies. Functional strategies address problems commonly faced by lower-level managers and deal with strategies for the major organizational functions (e.g., marketing, finance, production) considered relevant for achieving the business strategies and supporting the corporate-level strategy. Market definition is thus the domain of corporate-level strategy, market navigation the domain of business-level strategy, and support of business and corporate-level strategy by individual, but integrated, functional level strategies.

SEE ALSO *Generic Competitive Strategies; Porter's Five-Forces Model; Strategic Planning Failure; Strategic Planning Tools; Strategy Formulation; Strategy Implementation; Strategy in the Global Environment*

BIBLIOGRAPHY
———. *Competitive Strategy: Techniques for Analyzing Industries and Companies.* New York: Free Press, 1998.
D'Aveni, Richard A. "Corporate Spheres of Influence." *MIT Sloan Management Review* 45: 38–46.
de Wit, Bob, and Ron Meyer. *Strategy: Process, Content, Context.* 3rd ed. London: Thomson Learning, 2004.
Deephouse, D. "To Be Different, or to Be the Same? It's a Question (and Theory) of Strategic Balance." *Strategic Management Journal* 20 (1999): 147–166.
Digman, Lester A. *Strategic Management: Competing in the Global Information Age.* 8th ed. Mason, OH: Thomson Custom Publishing, 2005.
Dyer, J.H., P. Kale, and H. Singh. "When to Ally and When to Acquire." *Harvard Business Review* 82 (2004): 108–116.
Hambrick, D., I. MacMillan, and D. Day. "Strategic Attributes and Performance in the BCG Matrix." *Academy of Management Journal* (1982): 500–509.
Kroll, M., P. Wright, and R. Heiens. "The Contribution of Product Quality to Competitive Advantage: Impacts on Systematic Variance and Unexplained Variance in Returns." *Strategic Management Journal* 20 (1999): 375–384.
Lynch, Richard. *Corporate Strategy.* 4th ed. Harlow: Prentice Hall, 2006.
Mitra, Sramana. "The Coming Convergence." *Forbes,* 25 April 2008. Available from: http://www.forbes.com/technology/2008/04/24/mitra-apple-pasemi-tech-enter-cx_sm_0425mitra.html.
Porter, M. *Competitive Advantage: Creating and Sustaining Superior Performance.* New York: Free Press, 1998.

STRESS

As the pace at which our society operates increases, the pressures for every member of society to keep up with this pace also increase. Many of these pressures affect people through their jobs. Stress has become the "buzzword" that many people use to describe the impact that these

pressures cause. In the short-term, stress can enable individuals to meet high levels of demand or pending deadlines. Prolonged stress, however, has been shown to cause illness and other conditions that can have detrimental effects on an employer's workforce.

STRESS IN ORGANIZATIONS

Leon Warshaw noted in his 1979 book on dealing with stress in the workplace: "Stress affects personality, modifying our perceptions, feelings, attitudes and behavior. And it reaches beyond its immediate victims to affect the political, social and work organizations whose activities they direct and carry out." In other words, the increasing rate of stress at work has wide-ranging effects—absenteeism, impaired teamwork, workplace violence, decreased efficiency, increased rates of physical and mental illness, employee burnout, risk of discrimination, and growth in early retirement.

This phenomenon has only increased in intensity and societal concern over the past three decades. The American Psychological Association (APA) reported in October 2007 that one-third of Americans are living with extreme stress; work was the most commonly cited source of stress at 74 percent, a drastic increase from 59 percent the previous year. It has been widely noted that workplace stress can exact a high toll on businesses. A 2007 report by the British Health and Safety Commission concluded that in 2006, work-related stress had cost Great Britain over of £530 million.

In his 2004 article "Workplace Stress Sucks $300 Billion Annually from Corporate Profits," Ron Ball cites a recent study by Ravi Tangi that establishes a formula for measuring the "hard costs" of stress on business as whole. This formula quantified stress as causing the following:

- 19 percent of absenteeism
- 40 percent of turnover
- 55 percent of employee assistance programs
- 30 percent of short- and long-term disability
- 10 percent of drug plan costs
- 60 percent of total workplace accidents

There are many factors that contribute to making a workplace stressful. Research clearly indicates that certain jobs are more stressful than others. For example, people who work as police officers, fire fighters, air traffic controllers, and elected officials are exposed to higher levels of stress than people who work as janitors, florists, medical records technicians, forklift operators, librarians, and musical instrument repairers. The factors that contribute to making some jobs more stressful include: level of decision making required; level of monitoring workers must endure; unpleasant or dangerous physical or emotional conditions; repeated exchange of information with

Exhibit 1
The Effects of Stress

Figure 1

"Hard Costs" of Stress

| Absenteeism 19% | Turnover 40% | Employee Assistance Programs 55% | Short- and Long-Term Disability 30% | Drug Plan Costs 10% | Total Workplace Accidents 60% |
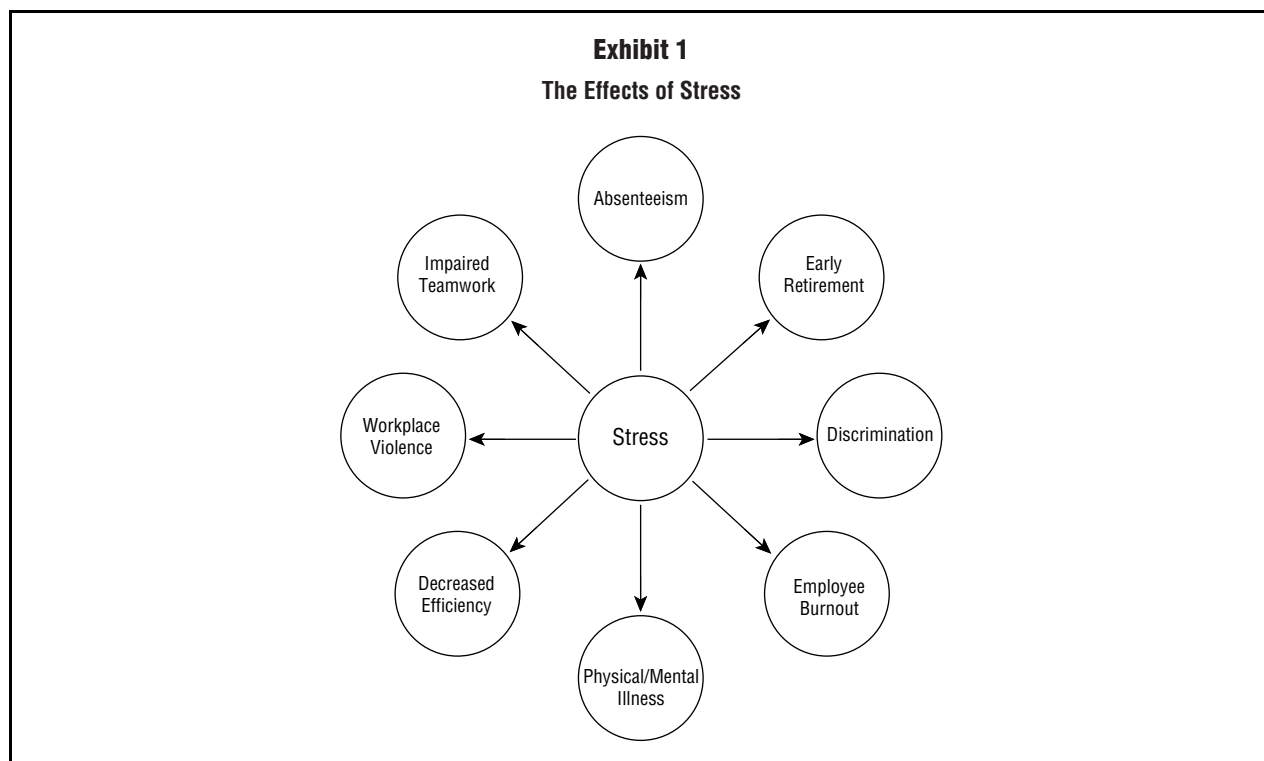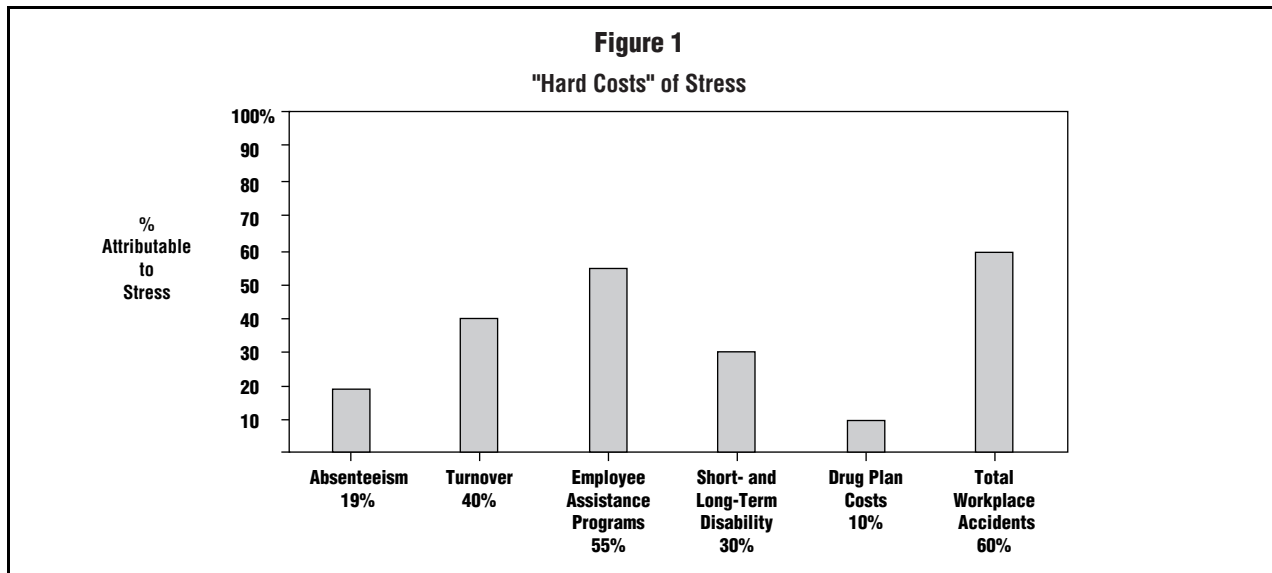
others; and whether job tasks are generally structured or unstructured.

Understanding the factors that contribute to creating stress in the workplace can help employers begin to manage stress among the workforce. The rest of this section will describe some of the detrimental effects of stress on the workplace and offer potential solutions for employers to minimize the potential harm to employees and to the work environment as a whole.

CONTROLLING ABSENCES

In increasing numbers, employees are calling in "sick" when they are really suffering from stress. A 2005 survey reported in the Silicon Valley/San Jose Business Journal found that only 38 percent of the employees who called in sick were actually suffering from a physical illness. The other 62 percent of these workers who failed to show up were dealing with stress, family issues, morale issues, motivational issues, etc. These results indicate a need for employers to implement some type of absence control measures.

Research from a wide range of organizations from around the world indicates that about 5 percent of the workforce accounts for about one-third of the absences, or lost days of work. This same research indicates that younger workers often have more absence patterns than older workers. Also, workers with the best attendance records are not always the healthiest or most fit employees. In many instances, the workers with poor attendance records demonstrate poor irregular attendance problems at previous jobs, and within the first six months of any new job. Therefore, employers must take note of attendance patterns of prospective workers (when available) and

pay close attention to attendance issues during probationary periods for new hires. Second, employers must set clear rules for attendance at work and identify disciplinary rules that will be enforced if workers fail to comply with the attendance rules. Supervisors must be adequately trained to set these rules and enforce them for the employer. Further, the employer could examine monthly or quarterly budget reports that review the absenteeism statistics for each department of the company. If there is one department that seems to be experiencing higher-than-normal rates of absenteeism, it could be indicative of stress or morale problems that the employer may need to address.

TEAMWORK ISSUES

Traditional research has taught us that teamwork in the workplace is generally desirable and tends to produce positive results. It is important to note, however, that many workplace teams fail to produce positive results because people often prefer to work with other people who are similar to them. These teams are often comprised of workers who come from diverse backgrounds, and they bring their own biases and cultural perceptions to the team dynamic. On some teams, this diversity can add richness and depth, and on other teams, this diversity facilitates the creation of barriers between team members. Employers can avoid breakdowns in teams by assigning manageable tasks to teams and setting reasonable deadlines for completion of these tasks. Also, employers should clearly define the charge and expectations for the team project and how it should undertake its mission. The less time teams have to get mired down in harmful in-fighting, the greater the chance of success.

WORKPLACE VIOLENCE

The following scenario is becoming increasingly typical: In December 2000, Michael McDermott, a software engineer at Edgewater Technology, selects and shoots co-workers in his Wakefield, Massachusetts, office. Seven people die. Employers at the Internet solution provider had recently told McDermott that wages would be garnished from his paycheck to pay the IRS for back taxes.

Because of their increasing frequency, violent acts are now considered a major workplace safety and health threat. A 1999 study by Yale University's School of Management, which surveyed workers throughout the country asked, "How often are you angry at work?" and more than 20 percent of respondents answered, "All the time." That seed of dissatisfaction often grows as time passes. The Occupational Safety and Health Administration estimates that two million workers are victims of violent workplace acts each year. Additionally, the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries reported that the U.S. had 564 workplace homicides in 2005, making homicide the fourth-leading cause of workplace fatalities. Such alarming statistics led many organizations to initiate programs aimed at reducing workplace violence. To a certain extent, these programs have succeeded. The BLS reported in 2006 that workplace homicides had decreased 9 percent to 516 and that the 2006 figure was the lowest annual homicide total reported since the BLS began keeping count in 1992.

Organizational interventions aimed at preventing workplace violence satisfy employers' moral and ethical obligations to provide their employees with safe work environments. Moreover, such interventions also help companies reduce their costs and comply with the law. Workplace violence can cost employers large sums of money. Employers must pay for victims' medical and psychiatric care, repairs and clean-up, insurance rate hikes, and increased security measures. Additional costs are incurred as the result of absenteeism, as the average victim misses 3.5 days of work following an incident.

Employers must also be concerned about workplace violence for legal reasons. The General Duty Clause of the Occupational Safety and Health Act states that employers can be cited for a violation if there is a recognized danger of workplace violence in their establishment, and they do nothing to prevent it. In addition to being fined by OSHA, employers can also be sued by victims of violence. The legal test for determining employer liability for violent acts committed by non-employees is as follows. The employer is liable if:

- It knew or should have known that a criminal act was probable (e.g., it was warned about threats made to an employee).

- It could have reasonably protected the employee from criminal assault, but failed to do so.

- Its failure to protect the employee caused the subsequent injuries to occur (in other words, had the employer done its part, the injury would not have happened).

A similar legal test is used to determine employer liability for violent acts committed by employees. An employer is liable for negligent hiring if it knew or should have known of the applicant's violent tendencies, yet decided to hire that person anyway. In a similar vein, successful negligent retention suits can be filed when an employer retains a current employee despite knowledge of violent tendencies. Employers are liable in these situations if they had (or should have had) information signaling the danger of future violent acts, yet ignored this danger.

So what can a company do to minimize the occurrences of violent acts? In 2002, OSHA issued a set of guidelines listing some of the security measures that can be implemented to reduce the threat of violence. These measures include:

- Provide improved lighting and employee escort services to and from parking lots.

- Ensure reception areas can be locked when no one is on duty.

- Create a policy stipulating that there are always at least two people on duty.

- Provide security systems, such as electronic access control systems, silent alarms, metal detectors, and video cameras.

- Establish policies regarding visitor access (sign-in, identification badges).

- Equip field staff with cellular phones.

- Install curved mirrors at hallway intersections or concealed areas as well as bullet-proof glass.

- Provide safety education for employees, so they know what conduct is unacceptable and what to do if they witness or are subjected to workplace violence.

- Provide drop safes to limit the amount of cash on hand.

- Instruct employees not to enter any location where they feel unsafe.

An employer should consider these measures in light of the level of risk at a particular worksite. For example, metal detectors and bullet-proof glass would be appropriate for inner-city emergency departments, abortion clinics, and psychiatric facilities where violence is highest. In addition to implementing OSHA recommendations, an

employer can further minimize violent acts through the use of pre-employment screening, strict anti-violence and anti-drug/alcohol policies, and training. All workers should be taught how to recognize early signs of a troubled or potentially violent person and how to respond to such persons. Managers should be further trained on how to properly handle terminations since such acts often trigger violence.

DECREASED EFFICIENCY AND INCREASED RATES OF PHYSICAL AND MENTAL ILLNESS

Excessive amounts of stress can have debilitating health effects, such as ulcers, colitis, hypertension, headaches, lower back pain, carpal tunnel syndrome, and cardiac conditions. Stressed workers may perform poorly, quit their jobs, suffer low morale, generate conflicts among coworkers, miss work, or exhibit indifference toward coworkers and customers. These stress-induced outcomes now cost U.S. businesses somewhere between $200 and $500 billion per year.

Stress can sometimes cause workers to turn to drugs and alcohol. The use of drugs and alcohol is pervasive in the United States. For instance, nearly 10 percent of all full-time employees use illicit drugs (primarily marijuana and cocaine), and another 10 percent are alcoholics. An increasing number of U.S. workers are taking some type of stimulant—beyond caffeine. A 1999 Drug Enforcement Agency survey estimated that at least 15 percent of U.S. adults had tried methamphetamines. Substance abuse costs U.S. employers an estimated $75 billion a year in terms of lost productivity, accidents, workers' compensation, health insurance claims, and theft of company property.

While most organizations are taking steps to keep their workplaces drug-free voluntarily, government contractors are required to take such steps. The 1988 Drug-Free Workplace Act states that government contractors must ensure a drug-free workplace by notifying employees about the following:

- The dangers of drug abuse in the workplace

- Its policy of maintaining a drug-free workplace

- Any available drug counseling, rehabilitation, and employee assistance programs

- The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace

Employers can combat substance abuse at the workplace by screening out applicants and discharging employees who have been identified as substance abusers. Substance abuse is most commonly detected through urine and blood tests. About two-thirds of all corporations presently require drug testing of current or future employees. Supervisors can also detect substance abuse by observing their employees' behavior. Some of the symptoms to look for are mood swings, slurred speech, flushed cheeks, frequent absences on Mondays and Fridays, missing deadlines, and overreacting to criticism.

Detecting substance abuse early can be quite useful to a company, as illustrated by the findings of a U.S. Postal Service study. The Postal Service tested 5,465 applicants for drugs, but did not use these results in hiring decisions. About 4,000 of these applicants were eventually hired. In a three-year follow-up, employees who tested positive had a 66 percent higher absenteeism rate and a 77 percent greater termination rate than those testing negative. The Postal Service now estimates that had it not hired the drug-positive group, it could have saved $150 million in absenteeism, rehiring, retraining, and injury compensation costs.

When dealing with current employees with drug problems, some employers take a rehabilitative approach: they help abusers overcome their problem through remedial counseling. Employee assistance programs (EAPs) employ mental health professionals (usually on a contract basis) to provide services to workers who are experiencing substance abuse or other personal problems. For example, the EAP at the Chase Manhattan Bank helps employees resolve problems of drug or alcohol abuse, child care, elder care, marital or family relationship concerns, emotional distress, anxiety, depression, or financial difficulties. Employees may seek help on a voluntary, confidential basis, or may be referred by a supervisor who suspects that the employee's declining job performance is being caused by personal problems.

Many companies currently use EAPs. The potential payoff of an EAP is evidenced by a study that found that every dollar spent on an EAP returned an estimated $3 to $5 in lower absenteeism and greater productivity.

Employers must develop written substance abuse policies that specify their approach to handling these problems. The policy should specify the prohibited behaviors and note the consequences employees will face if they break the rules. Such policies serve two purposes: (1) to act as a deterrent and (2) to establish a sound legal basis for taking punitive action (e.g., suspension or discharge).

EMPLOYEE WELLNESS

Employee wellness is a relatively new human resource management focus that seeks to eliminate certain debilitating health problems (e.g., cancer, heart disease, respiratory problems, hypertension) that can be caused by a person's poor lifestyle choices (e.g., smoking, poor nutrition, lack of exercise, obesity). Such health problems have become quite prevalent: cancer, heart, and respiratory

illnesses alone account for 61 percent of all hospital claims. These ailments can cause workplace problems such as absenteeism, turnover, lost productivity, and increased medical costs. For instance, people who have high blood pressure are 70 percent more likely than others to have medical claims of more than $5,750 per year, and the cost of medical claims for smokers is 22 percent higher than it is for nonsmokers.

Many organizations attempt to help employees improve or maintain their overall health by offering them employee wellness programs. Such programs provide employees with physical fitness facilities, on-site health screening, and programs to help them quit smoking, manage stress, and improve nutritional habits. Employee wellness programs can be quite effective. Research indicates that participation in a wellness program reduces both absenteeism and turnover, and increases productivity. A study conducted at Mesa Petroleum, for example, found that the productivity difference between participants and non-participants amounted to $700,000 in the first year, and $1.3 million in the second year.

If they are to work, wellness programs must successfully enlist "high-risk" individuals—those in greatest need of the program. Unfortunately, most employees who participate in wellness programs are those who fall into a low-risk category. Because at-risk individuals do not seek help, many employee wellness programs fail to meet their objectives. Employers must, then, find some way to motivate high-risk individuals to participate. Some companies offer positive inducements (e.g., cash bonuses) to individuals who participate; other companies focus their efforts on non-participants by imposing certain penalties. For example, they may increase insurance premium contributions of non-participants or raise their deductible levels.

Companies can help eliminate, or at least minimize, job stress. A firm can eliminate many sources of employee stress by implementing effective HRM practices. For instance, the implementation of effective selection and training procedures can help ensure that workers are properly suited to the demands of their jobs. Providing clearly written job descriptions can reduce worker uncertainty regarding job responsibilities. The use of effective performance appraisal systems can relieve stress by clarifying performance expectations. And the implementation of effective pay-for-performance programs can relieve stress by reducing worker uncertainty regarding rewards.

Unfortunately, companies cannot always eliminate all sources of job stress; some stress may be inherent in the job. For instance, some jobs are dangerous (e.g., logging, police work, firefighting), and some place the worker in demanding interpersonal situations (e.g., customer relations specialists). When job stresses cannot be relieved,

the worker must learn to cope with them. A firm can help by offering employees stress counseling or by providing them the opportunity to "work off" their stress through physical exercise. Some of the organizational interventions described earlier, such as the use of EAPs and wellness programs, can be helpful in this regard.

SEE ALSO *Employee Assistance Programs; Human Resource Management*

BIBLIOGRAPHY
Asworth, Susan. "Low Morale, Other Issues Push Absences to Five-Year High." *Silicon Valley/San Jose Business Journal,* 4 March 2005.

Ball, Ron. "Workplace Stress Sucks $300 Billion Annually From Corporate Profits." *Customer Inter@ction Solutions* 23, no. 5 (November 2004): 62.

Barling, Julian, E. Kevin Kalloway, and Michael Robert Frone. *Handbook of Work Stress.* Thousand Oaks, CA: Sage Publications, 2005.

Cooper, Cary L., and Roy Payne. *Stress at Work.* John Wiley & Sons, 1978.

Frost, Peter J., Walter R. Nord, and Linda A. Krefting. *HRM Reality: Putting Competence in Context.* Prentice Hall, Upper Saddle River, New Jersey, 2002.

Gunch, D. "Employees Exercise to Prevent Injuries." *Personnel Journal,* July 1993, 58—62.

Health and Safety Commission. "Workplace stress costs Great Britain in excess of £530 million." Available from: http://www.hse.gov.uk/press/2007/c07021.htm.

Jex, Steve M. *Stress and Job Performance: Theory, Research and Implications for Managerial Practice.* SAGE Publications, 1998.

Kleiman, L.S. *Human Resource Management: A Tool for Competitive Advantage.* 4th ed. Cincinnati: South-Western College Publishing, 2006.

Newell, Sue. *Creating the Healthy Organization: Well-Being, Diversity and Ethics at Work.* Thomson Learning, Cincinnati, 2002.

U.S. Occupational Safety and Health Administration. "Workplace Violence." Available from: http://www.osha.gov/SLTC/workplaceviolence/index.html.

Warshaw, Leon J. *Managing Stress: Addison-Wesley Series on Occupational Stress.* Reading, MA: 1979.

SUBJECT MATTER EXPERTS

A subject matter expert (SME) is a highly knowledgeable individual who performs specialized functions in given organizational processes. SMEs work either as external consultants or internal staff, and they provide technical advice on process designs and product specifications that organizations must adopt to maximize returns on investments. SME practice spans across different fields of professions such as education, human resource management, law, engineering, accounting, military, public relations,

marketing, information technology, sales, health, mining, architecture, and fashion.

A LONG LINE OF EXPERTS

SME practice has a long history that can be traced back to great philosophers such as Socrates (469–399 B.C.E.), Plato (429–347 B.C.E.), and Aristotle (384–322 B.C.E.), who offered some of the earliest authoritative views in their fields of specialization. The subject also received immense contributions from twentieth-century behavioral theorists such as Edward Thorndike (1874–1949) and B.F. Skinner (1904–1990), whose works bear impact on the instructional framework and learning processes that organizations adopt to implement SME practices. During the First World War (1914–1918) and Second World War (1939–1945), SMEs were widely used in the development of military strategy and equipment such as air and sea navigation devices. In the field of administration and management, SME practice was perfected by leading contemporary management theorists such as Henry Fayol (1841–1925) and Douglas McGregor (1906–1964), who proposed management models that are widely practiced in organizations throughout the world.

Modern management practices rely heavily on the services of SMEs in research and development processes as well as in routine organizational operations to achieve greater productivity and efficiency. Some of the roles that SMEs play in organizational business processes include:

- Analytical evaluation of the activities of the organization to determine the viability of resource allocation and utility

- Documentation, communication, and illustration of organizational information and processes in comprehensive and concise manner

- Translation of technical information into comprehensible language

- Modification and programming of test cases and requirements for business development models and designs

- Evaluation of the strategic intent alignment to organizational processes and management

- Exploration and recommendation of suitable innovative, technological, and logistical solutions that can be implemented to enhance performance improvement

- Recommendation and development of employee training programs and review of human resource practices in the organization

The wide scope of SME responsibilities can easily lead to management crisis because of ambiguity and duplication of responsibilities in organizations. The management of business organizations can avoid such problems by developing appropriate guidelines for monitoring the activities of SMEs. One such move should involve spelling out specific roles for a SME in such ways that enable the SME to gauge the objectives, expectations, and specific expertise that the organization is seeking to fulfill. This process can be perfected by: documenting reference instructions; detailing all the project activities, monitoring, and evaluation processes; and stipulating all deadlines during which a SME must deliver the periodic and the final results.

Consistent administrative support to SMEs is a central determinant of project success, especially if SMEs are external consultants. SMEs should be provided with adequate access to information processes, current testing procedures, organizational databases, management tools, and any shared resources in order to be able to inject new ideas and provide precise judgment on the organization's processes. Managers should encourage bonding and free flow of information between SMEs and the routine staff of the organization to enable SMEs to gain deep insights of a specific project or the entire organization.

FINDING A QUALIFIED SME

Project and organizational managers must justify the need for SME services before enlisting the services of an SME. The organization must vet a SME to ensure that the SME possesses the relevant expertise that the company is seeking to utilize. In an Internet article titled "Maximizing the Effectiveness of a Subject Matter Expert," Jose Farjardo suggest that managers must enlist the services of SMEs who possess competent qualities such as the ones listed below:

1. Relevant professional qualifications and experience

2. Expertise in business processes

3. Expertise for evaluating and understanding organizational structures

4. Ability to make authoritative decisions

5. Flexibility for attending appraisal meetings regularly

The performance and progress of a SME can be tracked and measured effectively by conducting frequent meetings between the SME and the project or organizational managers. Meetings should be facilitated and conducted through standardized procedures that allow both the SME and the facilitator to plan in advance on how best to present their contributions, queries, and concerns. Regular meetings enable the company management or project management team to establish frequent information feedback mechanisms between the SME and the management. Managers must also ensure that they

document the proceedings and outcomes of all meetings and initiate immediate implementation of corrective measures suggested by SMEs.

SEE ALSO *Project Management*

BIBLIOGRAPHY
Boehle, Sarah. "Solutions to Entice Subject Matter Experts to Deliver Training at Your Organization." *Training Magazine,* 3 April 2007. Available from: http://www.managesmarter.com/msg/content_display/training/e3i7cd2b625a6aef7f3d5ea95d981e09c30

Boque, Robert. "Anatomy of a Software Development Role: Subject Matter Expert." 2008. Available from: http://www.developer.com/mgmt/article.php/3496316.

Fajardo, Jose. "Maximizing the Effectiveness of a Subject Matter Expert." Available from: http://www.stickyminds.com/sitewide.asp?Function=edetail&ObjectType=ART&ObjectId=7095/

Nokes, Sebastian, and Sean Kelly. *The Definitive Guide to Project Management: The Fast Track to Getting the Job Done on Time and on Budget.* 2nd ed. Pearson Education Limited, 2007.

Price, Alan. *Human Resource Management in a Business Context.* 3rd ed. Cengage Learning Business Press, 2007.

SUCCESSION PLANNING

Succession planning is the systematic process of defining future management requirements and identifying candidates who best meet those requirements. Succession planning involves using the supply of labor within the organization for future staffing needs. With succession planning, the skills and abilities of current employees are assessed to see which future positions they may take within the organization when other employees leave their positions. Succession planning is typically used in higher-level organizational positions, such as executive-level positions; however, as the authors of *Building Tomorrow's Talent* (2007) note, "Many companies start both their high potential nomination and succession planning programs at the executive level, and then add additional layers of the organization to this process over time." In theory, succession planning can be used at all levels of an organization.

Succession planning is a critical part of the human resources planning process. Human resources planning (HRP) is the process of having the right number of employees in the right positions in the organization at the time that they are needed. HRP involves forecasting, or predicting, the organization's needs for labor and supply of labor and then taking steps to move people into positions in which they are needed.

GOALS OF SUCCESSION PLANNING

Succession planning is aimed at promoting individuals within the organization and thus makes use of internal selection. Internal selection, as opposed to hiring employees from outside the organization, has a number of benefits and drawbacks. With internal selection, the organization is aware of current employees' skills and abilities, and therefore is often better able to predict future performance than when hiring from the outside. Because of access to annual performance appraisals and the opinions of the employee's current managers, the company can have a fairly accurate assessment of the employee's work capabilities. Additionally, the organization has trained and socialized the employee for a period of time already, so the employee is likely to be better prepared for a position within the organization than someone who does not have that organizational insider experience. Finally, internal selection is often motivating to others in the organization—opportunities for advancement may encourage employees to perform at a high level.

STEPS IN SUCCESSION PLANNING

There are several steps in effective succession planning: human resources planning, assessing needs, developing managers, and developing replacement charts and identifying career paths.

Human Resources Planning. Engaging in human resources planning by forecasting the organization's needs for employees at upper levels is the first step in succession planning. Some staffing needs can be anticipated, such as a known upcoming retirement or transfer. However, staffing needs are often less predictable—organizational members may leave for other companies, retire unexpectedly, or even die, resulting in a need to hire from outside or promote from within. The organization should do its best to have staff available to move up in the organization even when unexpected circumstances arise. Thus, accurate and timely forecasting is critical.

Assessing Needs. The second major step for succession planning is to define and measure individual qualifications needed for each targeted position. Such qualifications should be based on information from a recent job analysis. Once these qualifications are defined, employees must be evaluated on these qualifications to identify those with a high potential for promotion. This may involve assessing both the abilities and the career interests of employees. If a lower-level manager has excellent abilities but little interest in advancement within the organization, then development efforts aimed at promotion will be a poor investment.

To determine the level of abilities of employees within the organization, many of the same selection tools that are used for assessing external candidates can be used, such as general mental ability tests, personality tests, and assessment centers. However, when selecting internally, the company has an advantage in that it has much more data on internal candidates, such as records of an employee's career progress, experience, past performance, and self-reported interests regarding future career steps.

Developing Managers. The third step of succession planning, which is actually ongoing throughout the process, is the development of the managers who are identified as having promotion potential. In order to prepare these lower-level managers for higher positions, they need to engage in development activities to improve their skills. Some of these activities may include:

- Job rotation through key executive positions. By working in different executive positions throughout the organization, the manager gains insight into the overall strategic workings of the company. Additionally, the performance of this manager at the executive level can be assessed before further promotions are awarded.

- Overseas assignments. Many multinational companies now include an overseas assignment as a way for managers to both learn more about the company and to test their potential for advancement within the company. Managers who are successful at leading an overseas branch of the company are assumed to be prepared to take an executive position in the home country.

- Education. Formal courses may improve managers' abilities to understand the financial and operational aspects of business management. Many companies will pay for managers to pursue degrees such as Masters in Business Administration (MBAs), which are expected to provide managers with knowledge that they could not otherwise gain from the company's own training and development programs.

- Performance-related training and development for current and future roles. Specific training and development provided by the company may be required for managers to excel in their current positions and to give them skills that they need in higher-level positions.

Developing Replacement Charts and Identifying Career Paths. In the final step of succession planning, the organization identifies a career path for each high-potential candidate—those who have the interest and ability to move upward in the organization. A career path is the typical set of positions that an employee might hold in the course of his or her career. In succession planning, it is a road map of positions and experiences designed to prepare the individual for an upper-level management position. Along with career paths, the organization should develop replacement charts, which indicate the availability of candidates and their readiness to step into the various management positions. These charts are depicted as organizational charts in which possible candidates to replace others are listed in rank order for each management position. These rank orders are based on the candidates' potential scores, which are derived on the basis of their past performance, experience, and other relevant qualifications. The charts indicate who is currently ready for promotion and who needs further grooming to be prepared for an upper-level position.

PROBLEMS WITH SUCCESSION PLANNING

Despite its many advantages, internal selection can also have some drawbacks. While the opportunities for advancement may be motivating to employees who believe that they can move up within the organization at a future date, those employees who feel that they have been passed over for promotion or are at a career plateau are likely to become discouraged and may choose to leave the organization. Having an employee who has been trained and socialized by the organization may limit the availability of skills, innovation, or creativity that may be found when new employees are brought in from the outside. Finally, internal selection still leaves a position at a lower level that must be staffed from the outside, which may not reduce recruitment and selection costs.

Many companies organize their management training and development efforts around succession planning. However, not all organizations take a formal approach to it, and instead do so very informally, using the opinions of managers as the basis for promotion, with little consideration of the actual requirements of future positions. Informal succession planning is likely to result in managers who are promoted due to criteria that are unrelated to performance, such as networking within and outside of the organization. Organizations would be better served by promoting managers who were able to successfully engage in human resource management activities and communicate with employees. Poor succession planning, such as just described, can have negative organizational consequences. Research indicates that poor preparation for advancement into managerial positions leaves almost one-third of new executives unable to meet company expectations for job performance. This may have negative repercussions for the newly promoted manager, the other employees, and the company's bottom line.

Succession planning is typically useful to the organization in its human resource planning, and when done properly, can be beneficial to organizational performance. However, there are potential problems associated with the use of succession planning: the crowned prince syndrome, the talent drain, and difficulties associated with managing large amounts of human resource information.

Crowned Prince Syndrome. The first potential problem in succession planning is the crowned prince syndrome, which occurs when upper management only considers for advancement those employees who have become visible to them. In other words, rather than looking at a wider array of individual employees and their capabilities, upper management focuses only on one person—the "crowned prince." This person is often one who has been involved in high-profile projects, has a powerful and prominent mentor, or has networked well with organizational leaders. There are often employees throughout the organization who are capable of and interested in promotion who may be overlooked because of the more visible and obvious "crowned prince," who is likely to be promoted even if these other employees are available. Not only are performance problems a potential outcome of this syndrome, but also the motivation of current employees may suffer if they feel that their high performance has been overlooked. This may result in turnover of high quality employees who have been overlooked for promotion.

Talent Drain. The talent drain is the second potential problem that may occur in succession planning. Because upper management must identify only a small group of managers to receive training and development for promotion, those managers who are not assigned to development activities may feel overlooked and therefore leave the organization. This turnover may reduce the number of talented managers that the organization has at the lower and middle levels of the hierarchy. Exacerbating this problem is that these talented managers may work for a competing firm or start their own businesses, thus creating increased competition for their former company.

Managing Human Resource Information. The final problem that can occur in succession planning is the concern with managing large amounts of human resource information. Because succession planning requires retention of a great deal of information, it is typically best to store and manage it on a computer. Attempting to maintain such records by hand may prove daunting. Even on the computer, identifying and evaluating many years' worth of information about employees' performance and experiences may be difficult. Add to that the challenges of comparing distinct records of performance to judge promotion

capability, and this information overload is likely to increase the difficulty of successful succession planning.

Succession planning is one element of successful human resource planning. Unfortunately, many organizations do a poor job of succession planning or no succession planning at all. According to a 2006 report, two-thirds of major firms do not have a succession planning process despite the clear need shown by such statistics as the following, cited in "Succession Planning: Current Trends" (2006):

- 57 percent of executives are in job transition

- 28 percent of executives are actively in a job search while employed by someone else (up from 22 percent in 2004)

- *Fortune* 500 companies experienced a 23 percent increase in their turnover of chief financial officers between 2003 and 2004

- The chief markets at the top 100 branded companies change on average every 23 months

Even when it is done properly, succession planning has some potential problems that can harm employee motivation and the company's bottom line. Effective succession planning, however, is likely to improve overall firm performance and to reward and motivate employees within the organization.

SEE ALSO *Employee Screening and Selection; Entrepreneurship; Human Resource Information Systems; Human Resource Management; Management and Executive Development*

BIBLIOGRAPHY

Dessler, Gary. *Human Resource Management.* 10th edition. Upper Saddle River, NJ: Prentice Hall, 2004.

Goldstein, Irwin L, and J. Kevin Ford. *Training in Organizations: Needs Assessment, Evaluation, and Development.* 4th edition. Belmont, CA: Wadsworth/Thomson Learning, 2002.

Gomez-Mejia, Luis R., David B. Balkin, and Robert L. Cardy. *Managing Human Resources.* 5th ed. Upper Saddle River, NJ: Prentice Hall, 2007.

Heneman, Herbert G., III, and Timothy A. Judge. *Staffing Organizations.* Boston, MA: Irwin/McGraw-Hill, 2005.

Noe, Raymond A. *Employee Training and Development.* 4th ed. Boston, MA: Irwin/McGraw-Hill, 2007.

Noe, Raymond A., John R. Hollenbeck, Barry Gerhart, and Patrick M. Wright. *Human Resource Management: Gaining a Competitive Advantage.* 5th edition. Boston, MA: McGraw-Hill/Irwin, 2006.

Sims, Doris, and Matthew Gay. *Building Tomorrow's Talent: A Practitioner's Guide to Talent Management and Succession Planning.* Bloomington, IN: Authorhouse, 2007.

"Succession Planning: Current Trends." *Insala*, 1 February 2006. Available from: http://www.insala.com/Articles/succession-planning/succession-planning-current-trends.asp.

SUNSHINE LAWS

Sunshine laws are state-sponsored and federally sponsored regulations that govern public disclosures of information concerning the activities of government departments and agencies in the United States. Sunshine laws outline the mandatory procedures that regulatory bodies must adopt to enhance public accessibility to documented records for all meetings and information about general proceedings and decision-making processes. The laws are meant to ensure that government agencies sanction the attendance of public representatives and the media organizations in all meetings so that the information of the proceedings of the meetings can be channeled to the public in an efficient and timely manner. As such, sunshine laws emphasize transparency and accountability in different functions of government departments and agencies.

CONSQUENCES OF WATERGATE

The first sunshine laws were enacted by the state of Utah in 1898, followed closely by sunshine laws enacted in Florida in 1905, with all the other states in the United States gradually adopting sunshine laws in the 1960s and 1970s. This trend culminated in the passing of the Government in the Sunshine Act by the Congress in 1976, an act that followed revelations about the Watergate scandal and other incidences of misappropriation of public resources. The increased recognition, enactments, and reviews of sunshine laws by states was influenced by increased public concern over decision-making and management processes in government and state agencies.

Sunshine laws differ from state to state, and different states frequently amend their sunshine laws to suit state specific regulatory requirements. Therefore, there exist variations in the way in which the virtues of public information access are implemented by different government agencies and different state governments in the United States. Variations are particularly imminent in state definitions of public institutions that are subjected to the provisions of open meetings and penalties for noncompliance to the provisions.

By subjecting management processes of governmental institutions to public scrutiny, sunshine laws lend credibility to institutional management processes and enhance openness in governance by virtue of diffusing information and delegating authority to different levels of society. Michael McLendon and James Hearn point out that the application of sunshine laws in regulatory bodies in the United States facilitates the achievement of targeted operational objectives such as financial health, fiscal stability, management honesty, consultative decision-making, and efficiency in management of state institutions.

PROBLEMS WITH SUNSHINE LAWS

However, there are deep concerns about some drawbacks that usually emerge from the implementation of sunshine laws in the operations and management activities of governmental organizations in the United States. Such problems include competing interests inherent in efforts to achieve public accountability without stifling individual privacy rights and institutional autonomy. These concerns can be addressed by exceptions spelled out in the Government in the Sunshine Act, which identifies special circumstances where the requirements described by the sunshine laws can be shelved. Such circumstances include:

- Sensitive information touching on national security matters
- Internal organizational prohibitions and rules
- Records and information related to criminal accusations and indictments
- Information that may trigger unfavorable speculation on financial institutions and processes
- Records and information that may tamper with ongoing investigations
- Information that may interfere with an individual's constitutional rights to privacy
- Information and documentation that touches on ongoing legal proceedings involving a government agency

The need for continued improvements of sunshine laws is demonstrated by increased controversies and financial losses that hit both public and private organizations in the United States at the onset of the twenty-first century. Therefore, government agencies in America have no recourse but to honor the statutory obligations requiring them to enhance public scrutiny and access to all their activities. Citizens have a responsibility to use the increased access to government information to make positive contributions of suggestion and ideas towards the development activities of their home states and counties.

OPENING UP ON THE WEB

Many government agencies have moved a notch higher by making government information more accessible by use of information technology systems. The United States government and state governments facilitate easy public access to government information by developing electronic databases, online registries, and Internet directories. Moreover, the United States government continuously updates the Sunshine Act, the Public Records Act, and the Freedom of Information Act to suit the latest information technology trends, accountability demands, and transparency practices.

BIBLIOGRAPHY

Martin, Amanda, Hugh Stevens, and Cathy Parker, eds. *North Carolina Media Law Handbook.* Raleigh, NC: North Carolina Press Association, 2007.

McLendon, Michael, K., and James C. Hearn. "Mandated Openness in Public Higher Education: A Field Study of State Sunshine Laws and Institutional Governance." *Journal of Higher Education,* 1 July 2006. Available from: http://goliath.ecnext.com/coms2/gi_0199-5655886/Mandated-openness-in-public-higher.html.

"Sunshine Laws." *The Columbia Encyclopedia,* 6th ed. New York: Columbia University Press, 2007.

Tolentino Francis, N. "Sunshine Laws and Transparency." *Manila Bulletin.* 17 October 2007.

SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) is a broadened management focus that considers the combined impact of all the companies involved in the production of goods and services, from suppliers to manufacturers to wholesalers to retailers to final consumers and beyond to disposal and recycling. This approach to managing production and logistics networks assumes all companies involved in the process of delivering goods to consumers are part of a network, pipeline, or supply chain. It encompasses everything required to satisfy customers and includes determining which products they will buy, how to produce them, and how to deliver them. The supply chain philosophy ensures that customers receive the right products at the right time at an acceptable price and at the desired location. Companies that practice supply chain management report significant cost and cycle time reductions. For example, Wal-Mart Stores Inc. announced increases in inventory turns, decreases in out-of-stock occurrences, and a replenishment cycle that has moved from weeks to days to hours.

Increasing competition, complexity, and geographical scope in the business world have led to this broadened scope and continuing improvements in the capabilities of the personal computer have made the optimization of supply chain performance possible. Further, technological developments in the communications field, such as e-mail and the Internet, have revolutionized data exchange, facilitating the necessary flow of information between the companies in the supply chain. Cutting-edge communication technologies make it possible to manage the complexity of networked production in a way unthinkable only two decades ago.

A fundamental premise of supply chain management is to view the network of facilities, processes, and people that procure raw materials, transform them into products, and ultimately distribute them to the customer as an integrated chain, rather than a group of separate, but somewhat interrelated, tasks. The importance of this integration cannot be overstated because the links of the chain are the key to achieving the goal. Every company has a supply chain, but not every company manages their supply chain for strategic advantage.

While easy to understand in theory, the chain management becomes more complex the larger the company and its range of products, and the more international the locations of its suppliers, customers, and distribution facilities. Supply chain management is also complex because companies may be part of several pipelines at the same time. A manufacturer of synthetic rubber, for example, can at the same time be part of the supply chains for tires, mechanical goods, industrial products, shoe materials and footwear, aircraft parts, and rubberized textiles.

LINKS WITHIN THE SUPPLY CHAIN

With supply chain management, information, systems, processes, efforts, and ideas are integrated across all functions of the entire supply chain. Supply chains become more complex as goods flow from more than one supplier to more than one manufacturing and distribution site. The possibility of outside sources for functions like assembly and packaging are also options in the chain.

The basic tasks of a company do not change, regardless of whether or not it practices supply chain management. Suppliers are still required to supply material, manufacturing still manufactures, distribution still distributes, and customers still purchase. All of the traditional functions of a company still take place. The ultimate difference in a company that manages its supply chain is their focus shifts from what goes on inside each of the links, to include the connections between the links.

A company practicing effective supply chain management also recognizes that the chain has connections that extend beyond the traditional boundaries of the organization. Managing the connections is where the integration of the supply chain begins. Any improvement in or disruption to the supply chain linkages affects the entire chain. The cumulative supply chain effect of uncertainty can be seen in this example. Suppose a manufacturer of integrated circuit boards receives a shipment of poor quality silicon. Because the manufacturer is dependent on its supplier for timely shipments, the poor quality lot results in a shipment delay to one of its customers. The computer manufacturer is forced to shut down its line because component circuit boards are not available. As a result, computer shipments to retailers are late. Finally, the customer goes to the retailer to purchase a new computer but is unable to find the desired brand. Frustrated, the customer decides to buy the product of a competitor. Consider too, the timing involved in this process. Because

of production and transportation lead times, the actual receipt of the poor quality silicon probably occurred several months before the customer made a computer purchase.

A wide variety of events occurs in the supply chain that is largely unpredictable. Suppliers can make early or late deliveries. Customers can increase, decrease, or even cancel orders. New customers can place large orders. Machines or trucks can break down. Employees can get sick, go on strike, and quit. Supplier shipments or manufactured products can have quality problems. In the past, companies prepared for uncertainty and improved their levels of customer satisfaction by allowing inventory levels to rise. This is no longer an acceptable solution. High inventories translate to increased carrying costs and risks of obsolescence that can limit a company's flexibility.

Throughout the supply chain, inventory is traditionally created and held at many locations. Any time a portion of that inventory can be reduced or eliminated, the company decreases costs and increases profitability. Shortening the length of time it takes to move a product from one link of the chain to the next also shortens the cycle time of the entire chain and thereby increases competitiveness and customer satisfaction.

IMPORTANCE OF CHAIN VISIBILITY

SCM provides needed visibility along the chain to improve performance. Without visibility up and down the supply chain, an effect known as the "bullwhip" can result. In reviewing the demand patterns at various points in their supply chain, Procter & Gamble (P&G) noticed that while the consumers, or in this case the babies, consumed diapers at a steady rate, the demand order variability in the supply chain was amplified as it moved up the supply chain. Without being able to see the sales of its product at the distribution channel stage, they had to rely on sales orders from resellers to make product forecasts, plan capacity, control inventory, and schedule production. This lack of visibility resulted in excessive inventory, inaccurate forecasts, excessive or constrained capacity, and reduced customer service levels. Each link in the supply chain stockpiled inventory to counteract the effects of demand uncertainty and variability. Various studies have shown that these inventory stockpiles can equal as much as 100 days' supply and by considering the effect on raw materials, the total chain could contain more than a year's supply of inventory.

Companies like P&G, Dell Computer, Hewlett-Packard, Campbell Soup, M&M/Mars, Nestlé, Quaker Oats, and many others have been able to control the bullwhip effect. Some of the methods used include innovative information flow for forecasting demand, revised price structures, or developing strategies to allow smaller batch sizes, while still maximizing transportation efficiency. By understanding the effects of supply chain integration, visibility, and information, these companies were able to develop strategies that enabled them to overcome many problems.

SCM BENEFITS

In addition to helping to create an efficient, integrated company, supply chain management also plays a large part in reducing costs. A study by the A.T. Kearney management consulting company estimates that supply chain costs can represent more than eighty percent of the cost structure in a typical manufacturing company. These numbers indicate that even slight improvement in the process eventually can translate into millions of dollars on the bottom line. These costs include lost sales due to poor customer service or out-of-stock retail products. For every dollar of inventory in a system, there are one to two dollars of hidden supply chain costs: working capital costs, asset costs, delivery costs, write downs and so on. Leaner inventories free up a large amount of capital.

Depending on the industry, companies leading in supply chain performance achieve savings equal to three to seven percent of revenues compared with their median performing peers. One Efficient Consumer Response Study, sponsored by the Food Marketing Institute, estimated that forty two days could be removed from the typical grocery supply chain, freeing up $30 billion in current costs, and reducing inventories by 41 percent.

REQUIREMENTS OF SCM

Customer Focus. All sources agree the fundamental focus of supply chain management begins by understanding the customer, their values, and requirements. This includes internal customers of the organization and the final customer as well. Companies must seek to know exactly what the customer expects from the product or service and must then focus their efforts on meeting these expectations. The process of suppliers must be aligned with the buying process of the customer. Even performance measurements must be customer driven, because the behavior of the final customer ultimately controls the behavior of the entire supply chain.

Information Flow. Another requirement is increased information flow. Companies must invest in the technology that will provide access to greater amounts of timely information. Information makes it possible to move to more instantaneous merchandise replenishment and allow all parties in the chain to respond quickly to all changes. Information facilitates the decisions of the supply chain such as evaluation and exploration of alternatives. Information flow is key to the visibility of the product as it

flows through the supply chain and is needed at every stage of he customer order. Improving the intelligence of where products are in the chain also improves inventory management and customer service capabilities. Issues of trust and security are fundamental to information integration. Many organizations are successfully dealing with these issues through the development of partnering relationships.

Employee and Management Support. As partners in the supply chain must also be highly flexible, supply chain strategies often require changes in processes and traditional roles. All members of the supply chain must be open to new methods and ideas. The flexibility and change required is often difficult for organizations and their employees. It is however, the ability to embrace necessary changes that will position a company to take advantage of the benefits of supply chain management. Because the supply chain is a dynamic entity, businesses are advised to organize for change. They must anticipate resistance and be prepared to deal with it. Training in the concepts of supply chain management will aid in this effort. Also, as with any organization change, the new ideas must be supported and embraced by all levels of management.

Measurement. Often companies undertake ways to improve themselves without also thinking about how to measure whether or not they have been successful. Performance measurement must consider the entire supply chain and be related to the effect on the ultimate goal of customer satisfaction. Therefore the final concept of supply chain management is ensuring measurement techniques are adequately considered during the implementation of supply chain management techniques.

ACHIEVING THE GOALS OF SUPPLY CHAIN MANAGEMENT

Methods being used to achieve the goals of supply chain management can be divided into two categories. Some methods seek to achieve the goals through improving the processes within the links of the chain. There are also methods that seek to achieve the goals by changing the roles or functions of the chain.

The methods used to improve the process include modeling various alternatives, effective measurement, improved forecasting, designing for the supply chain, cross-docking inventories, direct store delivery, and electronic data interchange (EDI) technology. Direct store delivery methods bypass the distribution center. Products using direct store delivery include bakeries, cosmetics, snack foods, and other items where product freshness or quick replenishment is required. Cross-docking is a proc-

ess that keeps products from coming to rest as inventory in a distribution center. Products arrive at the center and are immediately off loaded, moved, and immediately reloaded on waiting delivery trucks.

EDI technology is the electronic exchange of information between the computer systems of two or more companies. It is used to process transactions like order entry, order confirmation, order changes, invoicing, and pre-shipment notices. The EDI movement was started by big retailers like Wal-Mart, Kmart, and Target. To do business with some of these large customers, EDI processing is a requirement. EDI delivers results by facilitating the constant and rapid exchange of information between companies. Customer order, invoice, and other information that would previously require hours of data entry can be done in minutes. Point of sale data can be transmitted in a matter of minutes or hours instead of weeks.

Methods that use changing roles include postponement strategies, vendor managed inventory, and supplier integration. Postponement strategies delay the differentiation of products in order to gain flexibility to respond to changing customer needs. Product inventory is held in a generic form so that as specific demand becomes known, the product can be finished and shipped in a timely manner. Vendor managed inventory and continuous replenishment programs are ways in which organizations are reaching beyond their boundaries and integrating their efforts with suppliers and customers. Point of sale data is transferred from customer to supplier in real time so that automatic replenishments can occur. Companies can even surrender the responsibility for managing inventory to some of their suppliers. Supplier integration moves beyond partnering with suppliers and focuses on aligning with all critical suppliers the supply chain.

SCOR

The supply chain operations reference (SCOR) model is a process reference model, developed in 1996 by the Supply-Chain Council, as a cross-industry diagnostic, benchmarking, and process improvement tool for supply chain management. SCOR provides a complete set of supply chain performance metrics, industry best practices, and enabling systems' functionality that allows firms to thoroughly analyze all aspects of their current supply chain. A number of notable firms, such as IBM, Intel, 3M, and Siemens have used the model successfully.

The model separates supply chain operations into five distinct processes: plan, source, make, deliver, and return. Within these are three levels of process detail. Level I deals with process types, Level II is the configuration level and deals with process categories, and Level III is the process element level. The SCOR model endorses twelve performance metrics. The Levels II and III metrics are

keys to the Level I metrics that fall within the five process categories. Empirical research by Archie Lockamy III and Kevin McCormack found while some of the practices found in the model did not have an expected degree of impact, many of the practices did result in significant supply chain performance improvements.

THE FUTURE

Supply chain management, enabled by improvements in technology and a broader view of the organization, has addressed the issues of complexity and competition by exploiting and enhancing the chain to provide strategic, financial, and competitive advantage. Like other management philosophies, such as total quality management (TQM) or business process reengineering, supply chain management is an evolving process. Emerging technologies and successful supply chain management techniques used by companies today are the foundation of future improvements in techniques and technologies. Throughout the 2000s, management experts have been working on improving current models, such as the SCOR model, and on making links between SCM and other proven management techniques, such as Six Sigma, lean manufacturing, and just-in-time (JIT) systems. With continued attention on further developing supply chain management techniques, this approach will continue to provide great payoffs in cost and efficiency to organizations.

Another development that has occurred alongside rapid technological innovation is increasing environmental concerns. As responsible environmental practices have increased in importance, supply chain strategies have done the same. There are both logistical and political reasons for this. Firms finding that release of waste into the biophysical environment is becoming more difficult (or even impossible) to prevent are saddled with a new responsibility, waste control. This may have far-reaching implications for supply chain management. When source reduction is impossible or incomplete, the firm must deal with returned products as well as disassembly, recycling, reuse, repair work, or remanufacturing, all of which mean more movement of material. The supply chain is then extended beyond the final consumer to become a "reverse supply chain" (note that an earlier SCOR model contained only four processes; the "return" process was later added).

In the late-2000s, firms are also facing increasing pressure to adopt "green" practices in response to concerns over global warming and other impending pollution crises. Developments in supply chain management are keeping pace with these concerns. Recent works, such as *Greening the Supply Chain* (2006) and *Green Electronics Design and Manufacturing* (2008), indicate the importance of adopting innovative ideas capable of making a corporation's supply chain more socially and environmentally responsible.

SEE ALSO *Distribution and Distribution Requirements Planning; Electronic Data Interchange and Electronic Funds Transfer; Reverse Supply Chain Logistics*

BIBLIOGRAPHY

Bolstorff, Peter, and Robert Rosenbaum. *Supply Chain Excellence: A Handbook for Dramatic Improvement Using the SCOR Model* New York: AMACOM, 2007.

Gunasekaran, A., and E.W.T. Ngai. "Virtual Supply-Chain Management." *Production Planning* & *Control* 15, no. 6 (2004): 584–595.

Handfield, Robert, Robert Sroufe, and Steven Walton. "Integrating Environmental Management and Supply Chain Strategies." *Business Strategy and the Environment* 14, no. 1 (2005): 1–18.

Huan, Samuel H., Sunil K. Sheoran, and Ge Wang. "A Review and Analysis of Supply Chain Operations Reference (SCOR) Model." *Supply Chain Management: An International Journal* 9, no. 1 (2004): 23–29.

Kannan, Vijay R., and Keah Choon Tan. "Just-In-Time, Total Quality Management, and Supply Chain Management: Understanding Their Linkages and Impact of Business Performance." *Omega* 33, no. 2 (2005): 153.

Lockamy, Archie, III, and Kevin McCormack. "Linking SCOR Planning Practices to Supply Chain Performance: An Exploratory Study." *International Journal of Operations* & *Production Management* 24, no. 11/12 (2004): 1192–1218.

Martin, James William. *Lean Six Sigma for Supply Chain Management.* Boston: McGraw-Hill, 2006.

Nagurney, Anna, and Fuminori Toyasaki. "Reverse Supply Chain Management and Electronic Waste Recycling: A Multitiered Network Equilibrium Framework for E-cycling." *Transportation Research. Part E, Logistics* & *Transportation Review* 41E, no. 1 (2005).

New, Steve, and Roy Westbrook, eds. *Understanding Supply Chains: Concepts, Critiques* & *Futures.* Oxford University Press, 2004.

Sarkis, Joseph. *Greening the Supply Chain* London: Springer, 2006.

Shina, Sammy G. *Green Electronics Design and Manufacturing* Boston: McGraw-Hill, 2008.

Supply Chain Council Website. Available from: http://www.supply-chain.org.

Walker, William T. *Supply Chain Architecture.* Boca Raton: CRC Press, 2005.

Wisner, Joel D., G. Keong Leong, and Keah-Choon Tan. *Principles of Supply Chain Management: A Balanced Approach.* Mason, OH: Thomson South-Western, 2005.

SWEATSHOPS

Sweatshops are work environments that possess three major characteristics—long hours, low pay, and unsafe or unhealthy working conditions. Sweatshops may also have policies that severely restrict workers' freedoms, including limiting bathroom breaks and even conversations with fellow workers. At its worst, violence is used

against sweatshop workers. Sweatshops have been a factor in the production of goods around the world for centuries, but the globalization of business has led increasing numbers of major corporations to take advantage of low-cost sweatshop labor in developing countries. Recent examples of sweatshop conditions in the garment industry have caused an international outcry by labor leaders, activists, and government officials. Although manufacturers tend to deny it, sweatshops still exist, even in the United States.

THE HISTORY OF SWEATSHOPS

One of the earliest examples of a sweatshop was in the crude textile mills of Ecuador. Spanish conquerors put the native population to work in sweatshop conditions in the manufacture of cloth, rough garments, and assorted textile goods. The use of the term is more recently traced to working conditions in England's emerging manufacturing industries, where women and children sweated in jobs performed under horrid conditions: the work being monotonous, the hours long, and the pay miserably low. The British government established a Select Committee of the House of Lords on the Sweating System in 1889, thus publicly exposing the conditions for the first time. With massive immigration into the United States, especially beginning in the late 1880s, sweatshops became common in American cities on the east coast.

Southern and eastern European immigrants were easy prey for manufacturers who paid low wages and provided poor working conditions in factories. In many instances, the newly arrived immigrants were glad to have these sweating jobs at any wage, no matter how low. The situation in many of the new industries was ripe for sweatshops to develop. Social and economic conditions in most cities produced a large population from which to find workers willing to accept any wage and management systems that neglected the workers, thus removing any consideration of the human factor in manufacturing. Generally, workers lacked access to the kind of knowledge and resources that would enable them to overcome the impossible working conditions, while governments (both local and national), were unwilling to intervene on their behalf. Other characteristics of sweatshops included overcrowding, lack of sanitary conditions, no worker breaks or relief, demands to complete a task within a limited period of time, and—as important to the continuance of the sweatshop—a total lack of job security.

EFFORTS TO IMPROVE SWEATSHOPS

Initial efforts to correct or improve sweatshops in the United States began in 1884 with legislation in the state of New York to eliminate the production of tobacco products in homes—a practice common in the cigar industry. Similar state labor laws proved generally ineffective before trade unions were able to bring about slight relief. But it took federal minimum wage and maximum-hours legislation in 1938 before sweatshops began to disappear.

Making matters worse for the workers, there were few if any advocates for improving sweatshop conditions. The immigrants had virtually no voice in management or government. Many could not read or write—much less read and write in English—and were essentially pawns of often unscrupulous, profit-driven manufacturers. Educational opportunities were seldom available, and moving up the corporate ladder was not an option.

Though sweatshops have a long history in the United States, so do attempts to draw attention to them. Famously, Upton Sinclair's muckraking novel, *The Jungle*, was intended to draw attention to working conditions. However, the novel also drew attention to impurities in foods and instead inspired legislation about quality of foods. In the eighth edition of their classic study on the United States working class, *Labor Problems: A Text Book,* published in 1912, Thomas S. Adams and Helen Sumner outlined the three conditions in sweatshops and added a disturbing fourth: danger to the consumer's health from using goods manufactured in sweatshops. Few American consumers took notice, but union involvement in improving working conditions was quite evident beginning in the 1910s, especially in the garment industry.

The most infamous sweatshop incident in the United States occurred at the Triangle Waist Company, a garment company in New York City. On March 25, 1911, a fire broke out at the factory, resulting in the deaths of 146 workers, most of whom were young women. The fact that the owners had locked the factory's exits deeply contributed to the tragedy. This fire drew public outrage and attention to poor working and safety conditions in such factories; however, the factory's owners were acquitted of wrongdoing.

Another industry where sweatshop conditions often exist (and still do) is the agricultural industry, which employs a great many immigrants (both legal and illegal) for harvesting or picking fruits and vegetables. The working conditions include long daylight hours under a hot California or Florida sun with few or no breaks. Wages are quite low (often illegally so), but these workers seldom have the means or education to improve their plight, and all desperately need the money.

SWEATSHOPS IN MODERN INDUSTRY

Sweatshops have not been abolished to this day, as is evident in numerous recent examples in the apparel

industry that have brought national attention and government reaction to the issue. Garment manufacturers found new ways to finish goods in factories outside the United States, where labor costs were miniscule, and in these locations sweatshops flourished. In countries in South and Central America and Asia, such companies found a ready labor supply where wage expectations were low and the sweatshop thrived. Companies like Gap, Liz Claiborne, Kathie Lee Gifford, Nike, and Wal-Mart all came under criticism for marketing goods produced in sweatshops.

National attention was directed at these and other companies in the apparel industry through media outlets, and consumers were sometimes advised not to purchase certain brand names. Advocacy groups, particularly vibrant among college students (who got their start by refusing to buy college or university logo merchandise produced in sweatshops), organize consumer awareness of sweatshop conditions and attempt to pressure companies into ceasing their sweatshop-labor practices. A site was mounted on the Internet by Sweatshop Watch—a coalition of labor, community, civil rights, immigrant, and women's organizations (www.sweatshopwatch.org)—to further spread awareness and coalesce activist projects. Corpwatch (www.corpwatch.org) is another organization that monitors corporate practices, including the use of sweatshop labor.

Though most modern sweatshops exist in poorer and developing countries, it is important to note that sweatshop conditions can exist anywhere there is a vulnerable population, including inside the United States. In this case, immigrants and undocumented workers can be especially susceptible to sweatshop labor and practices. In 2006, a factory in Massachusetts was raided by authorities. The factory's workers included over 300 undocumented workers. Newspaper reports of the event repeatedly described the factory as a sweatshop.

Though garment and agricultural sweatshops are the most infamous examples, it is important to note that sweatshop conditions can exist in other industries as well. For instance, in 2006 Apple faced allegations that its iPod product was being produced in China under sweatshop conditions. Apple was quick to respond to these charges, launching its own investigation; however, the Apple example also points out how difficult combating sweatshops can be. Apple's official policy sets conditions against sweatshops.

The Apple incident illustrates how sweatshops can thrive with such practices as outsourcing. *BusinessWeek* has reported that although many multinational companies have specific policies against sweatshop practices, outsourced suppliers in countries such as China still operate such facilities and can be savvy in terms of hiding these practices, even to corporate clients.

Unfortunately, the problem of sweatshops is likely to deepen. Structural adjustment programs, which are often imposed on developing countries by major financial institutions like the International Monetary Fund, are among the hallmarks of the global economy. These programs, which derive from liberal capitalist economic theories, can act indirectly as barriers against labor laws and labor organization (under the logic that these constitute threats to free trade) while deregulating the flow of foreign investment. Hence, the prevailing social and economic climate makes sweatshop labor not only possible, but attractive (and for some industries, almost necessary).

The geographer Mona Domosh has also observed that sweatshops are heavily populated by women. She notes that women are often used in labor in what are termed "Export Processing Zones," also highlighting how globalization has compounded the problem of sweatshops.

In addition, the governments of many developing nations are reluctant to enforce strong worker-protection laws. They view cheap labor as one of the major assets they can offer to attract investment by multinational companies, which creates jobs and provides capital for development. These governments argue that all of the major developed nations limited worker rights early in their economic histories, and that they should be allowed to do so as well, with the goal of eventually achieving the prosperity that would enable them to eliminate sweatshops. They also claim that sweatshops often provide the best wages and working conditions available to workers in the developing world, who might otherwise be condemned to prostitution, begging, or subsistence farming.

Meanwhile, popular organizing against sweatshop labor is also gaining momentum. These groups try to capitalize on the knowledge that, if the general public were aware of the conditions in which certain consumer items were produced, they would refrain from buying them. Improved global communications, using such tools as satellite and the Internet, make it easy to disseminate information about the business activities of multinational corporations in developing nations. Activists hope that consumer pressure will force companies to become more socially responsible or face devastating negative publicity, like that experienced by Nike and Gap.

Gap provides a recent example of bad publicity because of sweatshops. In late 2007, it was revealed that some of the company's clothes were being produced by young children in India. Though Gap had policies and procedures to prevent the use of sweatshops and children in the production process, it was a subcontractor that was operating the facility. The company responded to this bad publicity by announcing plans for a "Sweatshop Free" label for its clothing. Gap also pledged to increase its monitoring of subcontractors and overseas factories.

Co-op America, sponsor of the "No Sweat!" program to end sweatshop labor, recommends that individuals and businesses take the following steps to aid the cause: organize local community groups to support a sweatshop-free purchasing law in local or state government; investigate companies with which you do business and insist they maintain good records on labor issues; use your clout as a shareholder to encourage companies to treat employees fairly; and purchase union-made, local, and fair-trade approved goods. Businesses can submit to workplace monitoring under programs run by the Fair Labor Association, Social Accountability International, or Worldwide Responsible Apparel Production.

SEE ALSO *Ethics; Globalization; International Management; Multinational Corporations*

BIBLIOGRAPHY
Associated Press. "Apple: No Sweatshop IPod Labor." *Wired,* 18 August 2006. Available from: http://www.wired.com/science/discoveries/news/2006/08/71619.

Balko, Radley. "Sweatshops and Globalization." A World Connected. Available from: http://www.aworldconnected.org.

Barnes, Edward. "Slaves of New York." *Time,* 2 November 1998, 72–75.

Co-op America. "Ten Ways to End Sweatshops." Available from: http://www.sweatshops.org/tenways.html.

Corpwatch. Available from: http://www.corpwatch.org/index.php.

Domosh, Mona, and Joni Seager. *Putting Women in Place.* New York: Guilford Press, 2001.

Esbenshade, Jill. *Monitoring Sweatshops: Workers, Consumers, and the Global Apparel Industry.* Philadelphia: Temple University Press, 2004.

Evans, Jonny. "Apple Responds to iPod Factory Claims." *Macworld,* 14 June 2006. Available from: http://www.macworld.co.uk/news/index.cfm?home&NewsID=14935.

Gap, Inc. "Social Responsibility," 2008. Available from: http://www.gapinc.com/public/SocialResponsibility/socialres.shtml.

Gap, Inc. "India Fact Sheet Update," 12 June 2008. Available from: http://www.gapinc.com/public/documents/India_Fact_Sheet_Update.pdf.

Greathead, Scott. "Making It Right: Sweatshops, Ethics, and Retailer Responsibility." *Chain Store Age,* May 2002.

Hartman, Laura P., ed. *Rising Above Sweatshops: Innovative Approaches to Global Labor Challenges.* New York: Praeger, 2003.

"Hypocrisy on Immigration; A raid in New England reveals a broken system." *The Washington Post,* 18 March 2007, B06.

Kernaghan, Charles. "Sweatshop Blues: Companies Love Misery." *Dollars & Sense,* March–April 1999, 18–21.

Manu, Joseph. "IT Sweatshops Breaking Indians." *Wired* 11 July 2003. Available from: http://www.wired.com/techbiz/media/news/2003/07/59477.

McDougall, Dan. "Child sweatshop shame threatens Gap's ethical image." *The Observer,* 28 October 2007, 36.

McDougall, Dan. "Gap plans 'sweatshop-free' labels." *The Observer,* 4 November 2007, 38.

Pratt, Mary K. "Is Your Outsourcer an IT Sweatshop?" *Computerworld,* 21 April 2008. Available from: http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=315482.

"Secrets, Lies and Sweatshops." *Businessweek,* 27 November 2006. Available from: http://www.businessweek.com/magazine/content/06_48/b4011001.htm?chan=globalbiz_asia_today.

Sinclair, Upton. *The Jungle.* New York: Penguin Books, 2006.

"The Triangle Factory Fire." The Kheel Center, Catherwood Library, ILR School at Cornell, 2005. Avaiable from http://www.ilr.cornell.edu/trianglefire/narrative1.html.

"A World of Sweatshops." *Business Week,* 6 November 2000.

SWOT ANALYSIS

Organizational strategies are the means through which companies accomplish their missions and goals. Successful strategies address four elements of the setting within which the company operates: (1) the company's strengths, (2) its weaknesses, (3) the opportunities in its competitive environment, and (4) the threats in its competitive environment. This set of four elements—strengths, weaknesses, opportunities, and threats—when used by a firm to gain competitive advantage, is often referred to as a SWOT analysis. SWOT was developed by Kenneth Andrews in the early 1970s, and it continues to be used with only minor modification and development into the twenty-first century. In 2008, the Harvard Business School Press put out two digital guides on performing SWOT analysis, and investment analysts regularly publish guides that perform a SWOT analysis on a wide variety of corporations and financial institutions.

An assessment of strengths and weaknesses occurs as a part of organizational analysis. It is an audit of the company's internal workings, which are relatively easier to control than outside factors. Conversely, examining opportunities and threats is a part of environmental analysis—the company must look outside of the organization to determine opportunities and threats, over which it has lesser control.

Andrews's original conception of the strategy model that preceded the SWOT asked four basic questions about a company and its environment: (1) What can we do? (2) What do we want to do? (3) What might we do? and (4) What do others expect us to do?

The answers to these questions provide the input for an effective strategic management process. While Andrews's original conception of this analysis has been developed and changed to the more streamlined SWOT analysis that we know today, his work is the foundation of this activity.

STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

Strengths, in the SWOT analysis, are a company's capabilities and resources that allow it to engage in activities to

generate economic value and perhaps competitive advantage. A company's strengths may be in its ability to create unique products, to provide high-level customer service, or to have a presence in multiple retail markets. Strengths may also be things such as the company's culture, its staffing and training, or the quality of its managers. Whatever capability a company has can be regarded as a strength.

A company's weaknesses are a lack of resources or capabilities that can prevent it from generating economic value or gaining a competitive advantage if used to enact the company's strategy. There are many examples of organizational weaknesses. For example, a firm may have a large, bureaucratic structure that limits its ability to compete with smaller, more dynamic companies. Another weakness may occur if a company has higher labor costs than a competitor who can have similar productivity from a lower labor cost. The characteristics of an organization that can be a strength, as listed above, can also be a weakness if the company does not do them well.

Opportunities provide the organization with a chance to improve its performance and its competitive advantage. Some opportunities may be anticipated, others arise unexpectedly. Opportunities may arise when there are niches for new products or services, or when these products and services can be offered at different times and in different locations. For instance, the increased use of the Internet has provided numerous opportunities for companies to expand their product sales.

Threats can be an individual, group, or organization outside the company that aims to reduce the level of the company's performance. Every company faces threats in its environment. Often the more successful companies have stronger threats, because there is a desire on the part of other companies to take some of that success for their own. Threats may come from new products or services from other companies that aim to take away a company's competitive advantage. Threats may also come from government regulation or even consumer groups.

A strong company strategy that shows how to gain competitive advantage should address all four elements of the SWOT analysis. It should help the organization determine how to use its strengths to take advantage of opportunities and neutralize threats. Finally, a strong strategy should help an organization avoid or fix its weaknesses. If a company can develop a strategy that makes use of the information from SWOT analysis, it is more likely to have high levels of performance.

Nearly every company can benefit from SWOT analysis. Larger organizations may have strategic-planning procedures in place that incorporate SWOT analysis, but smaller firms (particularly entrepreneurial firms) may have to start the analysis from scratch. Additionally, depending on the size or the degree of diversification of the company, it may be necessary to conduct more than one SWOT analysis. If the company has a wide variety of products and services, particularly if it operates in different markets, one SWOT analysis will not capture all of the relevant strengths, weaknesses, opportunities, and threats that exist across the span of the company's operations.

LIMITATIONS OF SWOT ANALYSIS

One major problem with the SWOT analysis is that while it emphasizes the importance of the four elements associated with the organizational and environmental analysis, it does not address how the company can identify the elements in their own company. Many organizational executives may not be able to determine what these elements are, and the SWOT framework provides no guidance. For example, what if a strength identified by the company is not truly a strength? While a company might believe its customer service is strong, they may be unaware of problems with employees or the capabilities of other companies to provide a higher level of customer service. Weaknesses are often easier to determine, but typically after it is too late to create a new strategy to offset them. A company may also have difficulty identifying opportunities. Depending on the organization, what may seem like an opportunity to some, may appear to be a threat to others. Opportunities may be easy to overlook or may be identified long after they can be exploited. Similarly, a company may have difficulty anticipating possible threats in order to effectively avoid them.

While the SWOT framework does not provide managers with the guidance to identify strengths, weaknesses, opportunities, and threats, it does tell managers what questions to ask during the strategy development process, even if it does not provide the answers. Managers know to ask and to determine a strategy that will take advantage of a company's strengths, minimize its weaknesses, exploit opportunities, or neutralize threats.

Some experts argue that making strategic choices for the firm is less important than asking the right questions in choosing the strategy. A company may mistakenly solve a problem by providing the correct answer to the wrong question.

USING SWOT ANALYSIS TO DEVELOP ORGANIZATIONAL STRATEGY

SWOT analysis is just the first step in developing and implementing an effective organizational strategy. After a thorough SWOT analysis, the next step is to rank the strengths, weaknesses, opportunities, and threats and to document the criteria for ranking. The company must then determine its strategic fit given its internal capabilities and

Figure 1

	Internal	
	Strengths	Weaknesses
External Opportunities	Quadrant 1 Possible Strategies	Quadrant 2 Possible Strategies
Threats	Quadrant 3 Possible Strategies	Quadrant 4 Possible Strategies
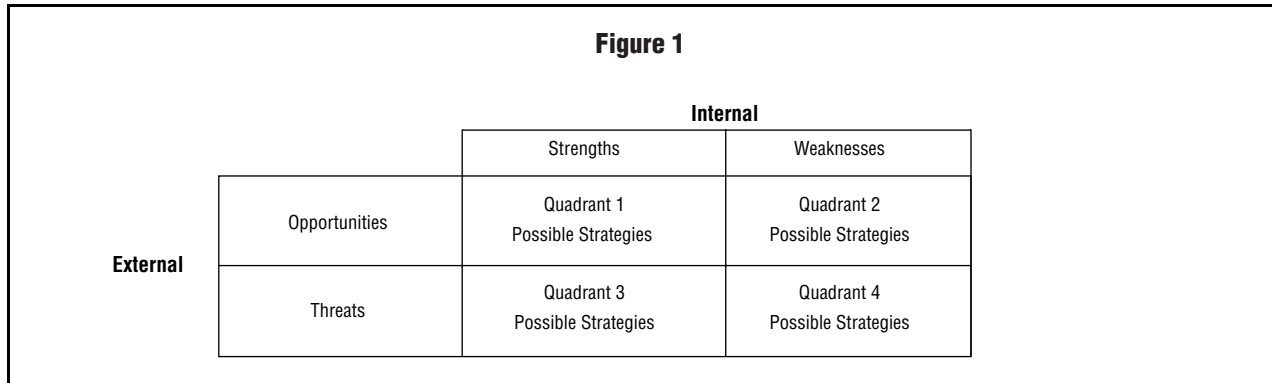
external environment in a two-by-two grid (see Figure 1). This fit, as determined in the grid, will indicate what strategic changes need to be made. The quadrants in this grid are as follows:

- *Quadrant 1*—internal strengths matched with external opportunities
- *Quadrant 2*—internal weaknesses relative to external opportunities
- *Quadrant 3*—internal strengths matched with external threats
- *Quadrant 4*—internal weaknesses relative to external threats

Quadrant 1 lists the strategies associated with a match between the company's strengths and its perceived external opportunities. It represents the best fit between the company's resources and the options available in the external market. A strategy from this quadrant would be to protect the company's strengths by shoring up resources and extending competitive advantage. If a strategy in this quadrant can additionally bolster weaknesses in other areas, such as in Quadrant 2, this would be advantageous.

Quadrant 2 lists the strategies associated with a match between the company's weaknesses with external opportunities. Strategies in this quadrant would address the choice of either improving upon weaknesses to turn them into strengths, or allowing competitors to take advantage of opportunities in the marketplace.

Quadrant 3 matches the company's strengths and external threats. Strategies in this quadrant may aim to transform external threats into opportunities by changing the company's competitive position through use of its resources or strengths. Another strategic option in this quadrant is for the company to maintain a defensive strategy to focus on more promising opportunities in other quadrants.

Quadrant 4 matches a company's weaknesses and the threats in the environment. These are the worst possible scenarios for an organization. However, because of the competitive nature of the marketplace, any company is likely to have information in this quadrant. Strategies in this quadrant may involve using resources in other quadrants to exploit opportunities to the point that other threats are minimized. Additionally, some issues may be moved out of this quadrant by otherwise neutralizing the threat or by bolstering a perceived weakness.

Once a strategy is decided on in each quadrant for the issues facing the company, these strategies require frequent monitoring and periodic updates. An organization is best served by proactively determining strategies to address issues before they become crises.

An example of how a firm can develop strategies using these quadrants is as follows. Generic Corporation produces high-quality, high-priced specialty kitchen items in a catalog and in stores and is known for their excellent customer service. This strength has been able to offset its major weaknesses, which are having few stores and no current capabilities for Internet sales. Its major opportunities come from the explosion of Internet shopping, and its threats are other more high-profile competitors, operating primarily on the Internet, and the concerns of identity theft in Internet sales that many customers have. Matching Generic's strengths to its opportunities (Quadrant 1), the firm may choose to enhance its Internet site to allow online purchases, still providing its excellent 24-hour telephone customer service. Ideally, this strategy will offset the weakness of not having an Internet presence, which addresses the concerns of Quadrant 2. Additionally, by bolstering the strength of excellent customer service by applying it to the online shopping site, the company may be able to alleviate customer concerns about identity theft (Quadrant 3). A strategy for Quadrant 4, which matches the company's weaknesses and threats, is that Generic may consider selling its online business to a competitor. Certainly, the Quadrant 4 strategy is the least preferred, but a proactive strategy that plans for managing such a situation is favored over a crisis

situation in which the company is forced to sell with no planning.

A SWOT analysis is a first, but critical, step in developing an organizational strategy. Examining a company's internal capabilities—its strengths and weaknesses, and external environment—its opportunities and threats, helps to create strategies that can proactively contend with organizational challenges.

SEE ALSO *Strategic Planning Tools; Strategy Formulation*

BIBLIOGRAPHY

Andrews, Kenneth R. *The Concept of Corporate Strategy.* Homewood, IL: R.D. Irwin, 1971.

Barney, Jay. *Gaining and Sustaining Competitive Advantage.* 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2006.

Fleisher, Craig S., and Babette E. Bensoussan. *Strategic and Competitive Analysis: Methods and Techniques for Analyzing Business Competition.* Upper Saddle River, NJ: Prentice Hall, 2003.

Jackson, Susan E., Randall S. Schuler, and Steve Werner. *Managing Human Resources: A Partnership Perspective.* 10th ed. Cincinnati, OH: South-Western College Publishing, 2008.

"Performing a SWOT analysis." *Chartered Management Institute: Checklists: Marketing Strategy,* 1 October 2005.

SWOT Analysis I: Looking Outside for Threats and Opportunities. Cambridge, MA: Harvard Business School Press, 2008.

SWOT Analysis II: Looking Inside for Strengths and Weaknesses. Cambridge, MA: Harvard Business School Press, 2008.

SYNERGY

Synergy, also known as synergism, refers to the combined effects produced by two or more parts, elements, or individuals. Simply stated, synergy results when the whole is greater than the sum of the parts. For example, two people can move a heavy load more easily than the two working individually can each move their half of the load. Synergy can be a positive or negative outcome of combined efforts.

According to the *American Heritage Dictionary*, the term "synergy" is derived from the Greek word *sunergos*, meaning "working together." Positive synergy is sometimes called the 2 + 2 = 5 effect. Operating independently, each subsystem can produce two units of output. However, by combining their efforts and working together effectively, the two subsystems can produce five units of output.

Negative synergy can be called the 2 + 2 = 3 effect. Again, individuals operating alone can each produce two units of output. However, with negative synergy, the combination of their efforts results in less output than what they would have achieved if they had each worked alone. Negative synergy can result from inefficient com-

mittees, business units that lack strategic fit, and from other poorly functioning joint efforts.

HISTORY OF SYNERGY

Synergy has origins as a theological term describing the cooperation of human effort with divine will. In recent years the term has most often been used in association with systems theory. Systems theory, as applied to biology and the physical sciences, describes the interdependence of various parts of an organism, such as the human body. The human body, as a system, is comprised of a set of interrelated subsystems, including the brain, skeleton, muscles, and others. To fully understand the larger system, one must examine the subsystems and the interrelationships. Systems theory was one of the first management theories to explicitly state that changing one of the subsystems could have an impact on the total system. Synergy was developed as a measure of the effectiveness of the joint efforts of various subsystems. Discussions of synergy also figure in medical literature, such as in research that addresses how the effects of medication on individuals are magnified when combined with a special diet or exercise.

INDIVIDUALS AND SYNERGY

One way to observe synergy in an organization is to observe the combined efforts of individuals working together. Synergy can result from the efforts of people serving on committees or teams. By combining their knowledge, insights, and ideas, groups often make better decisions than would have been made by the group members acting independently. Positive synergy resulting from group decisions may well include the generation of more ideas, more creative solutions, increased acceptance of the decision by group members, and increased opportunity for the expression of diverse opinions. Much of the current interest in teams and team building is an effort to achieve positive synergy through the combined efforts of team members.

Negative synergy occurs in groups, committees, and other joint efforts for a number of reasons. Groups commonly experience negative synergy because group decisions are often reached more slowly, and thus may be more expensive to make than individual decisions. The opportunity costs for having a group of high-paid executives spend an afternoon in a meeting rather than in more productive endeavors can be quite high. Negative synergy can also occur in group decisions if an individual is allowed to dominate and control the group decision. Also, groupthink—the pressure to conform—may cause the group to strive for harmony instead of evaluating information and alternative courses of action honestly and objectively.

SYNERGY AT THE ORGANIZATION LEVEL

Organizations strive to achieve positive synergy or strategic fit by combining multiple products, business lines, or markets. One way to achieve positive synergy is by acquiring related products, so that sales representatives can sell numerous products during one sales call. Rather than having two representatives make two sales calls to a potential customer, one sales representative can offer the broader mix of products.

Mergers and acquisitions are corporate-level strategies designed to achieve this kind of positive synergy. For example, the 2004 acquisition of Cingular by AT&T Wireless was an effort to create customer benefits and growth prospects that neither company could have achieved on its own—offering better coverage, improved quality and reliability, and a wide array of innovative services for consumers.

The concept of synergy can be applied to almost any aspect of a firm's operations, from human resources to manufacturing. As Michael Muchnik notes in *Complete Guide to Plant Operations Management, 21st Century Business Synergy* (2006), "A synergy in material handling is realized when jobs are handled without a delay direction into the queue of the next operation."

Negative synergy is also possible at the corporate level. Such negative synergy can result in downsizing, reorganizing, and the divestiture of businesses units. Downsizing to remove unnecessary levels of management has been a common course of action during the twenty-first century for firms looking to cut costs in order to remain competitive. Reorganizing and divestiture have also been used by firms looking to undo the effects of negative synergy. In 2008, Hewlett-Packard consolidated its highly-profitable printing division from five units to three in order to accelerate growth in its printing services businesses. Also in 2008, American International Group (AIG) began putting together a plan to divest in order to focus better on its core insurance businesses.

The intended result of many business decisions is the production of positive synergy, but reducing negative synergy is also a concern. Managers expect that combining employees into teams or broadening the firm's product or market mix will result in a higher level of performance. However, the mere combination of people or business elements does not necessarily lead to better outcomes, and the resulting lack of harmony or coordination can lead to negative synergy.

SEE ALSO *Mergers and Acquisitions; Organizational Structure; Teams and Teamwork*

BIBLIOGRAPHY

"Cingular Wins AT&T Wireless Bid." *CNN.com*, 17 February 2004. Available from: http://www.cnn.com/2004/BUSINESS/02/17/att.wireless/.

Corning, P.A. "Synergy and Self-organization in the Evolution of Complex Systems." *Systems Research* 12, no. 2 (1995): 89–121.

Gupta, D., and Y. Gerchak. "Quantifying Operational Synergies in a Merger/Acquisition." *Management Science* 48, no. 4 (2002): 517–33.

Lehman, C.M., and D.D. DuFrene. *Business Communication.* 15th ed. Mason, OH: Thomson/South-Western, 2007.

Millman, G.J. "Desperately Seeking Synergy." *Financial Executive* 16, no. 2 (March 2000): 12.

Muchnik, Michael. *Complete Guide to Plant Operations Management, 21st Century Business Synergy* 2nd ed. Brooklyn, NY: Integrated Productive Systems, 2006.

Richtel, Matt. "H.P. to Reorganize Its Printing Division." *New York Times,* 20 June 2008. Available from: http://biz.yahoo.com/nytimes/080620/1194786586255.html?.v=19.

SYSTEMS ANALYSIS

Systems analysis is the process of examining a business situation in order to develop a new system, or improve the current system, for the purpose of solving a problem or taking advantage of an opportunity. In present-day usage, systems analysis is geared towards establishing a new computer system or updating an older computer system. Systems analysis, however, goes beyond computer or database programming. It involves understanding activities and interactions within an organization.

PROJECT PROPOSAL

Before the development of any system can begin, a project proposal is prepared by the users of the potential system and/or by systems analysts and submitted to an appropriate managerial structure within the organization. The project proposal is the attempt to respond to or take advantage of a particular situation and is an essential element for correctly launching the system analysis. Although there are no hard and fast rules as to the form and content of the project proposal, the proposal should address the following points:

- The specifics of the business situation or problem

- The significance of the problem to the organization

- Alternative solutions

- The possible use of computer information systems to solve the problem

- The various people interested in or possessing knowledge relevant to the problem

System projects that are to be shared by a number of departments and users are usually approved by a committee rather than an individual. A project proposal is submitted to a committee that determines the merits of the proposal and decides whether or not to approve it. The

committee is made up of people from various functional areas of the organization who have an interest in the operation and information of the proposed system.

THE SYSTEMS DEVELOPMENT LIFE CYCLE

The systems development life cycle (SDLC) describes a set of steps that produces a new computer information system. The SDLC is a problem-solving process. Each step in the process delineates a number of activities. Performing these activities in the order prescribed by the SDLC will bring about a solution to the business situation. The SDLC process consists of the following phases:

1. Preliminary investigation—the problem is defined and investigated.

2. Requirements definition—the specifics of the current system as well as the requirements of the proposed new system are studied and defined.

3. Systems design—a general design is developed with the purpose of planning for the construction of the new system.

4. Systems development—the new system is created.

5. System installation—the current operation is converted to run on the new system.

6. Systems evaluation and monitoring—the newly operational system is evaluated and monitored for the purpose of enhancing its performance and adding value to its functions.

Looping back from a later phase to an earlier one may occur if the need arises.

Each phase has a distinct set of unique development activities. Some of these activities may span more than one phase. The management activity tends to be similar among all phases.

The SDLC is not standardized and may be unique to a given organization. In other words, the names and number of phases may differ from one SDLC to the next. However, the SDLC discussed here is, to a large extent, representative of what is typically adopted by organizations.

At each phase certain activities are performed; the results of these activities are documented in a report identified with that phase. Management reviews the results of the phase and determines if the project is to proceed to the next phase.

The first two phases of the SDLC process constitute the systems–analysis function of a business situation. The following discussion will concentrate on phase one (preliminary investigation) and phase two (requirements definition) of the outlined SDLC process.

PRELIMINARY INVESTIGATION

The first phase of the systems development life cycle is preliminary investigation. Due to limited resources an organization can undertake only those projects that are critical to its mission, goals, and objectives. Therefore, the goal of preliminary investigation is simply to identify and select a project for development from among all the projects that are under consideration. Organizations may differ in how they identify and select projects for development. Some organizations have a formal planning process that is carried out by a steering committee or a task force made up of senior managers. Such a committee or task force identifies and assesses possible computer information systems projects that the organization should consider for development. Other organizations operate in an ad hoc fashion to identify and select potential projects. Regardless of the method used, and after all potential projects have been identified, only those projects with the greatest promise for the well-being of the organization, given available resources, are selected for development.

The objective of the systems–investigation phase is to answer the following questions: What is the business problem? Is it a problem or an opportunity? What are the major causes of the problem? Can the problem be solved by improving the current information system? Is a new information system needed? Is this a feasible information system solution to this problem?

The preliminary-investigation phase sets the stage for gathering information about the current problem and the existing information system. This information is then used in studying the feasibility of possible information systems solutions.

It is important to note that the source of the project has a great deal to do with its scope and content. For example, a project that is proposed by top management usually has a broad strategic focus. A steering committee proposal might have a focus that covers a cross-function of the organization. Projects advanced by an individual, a group of individuals, or a department may have a narrower focus.

A variety of criteria can be used within an organization for classifying and ranking potential projects. For planning purposes, the systems analyst—with the assistance of the stakeholders of the proposed project—collects information about the project. This information has a broad range and focuses on understanding the project size, costs, and potential benefits. This information is then analyzed and summarized in a document that is then used in conjunction with documents about other projects in order to review and compare all possible projects. Each of these possible projects is assessed using multiple criteria to determine feasibility.

FEASIBILITY STUDY

The feasibility study investigates the problem and the information needs of the stakeholders. It seeks to determine the resources required to provide an information systems solution, the cost and benefits of such a solution, and the feasibility of such a solution. The analyst conducting the study gathers information using a variety of methods, the most popular of which are:

- Interviewing users, employees, managers, and customers

- Developing and administering questionnaires to interested stakeholders, such as potential users of the information system

- Observing or monitoring users of the current system to determine their needs as well as their satisfaction and dissatisfaction with the current system

- Collecting, examining, and analyzing documents, reports, layouts, procedures, manuals, and any other documentation relating to the operations of the current system

- Modeling, observing, and simulating the work activities of the current system

The goal of the feasibility study is to consider alternative information systems solutions, evaluate their feasibility, and propose the alternative most suitable to the organization. The feasibility of a proposed solution is evaluated in terms of its components. These components are:

1. Economic feasibility—the economic viability of the proposed system. The proposed project's costs and benefits are evaluated. Tangible costs include fixed and variable costs, while tangible benefits include cost savings, increased revenue, and increased profit. A project is approved only if it covers its cost in a given period of time. However, a project may be approved only on its intangible benefits such as those relating to government regulations, the image of the organization, or similar considerations.

2. Technical feasibility—the possibility that the organization has or can procure the necessary resources. This is demonstrated if the needed hardware and software are available in the marketplace or can be developed by the time of implementation.

3. Operational feasibility—the ability, desire, and willingness of the stakeholders to use, support, and operate the proposed computer information system. The stakeholders include management, employees, customers, and suppliers. The stakeholders are interested in systems that are easy to operate, make few, if any, errors, produce the desired information, and fall within the objectives of the organization.

REQUIREMENTS DEFINITION

This phase is an in-depth analysis of the stakeholders' information needs. This leads to defining the requirements of the computer information system. These requirements are then incorporated into the design phase. Many of the activities performed in the requirements definition phase are an extension of those used in the preliminary investigation phase. The main goal of the analyst is to identify what should be done, not how to do it. The following is a discussion of the activities involved in requirements definition.

Information Needs of the Stakeholders. Analysis of the information needs of the stakeholders is an important first step in determining the requirements of the new system. It is essential that the analyst understands the environment in which the new system will operate. Understanding the environment means knowing enough about the management of the organization, its structure, its people, its business, and the current information systems to ensure that the new system will be appropriate.

The Current Information System. A comprehensive and detailed analysis of the current system is essential to developing a high-quality replacement information system. The analyst should understand and document how the current system uses hardware, software, and people to accept and manage input data and to convert such data into information suitable for decision making. The documentation should be detailed and complete. For example, the analyst should assess the quality of input and output activities that form the user's interface. In addition, the volume and timing of such activities may be documented.

The Capabilities of the New Computer Information System. Functional requirements include the necessary hardware and software configurations along with the appropriate human resources. Specific functional requirements often include the following:

- User interface requirements—the input and output needs of the user that must be provided for by the new computer information system. These needs include layouts and definitions of input and output, volume, frequency, origination of input, and destination for reports.

- Processing requirements—the activities required for converting input into output, including calculations, decision rules, database operations, and other processing operations. In addition, requirements concerning capacity, throughput, turnaround time, response time, and the system's availability time, are established.

- Storage requirements—the organization, content, and size of databases, and types and frequency of updates and inquiries. Furthermore, backup procedures and the length of time and rationale for retention of backups are delineated.

- Control requirements—the accuracy, validity, security, and adaptability requirements for the system's input, processing, output, and databases. Crash recovery and auditing requirements of the organization are further specified in this stage.

The analysis team, at the end of this phase, produces a document containing the functional requirements of the new computer information system. Additionally, the document contains preliminary schedules and a budget for the next phase. The task force or committee responsible for the project studies the document for the purpose of approving or not approving the work of the analysis team. In addition, the analysis team provides the committee with a demonstration. In essence, the analysis team walks the committee members, step by step, through the requirements definition phase. If the committee approves this phase, then the analysis team is funded and given the go-ahead to proceed to the next phase. However, if the committee does not approve this phase, then either the project is canceled or, after appropriate modifications, the analysis team resubmits a new document to the committee.

A walk-through starts with a description of the project. From this point, the analysts delineate a set of well-defined goals, objectives, and benefits of the computer information system. Following that, the budgets and staffing requirements are articulated and the plans are shared with the committee. Specific, planned tasks are compared to actual accomplishments, and deviations, if any, are noted and accounted for. The plans for asset protection and business control are reviewed with the committee members. Finally, the analysts seek the committee's approval of the objectives, plans, time table, and budget for the next phase—systems design.

In summary, systems analysis is an essential starting point in the development of computer information systems projects. An organization generally follows a development pattern set up to meet its needs. Regardless of which methodology an organization uses, the objective of systems analysis is to fully understand the current environment and future requirements of a computer information systems project.

SEE ALSO *Business Process Reengineering; Data Processing and Data Management; Management Information Systems; Open and Closed Systems; Systems Design*

BIBLIOGRAPHY
Dennis, Alan, Barbara Wixom, Robey Roth. *Systems Analysis and Design: An Applied Approach.* 4th ed. Hoboken, NJ: Wiley, 2008.

Kendall, Kenneth, and Julia Kendall. *Systems Analysis and Design.* 7th ed. Englewood Cliffs, NJ: Prentice-Hall, 2007.

McLeod, Raymond, Jr., and George Schell Sumner. *Management Information Systems.* 9th ed. Englewood Cliffs, NJ: Prentice-Hall, 2004.

Valacich, Joseph, Joey George, and Jeffrey Hoffer. *Essentials of Systems Analysis and Design.* 4th ed. Englewood Cliffs, NJ: Prentice-Hall, 2009.

SYSTEMS DESIGN

A system can be defined in several ways, including: (1) a set of interrelated parts that function as a whole to achieve a common purpose; (2) a piece of software that operates to manage a related collection of tasks; or (3) a design for an organization that perceives sets of processes as a related collection of tasks.

Systems can be open or closed. An open system is one that interacts with the external environment; a closed system has no external interactions. A system is normally thought to have inputs, outputs, and a transformation process by which the inputs are transformed to the desired outputs. The majority of systems are open, requiring interaction with the environment for the source of inputs and the destination for outputs.

Almost any collection of related items or tasks that take inputs and produce outputs can be characterized as a system. This also allows for subsystems that are contained by the suprasystem. For example, an airplane can be conceived of as a system. The airplane takes fuel, oxygen, and passengers at one point and transforms the fuel and oxygen to a motive force, thus transforming the passengers from people who wanted to travel to people who have arrived. However, an airplane is made up of many subsystems, such as the engine that takes the fuel inputs and the cargo area that accepts passengers. Individually, either of these two subsystems can function, but together they produce an output that is greater than the sum of the outputs from the two subsystems. In many cases, as in the one described here, systems and subsystems are mutually dependent for their survival, or their utility.

Subsystems need to communicate in order for the suprasystem to function effectively. The subsystems therefore require common language(s) for system integration. Language is of the utmost importance in system integration. This connects systems theory and information theory.

Normally, systems are shown as having a feedback loop. An adaptation from engineering control systems,

this requires systems that are automatically controlled to have a feedback loop in order to direct the correction of inputs to result in the correct outputs. In organizational development theory, this feedback loop can be conceived of as business results, consumer comments, or market information.

For example, a thermostat is a simple system. The thermostat takes the temperature of the room as an input. If the temperature is below the set point, the furnace comes on to heat the room. As the room heats, the temperature that is read into the thermostat is compared against the set point. Once the room temperature reaches the set point, the furnace turns off. The input for this system is the room temperature. The transformation process is the heating of the room. The output is the warmed room. The feedback loop is the constant temperature measurement comparison to the set point.

HISTORY

In the late 1940s Norbert Wiener's *Cybernetics* set the stage for later development of the ideas of systems theory. In 1955, using ideas that were developed from the biological sciences, Bertanlanffy, Hempel, Bass, and Jonas wrote a seminal work on systems theory that presented the activities that occur within a corporation as being similar to a biological system. This was a dramatic shift from the mechanistic way of conceptualizing organizational activities that was popular during the first half of the twentieth century. In 1956 Kenneth E. Boulding presented an addition to systems theory that classified systems into hierarchies. He called this the hierarchy of levels. The hierarchy of levels indicated that systems are composed of a collection of systems that operate in a hierarchical manner.

More recently, Wendell L. French and Cecil H. Bell offered a list of systems into which the typical organization can be separated. The concept of a system was used by Michael Hammer and James Champy to develop their idea of business process reengineering. Systems design continues to be a growing and developing field in the twenty-first century. Such updated works as Valacich, George, and Hoffer's *Essentials of Systems Analysis and Design* (fourth edition published in 2009, first edition published in 2000), indicate the continuing power and importance of the systems approach for organizing and running present-day businesses.

SYSTEMS DESIGN
AND DEVELOPMENT

Systems theory can be helpful in analyzing business processes and finding inefficiencies. Business processes can include a set of elements such as a purchasing agent, a supplier, the customer orders that request a part, and the final product that uses the part. Analyzing how well this system functions across functional lines can help reduce non-value-added activities such as cyclical flows of paperwork and unnecessary cross-checking for accuracy. Many systems such as the one described develop over time without a great deal of effort to design or develop systems with efficiency. They become cumbersome due to stop-gap solutions that increase the number of steps, circular flows, and a variety of other non-value-added activities that are usually implemented to minimize errors or solve a problem in service. As a company grows, these stop-gap fixes can cause bottlenecks and delays in the process. At times, the original purpose of the measure is forgotten or even becomes obsolete, but the process is performed this way by employees who do not understand the system and its goals.

Systems within companies are often not readily apparent because they cross functional borders, geographical borders, and hierarchical borders. Employees within the system can therefore be blind to the impact of their activities on the end result of the system. At times, they may not even be aware of the result itself, but simply their piece of the activity. In systems design, therefore, it is often necessary to look across these borders to identify the key activities of the system and eliminate paperwork or other activities that only serve to reduce overall productivity.

Business Process Reengineering. Business process reengineering (BPR) was begun to help companies overcome these artificial barriers and see the whole system as a process that produces an end product, such as a bill, a satisfied customer, or a well-designed product. The popularity of BPR has waned somewhat because of the high number of failures to produce the promised results. In 1999 Hammer and Champy admitted that about 70 percent of the BPR efforts undertaken do not result in success.

BPR is the identification, analysis, and redesign of systems within a corporation in order to improve the efficiency of the operations. Much of the focus of BPR has been on the elimination of labor and employees, often at a fast pace. This has resulted in the phenomenon of downsizing. Downsizing is meant to eliminate all non-value-added activities as well as all nonessential employees of the system under evaluation. This concept attracted enthusiastic adherence in the early 1990s, and it has continued as a common business practice well into the 2000s, with major corporations often eliminating tens of thousands of jobs at a time. For example, in 2008, Ford Motor Company downsized both its manufacturing and white-collar jobs after a previous downsizing in manufacturing during 2006.

Downsizing has left some internal corporate systems changed with the expectation of improved efficiency, but the result was less than favorable. The interaction of other systems had been neglected in the analysis, as was sufficient time to retrain employees to adapt to the new system. The phenomenon of rehiring fired employees as consultants to keep the business running effectively was a direct result of over-enthusiastic downsizing. This, of course, reduced the expected savings and efficiencies, thus reducing the effectiveness of business process reengineering overall.

Examining a System. Systems design requires that all elements of the system be identified: inputs, outputs, feedback, and transformation. In addition, it is important to recognize that an organization consists of many different systems, all of which interact, and that the transitions between systems can be particularly difficult to manage. The use of systems design allows for the compartmentalization of processes into understandable and measurable systems that can then be diagnosed, redesigned, and implemented. This is of great value to complex organizations that are seeking greater efficiency and profitability.

For example, the system of product delivery—including order receipt, production, materials acquisition, packaging, quality control, and delivery—can be seen as a separate system from the human resources system (which consists of the interviewing, hiring, training, development, and release of employees), although the two systems certainly interact. However, analysis of the efficiencies of the human resources system can be conducted separately from analysis of the efficiencies of the product delivery system. Separating the system into its component parts can assist in the diagnosis of problems in a system. For example, hiring employees is an input to the human resources system, the training and development is the transformation, and the release of employees through retirement, layoffs, or firing is an output, as is the delivery of trained and qualified workers.

It is one thing to conceive of an organization as the total system containing various subsystems in the abstract; in practice, however, identifying the suprasystem and the subsystems has no convention and depends entirely upon the arbitrary perspective of the observer. French and Bell identify five subsystems of a corporation that may be considered generic and applicable to most business entities. These five subsystems are technological, task, structural, human-social, and the external interface subsystems. Other observers might identify more subsystems in a completely different manner.

Simply stated, the diagram of a system can be separated into subsystems by tracing a line around the boundaries of related activities that have a common goal. The items that cross the boundary are then considered inputs or outputs.

Value-Added and Non-Value-Added Activities. Systems design requires that one consider the value-added activities and minimize the non-value-added activities. Value-added activities are those that directly affect the product or service, such as assembly or delivery of a package. Non-value-added activities include such things as quality testing and writing a receipt. Normally this requires a cross-functional team that can examine the interfaces over which the system extends and ensure that these "hand-offs" occur efficiently. Various tools are used to develop a system, and several varieties of flow charts and diagrams can be used to develop a visual representation of the system. Team members may then analyze and discuss the activities represented on the flow chart and evaluate whether they are essential or can be minimized or eliminated.

Oftentimes, this is not immediately evident. For example, perhaps accounting policy once required that the account manager be called every time an order came in from a particular company with a spotty payment history. Over time, the computer systems were upgraded to check customer credit and whether a customer was current on its bills. At this point, the call to the account manager could have been eliminated. However, the customer service agent trained to call the account manager does not realize that these checks are occurring. The account manager receiving the calls may consider them important or trivial, but does not realize that at one time the calls were made to prevent over-selling to unreliable customers. During a discussion and analysis of this system, these two functional representatives should find that this activity is non-value-adding and, because of the improvements to the computer system, the calls are now completely unnecessary—a fact that may not have been uncovered otherwise.

In systems design, any activity that does not directly add to the value of the product is eliminated while value-added activities are made efficient. The related activities that must be done, as well as the activities that aid in the accounting, documentation, or delivery of the product, are examined together.

System Development. System development can be the development of a new system or improvement of an existing system. This can be approached much the same as system design and with much the same tools. However, current employees must be included in the development process and retrained to understand and help with the implementation. In addition, the goals or set points and the feedback loops are developed at this point in order to guide the system toward proper performance.

SYSTEM IMPLEMENTATION

Implementation of a new system design must include training employees to understand the new system and their role in achieving the goals the company has for it. Implementation times can vary depending upon the complexity of the system being implemented.

Computer systems have been developed to help organizations conduct, control, and document related tasks more efficiently. In this case, the design and development requires a study of the system to be modeled or controlled by the computer. Software and hardware are then acquired or developed to effectively handle the tasks. Implementation requires a verification stage that tests the computer system prior to actual use to verify that the system operates as envisioned. Modifications to fit the needs of the corporation are usually made over time as problems are identified with use. These systems tend to be expensive and development often requires significant effort to correctly handle the complexities of each individual company. Some computer systems that can be purchased off the shelf can handle such typical tasks as accounting, inventory control, or transportation. Some of these are even developed for a particular industry. However, most off-the-shelf products still require technical modification to fit the needs of the individual company.

It should be apparent that computer systems closely parallel the organizational systems previously discussed. In this sense the two definitions are related but not the same.

BIBLIOGRAPHY

Bertanlanffy, Ludwig von. *General Systems Theory: Foundations, Development, Applications.* rev. ed. New York: George Brazillers, 1976.

Boulding, Kenneth E. "General Systems Theory—The Skeleton of Science." *Management Science* 2 April 1956): 197—208.

Dennis, Alan, Barbara Wixom, Robey Roth. *Systems Analysis and Design: An Applied Approach.* 4th ed. Hoboken, NJ: Wiley, 2008.

French, Wendell L., and Cecil H. Bell, Jr. *Organizational Development: Behavioral Science Interventions for Organizational Improvement.* 6th ed. Englewood Cliffs, NJ: Prentice Hall, 1999.

Hammer, Michael, and James Champy. *Reengineering the Corporation.* New York: Harper Business, 2003.

Kast, Fremont E., and James E. Rosenzweig. "General Systems Theory: Applications for Organization and Management." *Academy of Management Journal,* December 1972, 447–465.

Kendall, Kenneth, and Julia Kendall. *Systems Analysis and Design.* 7th ed. Englewood Cliffs, NJ: Prentice-Hall, 2007.

Mingers, John, and Leslie P. Willcocks, eds. *Social Theory and Philosophy for Information Systems.* New York: John Wiley & Sons, 2004.

Wiener, Norbert. *Cybernetics.* New York: Wiley, 1948.

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TASK ANALYSIS

The definition of task analysis varies depending on the purpose for which it is being employed and the context in which it is performed. Similarly, purposes for conducting task analyses vary, from using the process as an aid in designing job descriptions to using it to develop effective tools for human-computer interaction (e.g., analyzing user needs and behaviors to develop software). David H. Jonassen et al. describe five general classes of task analysis: job or performance analysis, learning analysis, cognitive task analysis, content or subject–matter analysis, and activity–based methods, which is a relatively new category of the task-analysis discipline. Each approach requires different methods. In many cases, however, task analysis can most simply be described as the division of activity into its specific component levels in order to determine the value in solving particular performance problems.

Task analysis is a way of assessing what people, machines, or a combination thereof do and why they do it. Analyses examine how and where specific information flows, how it is modified at various stages (what is done to the information), who performs those modifications (a computer or person), and whether he, she, or it is the appropriate vehicle for efficient and effective completion of those tasks.

Task analysis is also studied in relation to group support systems (GSS). This type of analysis does not focus on the study of all tasks, but on those tasks typically encountered in organizational decision–making groups. Often such analysis is conducted in an effort to discern how the introduction of new elements, such as technology, can facilitate more effective group functioning and decision making.

Some workplaces emphasize tasks so heavily that they can be considered task environments, or may operate under task management. A task environment views tasks as behavior requirements. Required behaviors vary with the tasks to be performed, and those tasks influence behavior in that each task is characterized by its purpose, that is, what group members must do to accomplish a certain task (e.g., creative tasks require that a group generates ideas). Behavior determination for each task includes deciding what needs to be accomplished and how each goal should be met. Leaders in these organizations focus on managing the work that needs to be performed, and they expect employees to fall in line behind them in order to meet the prescribed goals. More specifically, the leaders manage procedures for coordinating the sequence of procedures and materials for the completion of specific tasks. These types of situations provide much fodder for research into group support systems and organizational behavior.

ORIGINS OF TASK ANALYSIS

Task analysis has been studied almost since the Industrial Revolution, during which employers began to focus on breaking down jobs into the specific tasks required. One of the first true leaders of task analysis was Frederick Winslow Taylor, the author of *The Principles of Scientific Management*, first published in 1911. Taylor applied critical thinking to industry, seeking the most efficient way to perform tasks and/or jobs and rewarding workers who found ways to facilitate working toward that goal.

Taylor's theories were a precursor to Jonassen's first classification of task analysis: job or performance analysis.

Originally meant to describe the simple behaviors performed on the job, analysis of this sort also became used as a way to plan technical training. During the 1950s and 1960s subject–matter analysis began to be used to plan curricula in educational facilities. This involved analyzing content into its most basic constructs and determining how they relate to other subject matter. The 1960s led to another revolution in learning psychology, and thus, to another form of analysis: learning analysis. This movement focused on people who learned processed information as they performed certain tasks. Cognitive task analysis evolved from this class, as did research in human–computer interaction. Finally, activity analysis studies how people perform in natural surroundings and which social and contextual factors affect that performance.

Task analysis was studied in organizational literature and as part of the group process in the mid–to late–1960s. Scholars of group behavior felt that tasks undertaken as part of the group process played particularly important roles in how group members interacted and performed. Group support systems (GSS) literature also emphasized the importance of tasks and, from the mid–1980s to the mid–1990s, developed a task classification scheme that has since been widely used. In the late 1990s theories were explored as to how tasks and technology worked together within GSS. The theory asserts that clear descriptions of tasks are an important part of any GSS environment, and that technology is linked specifically to the demands of the tasks to be performed.

DEFINING DATA AND ACTIVITY FLOW

A major part of task analysis is defining the data or information processed in an organization, as well as the flow of that organization's activity. This analysis helps an organization better understand its practices. Many professionals clarify ideas through the use of data–flow diagrams and activity–flow diagrams. Data–flow diagrams provide detail on information—where it goes and when, and which unit of a system handles it at which point. Activity–flow diagrams provide detail on the data processing and a system's communication needs.

DATA–FLOW DIAGRAMS

Specific elements included on data–flow diagrams (DFDs) include outside units such as customer needs, inside units such as the employees who actually manipulate data, and whether a data element inputs to an element or reads from an element. Data storage areas are also indicated on DFDs. Data–flow diagrams can be designed to illustrate existing processes as well as to document better and even ideal situations. Each type of element is denoted within a prescribed symbol (e.g., rectangles sig-

nify outside units) so that a simple glance at the chart is enough to differentiate each element.

DFDs are helpful in that they show exactly how data flow is initiated and by whom, who or which system receives the data, and what they do to the data. Diagrams can also be annotated to show the volume and frequency with which these changes occur. However, data–flow diagrams do not show specific processing details, nor are they a helpful representation of how the process fits onto a timeline.

ACTIVITY–FLOW DIAGRAMS

Activity–flow diagrams (AFDs) keep track of the people or systems that use data or information, and the time sequence in which that occurs. Activity–flow diagrams are similar to flow charts, with a special language and symbols specific to their purpose. They also note any activities that involve the transformation of data or materials.

Activities included on AFDs include the following:

1. Transportation of information—physically moving information from one place to the next. No transformation of data takes place.

2. Information transformation—changing information from one medium to another. The location and content of that data does not change.

3. Algorithmic processing—sorting incoming data and making decisions about the information according to pre–programmed rules.

4. Judgmental processing—sorting information according to multiple, more complex dimensions than algorithmic processing may be capable of.

5. Correlating information—retrieving information from several sources and merging several aspects of each to form a new record.

6. Information analysis—looking for patterns, projections, and trends in the treatment of data.

7. Negotiation—persuading, teaching, and learning. It involves using more complex judgment and interpersonal communication.

8. Information generation—organizing, synthesizing, and adding new information.

The purpose of AFDs is to look for efficiencies and prescribe support in the most appropriate and effective way possible where it is lacking. Support may be required in a human capacity, or technological systems may be available to automate or support some activities. Processes are allocated to computers and/or personnel according to what each does best and what best suits the needs of the specific processes. Various options are analyzed using cost/benefit analysis, but tend to follow some general conditions:

- Data transport, transformation, and algorithmic processing can be highly automated.

- Judgment processing and correlation can be supported by technology.

- Analysis and creation of data requires human effort.

TRENDS

The use of task analysis across various market segments is growing. Computer–supported cooperative work (CSCW) and GSS continue to increase in importance, along with the need to support interdisciplinary collaboration, telecommuting, and cultural challenges in the global workplace. With the number of telecommuting jobs rising sharply in the U.S.–estimated at 44.4 million in 2004, 7.5 percent higher than in 2003–new types of task analysis are taking on greater importance. With studies estimating that employers can save up to $5,000 annually per employee who works from home, firms have a direct interest in determining how to design job descriptions for telecommuters and how to support these workers with tools that will make them more effective.

The use of task analysis is making its way into the military as well. As described in a 2004 article by Pezzano and Burke in *Defense AT&L*, the U.S. Army used task analysis to identify requirements, increase flexibility, and reduce risk in maturing technological systems. With the present pace of technological innovation in the military, task analysis will continue to be an important part of maintaining effectiveness in this sector.

In the fields of occupational and organizational psychology, cognitive task analysis is being used in two ways. In the healthcare field, occupational therapists work to identify how people approach everyday tasks in order to better help patients learn to perform tasks. On a more organizational level, researchers examine the cognitive activity behind complex task performance to better train workers and design or improve manufacturing systems. The goal in these studies is to reduce error and mitigate risk in work settings. This is also referred to as "process tracing." While no dominant methodology has evolved yet for this emerging trend, models are being developed and proposed as the popularity of the technique continues to grow.

SEE ALSO *Human Resource Management; Job Analysis; Strategic Planning Tools*

BIBLIOGRAPHY

Crandall, Beth, Gary Klein, and Robert R. Hoffman. *Working Minds: A Practitioner's Guide to Cognitive Task Analysis.* Cambridge, MA: MIT Press, 2006.

Desberg, Peter, and Judson Taylor. *Essentials of Task Analysis.* Lanham, MA: University Press of America, 1986.

Diaper, Dan, and Neville Stanton, eds. *The Handbook of Task Analysis for Human–Computer Interaction.* Mahwah, NJ: Lawrence Erlbaum, 2004.

Hackos, JoAnn T., and Janice C. Redish. *User and Task Analysis for Interface Design.* New York: John Wiley & Sons, 1998.

Jonassen, David H., Wallace H. Hannum, and Martin Tessmer. *Handbook of Task Analysis Procedures.* Westwood, CT: Greenwood Publishing Group, 1989.

Kirwan, B., and L.K. Ainsworth. *A Guide to Task Analysis.* Washington: Taylor & Francis, 1992.

Patrick, John, and Nic James. "Process Tracing of Complex Cognitive Work Tasks." *Journal of Occupational and Organizational Psychology* June 2004: 259.

Pezzano, Anthony, and Peter Burke. "Flexible Contracting Approach: Mitigating the Challenges of Technology Maturation." *Defense AT&L,* July/August 2004, 20.

———. *Task Analysis Methods for Instructional Design.* Mahwah, NJ: Lawrence Erlbaum Associates, 1999.

"U.S. Telework Scene–stats and facts." Available from: http://www.ivc.ca/studies/us.html.

Watson, Diane E. *Task Analysis: An Individual and Population Approach.* 2nd ed. Bethesda, MD: American Occupational Therapy Assn., 2003.

TEAMS AND TEAMWORK

A team is a collection of interdependent individuals organized to accomplish a common purpose. Teams exist within a larger organization and interact with other teams and with the organization. Teams are one way for organizations to gather input from members and to provide organization members with a sense of involvement in the pursuit of organizational goals. Further, teams allow organizations flexibility in assigning members to projects and allow for cross-functional groups to be formed.

TYPES OF TEAMS

There are six major types of teams: informal, traditional, problem solving, leadership, self-directed, and virtual. Table 1 describes some of the characteristics of these six types of teams.

Informal Teams. Informal teams are generally formed for social purposes. They can help to facilitate employee pursuits of common concerns, such as improving work conditions. More frequently however, these teams form out of a set of common concerns and interests, which may or may not be the same as those of the organization. Leaders of these teams generally emerge from the membership and are not appointed by anyone in the organization.

Table 1

Six Types of Teams

Informal
- Social in nature
- Leaders may differ from those appointed by the organization

Traditional
- Departments/functional areas
- Supervisors/managers appointed by the organization

Problem-Solving
- Temporary teams
- Frequently cross-functional
- Focused on a particular project

Leadership
- Steering committees
- Advisory councils

Self-Directed
- Small teams
- Little or no status differences among team members
- Have authority to decide how to get the work done

Virtual
- Geographically spread apart
- Meetings and functions rely on available technology

Traditional Teams. Traditional teams are the organizational groups commonly thought of as departments or functional areas. Leaders or managers of these teams are appointed by the organization and have legitimate power in the team. The team is expected to produce a product, deliver a service, or perform a function that the organization has assigned.

Problem-Solving Teams. Problem-solving teams or task forces are formed when a problem arises that cannot be solved within the standard organizational structure. These teams are generally cross-functional; that is, the membership comes from different areas of the organization and are charged with finding a solution to the problem.

Leadership Teams. Leadership teams are generally composed of management brought together to span the boundaries between different functions in the organization. In order for a product to be delivered to market, the heads of finance, production, and marketing must interact and come up with a common strategy for the product. At top management levels, teams are used in developing goals and a strategic direction for the firm as a whole.

Self-Directed Teams. Self-directed teams are given autonomy over deciding how a job will be done. These teams are provided with a goal by the organization, and then determine how to achieve that goal. Frequently there is no assigned

manager or leader and very few, if any, status differences among the team members.

These teams are commonly allowed to choose new team members, decide on work assignments, and may be given responsibility for evaluating team members. They must meet quality standards and interact with both buyers and suppliers, but otherwise have great freedom in determining what the team does. Teams form around a particular project and a leader emerges for that project. The team is responsible for carrying out the project, for recruiting team members, and for evaluating them.

Virtual Teams. Technology is impacting how teams meet and function. Collaborative software and conferencing systems have improved the ability for employees to meet, conduct business, share documents, and make decisions without ever being in the same location. While the basic dynamics of other types of teams may still be relevant, the dynamics and management of virtual teams can be very different. Some have pointed out that building team chemistry and a specific team dynamic can be far more difficult for virtual teams. Issues can arise with a lack of facial or auditory clues; participants must be taken at their word, even when video-conferencing tools are used.

Accountability is impacted by taking a team virtual. Each member is accountable for their tasks and to the team as a whole usually with minimal supervision. Some have pointed out that members' performance in a virtual team needs to be measured by outcome. Key factors in the success of a virtual team are effective formation of the team, trust and collaboration between members, and excellent communication.

In general, managers must be attuned to dynamics that are unique to virtual teams. In Blackwell's handbook on global management, Davison and Ekelund note that conflict can take on a specific character in a virtual environment. While it can explode quickly, it can dissipate just as fast. They stress the importance of being deliberate in writing communications, to avoid information being read out of context.

However, virtual teams can also present specific advantages. For example, they allow managers to assemble the best team members across an entire organization. Judy Zuccon and others advise that virtual teams must take advantage of numerous communications and collaborative tools, such as blogs and wikis.

Global Teams. With the globalization of business, multinational firms can assemble teams comprised of members in different countries throughout the world. To a large degree, information technology has made this possible. However, while some global teams do resemble virtual teams, others may take the form of more traditional

teams. Some argue that even if a global team will be operating as a virtual team for the most part, initial in-person meetings are crucial to establishing a rapport among team members.

Often times, members of global teams are also members of different teams. Global teams are used to work on both short-term and long-term projects. However, as Julia C. Gluesing and Christina B. Gibson note In Blackwell's handbook on global management, global teams do not necessarily represent the most efficient manner of completing a task. They point out that issues of time and distance mean that some tasks can be accomplished with greater speed by local teams. Additionally, cultural differences can present a challenge to global teams. These differences can be made manifest in different communication styles, languages, and operating styles.

To combat this challenge, Gluesing and Gibson emphasize creating a shared "context" or environment, something akin to a third space where team members can create a shared culture, even if that culture and context survives only as long as the team itself does. The standard ways of creating this context are those that are used to create ritual and symbol in creating a company culture. Another way to ensure the effectiveness in global teams is selecting the team members carefully. Finally, Gluesing and Gibson stress the importance of clear communication. Communicate information as deliberately and specifically as possible to ensure that the message is being conveyed clearly.

Global teams also present unique challenges to managers and team leaders. Many of these have to do with managing cultural differences and perceptions. In Blackwell's handbook on global management, Bradley L. Kirkman and Deanne N. Den Hartog point out that members of a global team from different nations may have different expectations regarding performance and management. Some team members may want to be recognized for their own performance, while this same measure may be of little to no importance for other team members. In general, those leading global teams must be very involved in how that team functions, paying close attention to maintaining an environment, virtual or otherwise, where all team members are comfortable operating.

CHARACTERISTICS OF EFFECTIVE TEAMS

Some characteristics of effective teams are clear direction and responsibilities, knowledgeable members, reasonable operating procedures, good interpersonal relationships, shared success and failures, and good external relationships.

Clear Direction. Clear direction means that the team is given a clear and distinct goal. The team may be empow-

ered to determine how to achieve that goal, but management, when forming the team, generally sets the goal. A clear direction also means that team outcomes are measurable.

Clear Responsibilities. Clear responsibilities means that each team member understands what is expected of her or him within the team. The roles must be clear and interesting to the team members. Each team member needs to be able to rely on all the other members to carry out their roles so that the team can function effectively. Otherwise, one or two team members come to feel that they are doing all the work. This is one of the reasons so many individuals are initially reluctant to join teams.

Knowledgeable Members. An effective team will be comprised of individuals who have the skills and knowledge necessary to complete the team's task. Cooperation is essential at an early stage in inventorying the skills and knowledge each member brings to the team, and working to determine how to utilize those skills to accomplish the team task.

Reasonable Operating Procedures. All teams need a set of rules by which they operate. Sports teams, for example, operate according to a clearly laid-out set of rules about how the game is played. Similarly, work teams need a set of procedures to guide meetings, decision making, planning, division of tasks, and progress evaluation. Setting, and sticking to, procedures helps team members become comfortable relying on one another.

Interpersonal Relationships. Teams are composed of diverse individuals, each of whom comes to the team with his or her own set of values. Understanding and celebrating this diversity helps to make a stronger, more effective team.

Sharing Success and Failures. Everyone wants to feel appreciated. Within a team, members should be willing to express their appreciation, as well their criticisms, of others' efforts. Similarly, the organization must be willing to reward the team for successful completion of a task and hold all members responsible for failure.

External Relationships. In the process of building a strong team, groups external to the team are frequently ignored. In order for the team to successfully complete its task, it cannot operate in isolation from the rest of the organization. Teams need help from people within the organization who control important resources. Establishing clear lines of communication with these people early on will facilitate the completion of the team's task.

TEAM BUILDING

The most successful teams go through five stages of development. Table 2 outlines these stages.

Forming. Forming is the stage when team members become acquainted with one another. They also assess the group task and the ground rules that will apply to that task. At this stage everyone is typically very polite and willing to go along with suggestions made by other team members. Team members try to avoid making enemies and are frequently more patient with one another than they might be later in the process.

Storming. As the novelty of being a member of the team wears off, conflict emerges. Members of the team emerge who want to exert greater influence over the process. Leadership struggles begin, as do interpersonal conflicts. Conflicts erupt over the task requirements and the best way to achieve that task. This is the stage at which listening and finding mutually acceptable resolutions to the conflict is most important. The team can either emerge united and ready to take on the assigned task, or divided, with some members taking a passive role.

Norming. In the norming stage team members make an effort to discover what standards of performance are acceptable. What do deadlines really mean? How high a level of quality is necessary? Does every member have to be at every meeting? What about developing sub-teams? If the team can establish harmonious relationships at this stage, they are ready to move on to the performing stage. Some teams, however, disband at this stage.

Table 2

Five Stages of Team Development

Forming
- Assess the ground rules
- Gather information about group goals

Storming
- Initiate conflict with other team members
- Find mutually acceptable resolutions

Norming
- Build cohesion
- Develop a consensus about norms

Performing
- Channel energy toward the task
- Apply problem-solving solutions generated in the previous stages

Adjournment
- Disengagement after successful completion of goals
- Regrets at team break-up

Performing. At this stage the team is ready to be productive and work on the task assigned. Team members' roles have been established and clarified. Group interaction should be relatively smooth as the team applies some of the problem-solving skills it learned in earlier stages to the task at hand. If the team has reached this stage without successfully working through the problems and issues of the earlier stages, it may disband or regress and work through those issues.

Adjournment. At some point almost all teams are disbanded, whether their task is completed or a team member leaves. On the one hand this can be a happy stage, with members congratulating one another on a job well done. On the other hand adjournment means the disruption of working arrangements that may have become comfortable and efficient, and possibly the end of friendships.

SELECTING THE TEAM MEMBERS

Forming an effective team is more complex than simply throwing a group of people together, assigning them a task, and hoping for the best. Potential team members need to be interviewed and their skills and knowledge should be assessed. Issues to consider in selecting team members include: the individual's motivation with respect to both the team and the task at hand; the attitudes and goals of potential team members; potential problems with intragroup relationships; and potential problems with relationships with external groups.

The organization needs to first assess what the skills, knowledge, and attitudes of potential team members should be. What are the tasks that need to be accomplished for the team to be successful? Have managers analyzed the jobs and developed an inventory of required skills and knowledge?

Once these steps have been completed, potential team members can be interviewed. Among the issues the interview process should cover are:

- What strengths does the individual bring to the team?
- What is she or he willing to work on improving?
- What problem solving style does the individual employ?
- Can she or he share information in an effective manner?
- Does the individual have good listening skills?
- Can the individual provide constructive feedback?

It is important to remember that effective teams are generally made up of a variety of personalities. The selection process needs to be structured so that it is not biased

toward one personality type. An effective team needs both the thoughtful, detail-oriented individuals, as well as the outgoing, insightful individuals.

Additional considerations for building an effective team are being identified. There are four important factors to consider when selecting team members:

1. Years of professional work experience
2. Frequency of team participation
3. Type of team training
4. Situational entry to team assignments (volunteered, assigned, requested)

These factors can be effectively utilized by management when selecting team members to increase the opportunity for overall success.

ORGANIZATIONAL BENEFITS OF TEAMS

The major impetus for organizations to embrace the team concept is the effort to improve productivity and quality. Teams are a key component of many total quality management programs. The QS 9000 program, which suppliers to the major automobile manufacturers have embraced, relies on the team approach to ensure quality while maintaining a low-cost approach to manufacturing.

In addition to improved productivity and quality, some of an organization's major benefits from the use of teams are improved quality of work life for employees; reduced absenteeism and turnover; increased innovation; and improved organizational adaptability and flexibility. Effective implementation of teams can also improve office politics by improving the communication and trust between the team members.

Improved Quality of Work Life. Effective teams frequently improve the quality of work life for the employees. An effective team is generally one in which members are empowered to make decisions about how to get work done. Giving team members authority and control over the work processes reduces the amount of external control and increases the sense of ownership and accountability for the work being done. This helps to create a satisfying and rewarding work environment.

Lower Absenteeism and Turnover. A satisfying and rewarding work environment helps to lower absenteeism and turnover. Teams are particularly effective in this area. Membership in a work team gives an employee a sense of belonging, interaction with others on a regular basis, and recognition of achievements. All of these help to eliminate a sense of isolation within the organization. Team members identify with and feel pride in the work they are

doing and come to rely on one another being there. At some companies, employees are evaluated based on their contribution to their team's efforts.

Teams are not appropriate for all organizations or in all types of businesses. Behavioral scientists are still working to determine exactly when teams will be most effective, what motivates team members, what types of business can best benefit from the implementation of teams, and so on. The study of the philosophy and psychology of teamwork is still in its infancy. While effective teams can produce extraordinary results, studies have found that an estimated 50 percent of self-directed work teams culminate in failure.

The introduction of effective and stable new technologies has greatly affected teams and teamwork. Collaborative software and other multimedia options are providing businesses with tools to conduct teamwork regardless of location or time. New issues of accountability, team structure, and team selection are arising for management to deal with and coordinate within the businesses' overall goals and objectives.

But as more and more businesses introduce the team concept, the wrinkles in the process are being ironed out and team popularity is growing. An increasing number of organizations are using teams to improve productivity and quality, and to solve a range of managerial problems.

Improved quality of work life and a reduction in absenteeism and turnover all contribute to a positive impact on the bottom line. Involving employees in teams helps the organization remain open to change and new ideas. As long as teams are seen as a means of improving the organization's ability to meet competitive challenges, teams will be part of the business world.

SEE ALSO *Empowerment; Group Dynamics; Participative Management*

BIBLIOGRAPHY

The Blackwell Handbook of Global Management. Lane, Henry W., Martha L. Maznevski, Mark E. Mendenhall, and Jeannne McNett, ed. Malden, Massachusetts: Blackwell Publishing, 2004.

Carney, Steven H. *The Teamwork Chronicles: A Startling Look Inside the Workplace for Those Who Want Better Teamwork.* Austin, TX: Greenleaf Book Group, LLC, 2003.

Gold, N. *Teamwork: An Interdisciplinary Approach.* New York: Palgrave Macmillan, 2005.

Huszczo, Gregory E. *Tools for Team Excellence: Getting Your Team into High Gear and Keeping It There.* Palo Alto, CA: Davies-Black Publishing, 1996.

Johnson, P., V. Heimann, and K. O'Neill. "The 'Wonderland' of Virtual Teams." *Journal of Workplace Learning* 13, no. 1 (2001): 24.

Lewis, Carol. "So Far and Yet So Near." *The Times,* 26 October 2006, 4.

"Managing Virtual Teams is Fraught with Difficulty, Says New Report." *Training Journal* 5 (May 2003).

Maxwell, John C. *The 17 Indisputable Laws of Teamwork: Embrace Them and Empower Your Team.* Nashville, TN: Nelson Books, 2001.

Nemiro, Jill. *Creativity in Virtual Teams: Key Components for Success.* San Francisco, CA: Pfeiffer, 2004.

"Overcoming Electronic Barriers." *The Irish Times,* 6 October 2006, 12.

Stewart, Greg L., Charles C. Manz, and Henry P. Sims. *Team Work and Group Dynamics.* New York: John Wiley & Sons, 2000.

Weiss, W.H. "Team Management." *SuperVision* 65 no. 11 (November 2004): 19–21.

Zuccon, Judy. "IT Down to a T." *Herald Sun,* 26 June 2007, 51.

TECHNOLOGY MANAGEMENT

Since technology is such a vital force, the field of technology management has emerged to address the particular ways in which companies should approach the use of technology in business strategies and operations. Technology is inherently difficult to manage because it is constantly changing, often in ways that cannot be predicted. Technology management is the set of policies and practices that leverage technologies to build, maintain, and enhance the competitive advantage of the firm on the basis of proprietary knowledge and know-how.

The U.S. National Research Council in Washington, D.C., defined management of technology (MOT) as linking "engineering, science, and management disciplines to plan, develop, and implement technological capabilities to shape and accomplish the strategic and operational objectives of an organization" (National Research Council, 1987). While technology management techniques are themselves important to firm competitiveness, they are most effective when they complement the overall strategic posture adopted by the firm. The strategic management of technology tries to create competitive advantages by incorporating technological opportunities into the corporate strategy.

In the context of a business, technology has a wide range of potential effects on management:

- Reduced costs of operations. For example, Dell Computer Corporation used technology to lower manufacturing and administrative costs, enabling the company to sell computers cheaper than most other vendors.

- New product and new market creation. For example, Sony Corporation pioneered the technology of miniaturization to create a whole new class of portable consumer electronics (such as radios, cassette tape recorders, and CD players).

- Adaptation to changes in scale and format. In the early part of the twenty-first century, companies addressed how small devices such as cell phones, personal digital assistants (PDAs), and MP3 players could practically become, as well as how each product could support various features and functions. For example, cell phones began to support email, web browsing, text messaging, and even picture taking as well as phone calls.

- Improved customer service. The sophisticated package-tracking system developed by Federal Express enables that company to locate a shipment while in transit and report its status to the customer. With the development of the World Wide Web, customers can find the location of their shipments without even talking to a Federal Express employee.

- Reorganized administrative operations. For example, the banking industry has reduced the cost of serving its customers by using technologies such as automated teller machines, toll-free call centers, and the Web. In 2005, the cost of a bank transaction conducted by a human teller was approximately $2, compared to $1 for a telephone banking transaction, $.50–1.00 for an ATM transaction, and about $.10 for banking over the Internet. Automated Clearing House (ACH) or "checkless" check processing costs were $.25–.50 per transaction. This reduction in cost could be attributed primarily to reducing the amount of labor involved, which had a profound effect on employment and labor-management relations in banking.

Professor Michael Porter of the Harvard Business School is one of many business analysts who believe that technology is one of the most significant forces affecting business competition. In his book *Competitive Advantage* (1985), Porter noted that technology has the potential to change the structure of existing industries and to create new industries. It is also a great equalizer, undermining the competitive advantages of market leaders and enabling new companies to take leadership away from existing firms. In a Grant Thorton LLP survey conducted during late 2004, 47 of 100 mid-size manufacturing businesses agreed that innovation had become increasingly import to the industry. As M.F. Wolff reported, corporate strategists were encouraging this by bringing product designers along on customer visits, offering rewards and recognition programs to employees with innovative ideas, including innovation as a priority in business strategies, setting revenue goals attributable to innovation, and looking for "willingness and ability to innovate" when making hiring decisions.

It is important to note that technology management is different from research and development (R&D)

management. R&D management refers to the process by which a company runs its research laboratories and other operations for the creation of new technologies. Technology management focuses on the intersection of technology and business, encompassing not only technology creation but also its application, dissemination, and impact. Michael Bigwood suggests that New Technology Exploitation (NTE) lies somewhere between R&D and New Product Development, with characteristics of the cyclical learning process of scientific discovery and the more defined and linear process of product development.

Given these trends, a new professional position, known as the technology manager, emerged. Generalists with many technology-based specializations and new managerial skills, techniques, and ways of thinking, technology managers know company strategy and how technology can be used most effectively to support firm goals and objectives.

Educational programs supporting this career grew as well. Formal Technology Management programs became available in the 1980s and these were largely affiliated with engineering or business schools. Coursework was limited, and the field was just finding its own unique focus. During the 1990s, the increasing integration of technology into overall business function and strategy helped to align technology management more closely with business programs. Most graduate programs in the 2000s were offered through business schools, either as separate MBA tracks or as MBA concentrations. Coursework in these programs shifted emphasis from technology to management, centering around innovation management and technology strategy, while touching on other areas such as operations, new product development, project management, and organizational behavior, among others. There was still little specialization in any particular industry.

During the early 2000s, another shift took place. Global distribution, outsourcing, and large-scale collaboration impacted the nature of technology management (TM) and preparatory educational programs. In response, several MBA programs shifted their technology management focus to "innovation and leadership," with particular emphasis on real-world problem solving in partnership with large corporations.

TECHNOLOGY AND INNOVATION

Technological change is a combination of two activities—invention and innovation. Invention is the development of a new idea that has useful applications. Innovation is a more complex term, referring to how an invention is brought into commercial usage. The distinction between the two is very important. As an example, Henry Ford did not invent the automobile; companies in Europe such as Daimler were producing cars well before Ford founded his company. Henry Ford instead focused on the innova-

tion of automobiles, creating a method (mass production) by which cars could be manufactured and distributed cheaply to a large number of customers. However, Ford later failed to innovate further, and lost market share as General Motors began introducing new products and automobile models on a regular basis.

The practice of technology management and the development of technology strategy require an understanding of the different forms of innovation and the features of each form.

- Incremental innovations exploit the potential of established designs, and often reinforce the dominance of established firms. They improve the existing functional capabilities of a technology by means of small-scale improvements in the technology's value, adding attributes such as performance, safety, quality, and cost.

- Generational or next-generation technology innovations are incremental innovations that lead to the creation of a new but not radically different system.

- Radical innovations introduce new concepts that depart significantly from past practices and help create products or processes based on a different set of engineering or scientific principles and often open up entirely new markets and potential applications. They provide new functional capabilities unavailable in previous versions of the product or service. More specifically related to business, radical innovation is defined in a 2005 article by O'Connor and Ayers as "the commercialization of new products and technologies that have strong impact on the market, in terms of offering wholly new benefits, and the firm, in terms of its ability to create new businesses."

- Architectural innovations serve to extend the radical-incremental classification of innovation and introduce the notion of changes in the way in which the components of a product or system are linked together.

There are two important steps required to properly manage corporate innovation. First is to correctly identify a project as a new product vs. a technological innovation, so a proper development process can be used (the first may be a more traditional stage-gate process; the second should be more cyclical and iterative). Second, managers need to identify what category an innovation falls under, since each type of innovation has its own challenges.

INNOVATION MANAGEMENT

Invention is an activity often identified with a single engineer or scientist working alone in a laboratory until

he or she happens upon an idea that will change the world, like the light bulb. In reality, industrial invention, at least since the time of Edison, has involved many people working together in a collaborative setting to create new technology. Innovation requires an even broader set of people, including manufacturing engineers, marketing and sales managers, investors and financial managers, and business strategists. The methods for organizing this set of people to bring a new idea from the laboratory to the marketplace form the basis of the discipline of innovation management.

Innovation traditionally has been viewed as a linear process, which involves several stages in sequence: research, development, manufacturing, marketing, and ultimately, reaching the customer.

In each step, a group of employees take the idea as it is passed to them from the previous stage, modify it to accomplish a specific function, and pass it on to the next stage. Each team involved in the process has a clear function. Researchers are responsible for creating a working demonstration of the technology, developers and engineers turn it into something that can be produced, manufacturing engineers actually turn out the product, and marketers sell it to customers.

This linear model of innovation has proven to be a misconception of the process, however. For example, problems during the manufacturing process may require researchers to go back and change the technology to facilitate production. The technology may reach the marketing stage, only to turn out to be something no one wants to buy. Technology cannot be handed off between stages like a baton in a relay race. In any case, managing innovation in a sequential process would take a very long time, especially if each stage needs to perfect the technology before it can move on to the next stage. Some models simply add on to the linear stage-gate development approach, adding R&D discovery or planning phases to the front end of the process.

An alternative to the linear model of innovation was offered by the expanded, *chain-linked* model of innovation. This model captures the interactions between the different stages of innovation in a more complete fashion. Some of the important aspects of innovation highlighted by this model are:

- Technologies can move both forwards and backwards in the process, for example going back to the lab if further development is needed.

- Downstream stages (such as marketing) can be consulted for input at earlier stages (such as design and test).

- Scientific research and engineering knowledge contributes to every stage in the innovation process.

- Most firms create technology platforms, which are generic architectures that become the basis for a variety of technology-based products and services.

- The knowledge and skills needed for innovation are developed by communities of practitioners, not by individuals, and many of those communities exist outside of a particular firm (for example, in universities).

- Users of technology can be an important source of ideas for improvements or even new innovations with substantial market potential.

While the chain-linked model of innovation is more difficult to comprehend and analyze than the linear model, it is ultimately more rewarding as it tracks more closely to the way that innovations actually progress on their way from the laboratory to the marketplace.

Another innovation process suggested was new technology exploitation (NTE), as suggested by Bigwood, which resides somewhere between new product development and "pure science." He defined NTE as "the testing of novel technical approaches specifically aimed at achieving a pre-defined result (target performance, cost reduction, etc.)." It is an iterative process, allowing for the more cyclical learning process of scientific discovery, but clearly working toward tangible goals and benefits.

INTERNAL FORCES AFFECTING INNOVATION

While users and other external organizations are important sources of ideas for innovations, the internal organization of a company has the greatest impact on its capability for creating innovation. The ideal work environment for innovation does not exist. Instead, innovation is facilitated through the tension and balance between various conflicting but necessary forces:

- Creativity and discipline. Creative employees are needed who challenge existing assumptions and develop new and radical approaches to solving key problems. That creativity must be tempered by the discipline to capture the ideas generated by creative employees and by systematically determining which ideas can be turned into innovations, and how.

- Individuality and teamwork. Creativity is considered an individual trait, with some people being more naturally creative than others. But innovation is clearly a team effort, often involving hundreds or thousands of people. While companies should allow employees to express their individuality as a way to facilitate creative thought, that freedom must be placed in the context of the firm as a collaborative environment, where even the most brilliant

individual has to work well with others for the company to succeed.

- Exploration and focus. New ideas can come from a wide variety of sources, and it is hard to predict which paths of investigation will lead to the next breakthrough technology. Still, no firm has the resources to conduct research in every conceivable field at all times. The freedom to explore new domains of knowledge needs to be balanced by corporate decisions on what areas of investigation have the greatest promise of paying off, and focusing research in those areas.

- Long-term and short-term. Radical innovations often take years to progress from concept to tangible product. For example, the digital computer invented in the 1950s had its roots in research conducted in the mid-nineteenth century on logic and mathematics. Unfortunately, most firms cannot spend money on research that will only begin generating revenues in ten or twenty years. Most innovative activity in firms by necessity is focused on short-term improvements and technologies. Still, firms should not lose sight of long-term innovations, as those are the technologies that can undermine existing market dominance.

One enduring debate in technology and innovation management is whether small firms are inherently more innovative than large ones. The answer appears to be different at different times. For example, the small firm Apple Computer appeared to turn out many more innovations in the 1980s than its large rival, IBM, but in the 1990s, IBM used its huge resources to regain technological dominance in computers while Apple floundered. During the 2000s, Apple came back strongly with innovative designs and technology, such as the iPod and iPhone, and made big waves in the consumer arena.

It may be more accurate to say that small firms are better organized to handle specific types of innovation compared to large firms. Small firms have very streamlined organizational structures that have few layers of management, and managers are multi-functional; i.e., they may handle business development as well as technical work, or they may be project leaders and handle company-wide finances. This cross-disciplinary approach favors flexibility and efficiency, which in turn is more conducive to radical innovation. The small firm model of organization is quite different from large established firms in which personnel in general have more narrow tasks and bureaucratic processes tend to suppress creativity and individual initiative.

Large companies are geared for production and distribution, which are large-scale undertakings that do not accommodate rapid change. Hence, the organizational structure of a large firm is quite matrix-oriented; engineering disciplines are assigned to projects, and a central laboratory supports research and development. Innovation is organized in a more linear fashion, and internal organization favors discipline and focus. This type of organization is better suited to incremental innovation, since it can identify problems and focus tremendous resources on solving them.

There are several ways in which small and large firms can overcome natural tendencies to gain proficiency in all types of innovation. Lockheed Martin, a large aerospace firm, was the originator of the Skunk Works, a lean, aggressive organization focused on R&D and rapid development of cutting-edge technologies. The group is kept completely isolated from the larger corporate organization, so that the engineers are unencumbered with overhead issues that are handled by other resources within the company at large. From the cultural point of view, aside from the infrastructure, a large company has to handle regulatory matters as well as financial support. A small firm and a Skunk Works of a large firm can be very similar. For example, Xerox's famed Palo Alto Research Center (PARC) also provides an example of how a large corporation can capitalize on advantages that may be more typical to smaller organizations. PARC is owned by Xerox, but is, according to its Web site, an "independent research business." PARC has resulted in the development of numerous Xerox products, as well as the introduction of technologies with wider applications, such as the Graphical User Interface.

A small firm, in turn, can partner with a larger firm to gain access to the resources and infrastructure needed to address incremental as well as radical innovation. Carayannis et al. found that small firms tended to form technology-based strategic alliances as a source of financing. The funds gained through the alliance with a larger firm are then devoted to acquiring and developing tangible strategic assets such as proprietary technology, general working capital, and skills and know-how possessed by key managerial personnel. The large firm in the alliance receives technology-related intellectual property rights (IPRs) and marketing rights more often than equity, manufacturing rights, and so forth, in exchange for their capital infusion. An alliance with a large firm can create a powerful combination that benefits both the small company and its established partner.

During the early 2000s, companies were still seeking ways to build radical innovation competencies into their own organization. O'Connor and Ayers reported on a three-year study of twelve large firms (such as GE, Corning, IBM, and Shell Chemicals, among others) who worked to develop this competency, and identified three key competencies that were critical to success:

Table 1
Technology vs. Market Push and Pull

The Technology Perspective

	Market Pull	Market Push
Technology Pull	*Market Satisfying*	*Technology Satisfying*
Technology Push	*Technology Satisfying*	*Market Seeding*

- Discovery—creation, recognition, elaboration, and articulation of opportunities

- Incubation—experimentation, technical, as well as for market learning, market creation, and matching the innovation with company strategy

- Acceleration—exploiting the technology, investing to build new business and infrastructure, responding to market opportunities

Finally, O'Connor and Ayers concluded that no one model works for all companies. Of the twelve companies studied, four had very distinct but different approaches, each influenced by that company's corporate culture. But nearly all participants in the study acknowledged a need for cultural change within the organization before radical innovation could take place.

EXTERNAL FORCES AFFECTING INNOVATION

Various forces outside the direct control of the firm can also affect the innovation process. One set of forces relates to the tension between the demands of the market and the capabilities of the technology under development.

A conventional way of analyzing technology development is to contrast the influence of *technology push* with that of *market pull.* The primary difference between a push or pull scenario is between solving a problem and accommodating a solution. Technology push is the process of solving a problem by providing a technical answer to a market need (which can be either anticipated or existing). Market pull involves solving a problem to provide a market answer to a technical need or accommodating a technical solution by finding market uses. The dynamic balancing act between technology push and market pull drives the speed and acceleration of technological change, and in the process creates significant windows of market opportunity as well as competitive threats to the established technologies.

The terms push and pull can be expanded to encompass either a technology or market point of view:

- Technology push has been historically defined by an innovation-cycle-driven culture focused on marketing/technology management analysis. In this context, a firm's R&D division brings an idea from the invention stage to its fruition in commercial markets.

- The not-so-traditional technology pull is best described as the reaction to demand in the market. The desire for more efficient technologies by customers creates incremental improvements in these technologies that may eventually lead to a critical mass of innovations and possibly to radical improvements.

- On the other hand, market pull has been historically defined by marketing. The marketplace dictates the products that are to be supplied by a firm. In order to meet demand, a firm must constantly strive to increase performance and customer satisfaction.

- Market push is a term that addresses the creation of markets through marketing-driven efforts that, along with technology pull, can lead to the creation of technological standards that define and enable the emergence of new markets (see Figure 1).

Figure 1 presents possible configurations combining market and technology push and pull from a technology and a market perspective. The emphasis swings from a reactive stance, through an accommodating one, to a proactive one (from reacting to demand and satisfying markets to seeding and anticipating demand). The relative strength of each of the four forces (technology push or pull and market push or pull) varies during the lifecycle of the technology.

Technologies, as they develop, often follow a pattern known as the technology S-curve. In the first phase of development, tremendous investment in the technology

yields relatively little improvement in performance, since the investment is devoted to researching various aspects of the technology, many of which do not have useful results. At some point, the technology takes off when a key breakthrough is made. At this critical moment, called an inflection point, the performance of the technology improves rapidly. During this second, or growth, phase, additional investment is focused on the technological breakthrough, with rapid results. As that breakthrough technology is more fully understood and exploited, the rate of improvement begins to slow and the technology enters its third phase, maturity. Finally, the technology reaches a point where additional research yields little new knowledge and few results. At this point, the technology begins the final stage, decline, and often becomes obsolete as better technologies are developed and introduced to the market.

TECHNOLOGY MANAGEMENT AND INNOVATION IN A GLOBAL BUSINESS WORLD

Some have argued that technology management is crucial to a firm's success in the world of globalization. Management scholars have noted that, ironically, the technology and innovation explosion of the late twentieth and early twenty-first centuries has meant that products become outdated at a very fast pace and that consumers have come to expect the rapid introduction and improvement of new technology products. In this environment, companies must achieve a level of synchronicity between R&D and marketing. Otherwise, as the authors of *Strategic Technology Management* stress, problems can arise. Firms may have the correct or necessary new technology product, but fail to market it effectively. Conversely, a marketer can determine a need for a specific new product derived from an environment, but R&D can fail to produce it. This need also highlights the nonlinear nature of product development and technology management. They also note that a business world that is full of change necessitates a degree of long-range planning with technology management.

Globalized R&D Efforts. Others have observed that firms that have highly decentralized multinational operations can face additional challenges. This type of organization can have either their own R&D units in different countries or can have relationships with other organizations, such as companies or universities. R&D is an inherently collaborative endeavor, and because of this, Klaus Brockhoff and John Medcof argue that communication is imperative, especially when different teams collaborating around the world may have cultural and language barriers. However, they also stress that a lot of pointless communication, rather than substantive com-

munication, can make these potential challenges worse. Additionally, there is disagreement with regards to how much autonomy specific research units should have. Some feel that a high degree of control over different R&D units is best, while others see advantages to granting each unit a large measure of independence.

Technology and innovation management constitute a discipline of management that continues to gain importance, impact, and attention. As technology is a pervasive force in business and in society, management of technology helps to ensure that the development of new technology and its applications are aimed at useful purposes, and that the benefits of new technology outweigh the disruptions and difficulties that accompany innovation. While it is possible to specialize in technology management, this discipline also constitutes a set of skills that all managers should possess in the modern technology-intensive and technology-driven world of business.

SEE ALSO *Innovation; Management Information Systems; New Product Development; Organizational Learning; Technology Transfer*

BIBLIOGRAPHY

Betz, Frederick. *Executive Strategy Strategic Management and Information Technology.* Wiley, 2001.

Bigwood, Michael P. "Managing the New Technology Exploitation Process." *Research-Technology Management,* November-December 2004, 38.

Brockhoff, Klaus K., and John W. Medcof. "Performance in Internationally Dispersed Research and Development Units." *The Journal of High Technology Management Research,* 18, no. 1 (2007), 99-110.

Burgelman, Robert A., Clayton M. Christensen, and Steven C. Wheelwright. *Strategic Management of Technology and Innovation.* McGraw-Hill/Irwin, 2003.

Carayannis, Elias, and Jeffrey Alexander. "The Wealth of Knowledge: Converting Intellectual Property to Intellectual Capital in Co-opetitive Research and Technology Management Settings." *International Journal of Technology Management* 17, no. 3/4 (1998).

Carayannis, Elias, S. Kassicieh, and R. Radosevich. "Financing Technological Entrepreneurship: The Role of Strategic Alliances in Procuring Early Stage Seed Capital." Paper presented at the 1997 Proceedings of the Portland International Conference on Management of Engineering and Technology, Portland, OR, July 1997.

"Fitch Ratings Comments on IBM's Sale of PC Business." *Business Wire,* 8 December, 2004.

Harrison, Norma, and Danny Samson. *Technology Management: Text and International Cases.* McGraw-Hill/Irwin, 2001.

Khalil, Tarek. *Management of Technology.* McGraw-Hill Science/ Engineering/Math, 1999.

Miller, Roger, and Serghei Floricel. "Value Creation and Games of Innovation." *Research-Technology Management,* November-December 2004, 25.

Nambisan, Satish, and David Wilemon. "Industry Should Help Redefine the Agenda for Technology Management

Education." *Research-Technology Management,* November-December 2004, 9.

O'Connor, Gina Colarelli, and Alan D. Ayers. "Building a Radical Innovation Competency." *Research-Technology Management,* January-February 2005, 23.

Palo Alto Research Center, Inc. "About PARC: Overview." Available from: http://www.parc.com/about/.

Porter, Michael. *Competitive Advantage.* New York: The Free Press, 1985.

Rivas, Rio, and David H. Gobeli. "Accelerating Innovation at Hewlett-Packard." *Research-Technology Management,* January-February 2005, 32.

Rogers, Everett M. *The Diffusion of Innovations.* New York: The Free Press, 1995.

Rosenberg, Nathan, and Ralph Landau. "An Overview of Innovation." In *The Positive Sum Strategy.* Washington National Academy Press, 1986.

Rosenbloom, Richard, and William Spencer, eds. *Engines of Innovation U.S. Industrial Research at the End of an Era.* Cambridge, MA: Harvard Business School Press, 1996.

Schilling, Melissa. *Strategic Management of Technological Innovation.* McGraw-Hill/Irwin, 2004.

Schrage, Michael. "Innovation Diffusion." *Technology Review,* December 2004. Available from: http://www.technology review.com/Energy/13987/.

Tesar, George, Sibdas Ghosh, Steven W. Anderson, and Tom Bramorski. *Strategic Technology Management: Building Bridges Between Sciences, Engineering and Business Management.* Singapore: World Scientific, 2004.

U.S. National Research Council. *Management of Technology: The Hidden Competitive Advantage.* Washington National Academy Press, 1987.

U.S. Office of Technology Assessment. "Innovation and Commercialization of Emerging Technologies." Report OTA-BP-ITC-165, Washington GPO, September 1995. Available from: http://www.ota.nap.edu.

Wells, Rachel, et al. "Technology Roadmapping for a Service Organization." *Research-Technology Management,* March-April 2004, 46.

Wolff, M.F. "Manufacturers Seek More Innovation." *Research-Technology Management,* January-February 2005, 6.

Yang, Jie, and Chang-Yung Liu. "New Product Development: An Innovation Diffusion Perspective." *The Journal of High Technology Management Research,* 17, no. 1 (2006), 17-26.

TECHNOLOGY TRANSFER

According to Carayannis et al., technology transfer usually involves some source of technology, created and owned by a group which possess specialized technical skills; this group then transfers the technology to a target group of receptors who do not possess those specialized technical skills, and who therefore cannot create the tool themselves. In the United States especially, the technology transfer experience has pointed to multiple transfer strategies, two of which are the most significant: (1) the

licensing of intellectual property rights and (2) extending property rights and technical expertise to developing firms.

Technology transfer is a fast-growing activity in the U.S. research and development system, and one which has received substantial attention from governments, industry, and universities. The exact nature of this activity is difficult to pin down, partly because the term has many different connotations. Some of the varieties of technology transfer commonly discussed in business periodicals (such as the *Wall Street Journal*) include:

- International technology transfer: the transfer of technologies developed in one country to firms or other organizations in another country. In the United States, this issue is sometimes associated with the undesired transfer of weapons technology to hostile nations.

- North-South technology transfer: activities for the transfer of technologies from industrial nations (the North) to less-developed countries (the South), usually for the purpose of accelerating economic and industrial development in the poor nations of the world.

- Private technology transfer: the sale or other transfer of a technology from one company to another.

- Public-private technology transfer: the transfer of technology from universities or government laboratories to companies.

While all four types of technology transfer are of concern to businesses, this overview will deal mostly with the first two types. International technology transfer and North-South technology transfer these activities tend to be driven directly by foreign policy and national defense concerns, while the other two types are driven by a balance of corporate and policy interests.

The major categories of technology transfer and commercialization involve the transfer of:

a. technology codified and embodied in tangible artifacts

b. processes for implementing technology

c. knowledge and skills that provide the basis for technology and process development

WHY TRANSFER TECHNOLOGY?

Most technology transfer takes place because the organization in which a technology is developed is different from the organization that brings the technology to market. The process of introducing a technology into the marketplace is called technology commercialization. In many cases, technology commercialization is carried out

by a single firm. The firm's employees invent the technology, develop it into a commercial product or process, and sell it to customers. In a growing number of cases, however, the organization that creates a technology does not bring it to the market. There are several potential reasons for this:

- If the inventing organization is a private company, it may not have the resources needed to bring the technology to market, such as a distribution network, sales organization, or simply the money and equipment for manufacturing the product (these resources are called complementary assets). Even if the company has those resources, the technology may not be viewed as a strategic product for that firm, especially if the technology was created as a byproduct of a research project with a different objective.

- If the inventing organization is a government laboratory, that laboratory is forbidden in general by law or policy (in the United States) from competing with the private sector by selling products or processes. Therefore, the technology can only be brought to market by a private firm.

- If the inventing organization is a university, the university usually does not have the resources or expertise to produce and market the products from that technology. Also, if the technology was developed with funding from the federal government, U.S. law strongly encourages the university to transfer the technology to a private firm for commercialization.

From a public policy perspective, technology transfer is important because technology can be utilized as a resource for shared prosperity at home and abroad. As a resource, technology (1) consists of a body of knowledge and know-how, (2) acts as a stimulant for healthy competitive international trade, (3) is linked with other nations' commercial needs, and (4) needs an effective plan for management and entrepreneurship from lab to market.

From a business perspective, companies engage in technology transfer for a number of reasons:

- Companies look to transfer technologies from other organizations because it may be cheaper, faster, and easier to develop products or processes based on a technology someone else has invented rather than to start from scratch. Transferring technology may also be necessary to avoid a patent infringement lawsuit, to make that technology available as an option for future technology development, or to acquire a technology that is necessary for successfully commercializing a technology the company already possesses.

- Companies look to transfer technologies to other organizations as a potential source of revenue, to create a new industry standard, or to partner with a firm that has the resources or complementary assets needed to commercialize the technology.

For government laboratories and universities, the motivations for technology transfer are somewhat different:

- Governments or universities may transfer technology from outside organizations if it is needed to accomplish a specific goal or mission (for example, universities may transfer educational technologies), or if that technology would add value to a technology the government or university is hoping to transfer out to a company.

- Government laboratories and universities commonly transfer technologies to other organizations for economic development reasons (to create jobs and revenues for local firms), as an alternate source of funding, or to establish a relationship with a company that could have benefits in the future.

Technology transfer has also proved to be fertile ground for secondary markets. For example, the company UTEK has created a business out of purchasing and then reselling technologies. This business is important to some companies that may lack the resources to develop technologies or the connections to engage more directly with technology transfer. UTEK is one type of intermediary that works to connect different sectors, such as universities, public institutions, and companies.

HOW IS TECHNOLOGY TRANSFERRED?

The first requirement for an organization to transfer a technology is to establish legal ownership of that technology through intellectual property law. There are four generally recognized forms of intellectual property in industrialized nations:

- Patents, dealing with functional and design inventions

- Trademarks, dealing with commercial origin and identity

- Copyrights, dealing with literary and artistic expressions

- Trade secrets, which protect the proprietary capabilities of the firm

Under U.S. law, a patent is granted only by the federal government and lets the patentee exclude others from making, using, selling, or offering an invention for a fixed term, currently 20 years from the date the patent

application is filed. A trademark, as defined under the Trademark Act of 1946 (The Lanham Act) is "any word, name, symbol, or device, or any combination thereof (1) used by a person, or (2) which a person has a bona fide intention to use in commerce…to identify and distinguish his or her goods, including a unique product, from those manufactured or sold by others, and to indicate the source of the goods, even if that source is unknown."

A copyright seeks to promote literary and artistic creativity by protecting, for a limited time, what the U.S. Constitution broadly calls writings of authors. The general rule in the United States for a work created on or after January 1, 1978, whether or not it is published, is that copyright lasts for the author's lifetime plus 50 years after the author's death. The copyright in a work made for hire or in an anonymous work lasts for 75 years from publication or 100 years from creation, whichever is shorter.

A trade secret is information that an inventor chooses not to disclose and to which the inventor also controls access, thus providing enduring protection. Trade secrets remain in force only if the holder takes reasonable precautions to prevent them from being revealed to people outside the firm, except through a legal mechanism such as a license. Trade secrets are governed by state rather than federal law.

In the early twenty-first century, a number of scholars from fields such as law voiced concerns that new technologies were outpacing current intellectual property law. Specifically, they argued that copyright law prevented new forms of creative expression that had been enabled by new media technologies. Creative Commons was one organization that was created with the intent of allowing for more flexible types of copyrights. Later, Creative Commons launched Scientific Commons, which sought to address the same concerns in scientific fields. One of the goals behind this project was to ease the transfer of various forms of knowledge.

The second step in technology transfer is finding a suitable recipient for that technology—one that can use the technology and has something of value to offer in return. Firms are now studying more systematically the process of licensing and technology transfer. There are five information activities needed to support technology transfer:

- Technology scouting—this includes searching for specific technologies to buy or license.

- Technology marketing—this includes searching for buyers for a technology, the inverse of tech scouting, and also searching for collaborators, joint venture or development partners, or investors or venture capital to fund a specific technology.

- Technology assessment—this refers to evaluating technology, aimed at answering the question "what is this technology worth?" It includes research of any intellectual properties, and market and competitor assessments.

- Transfer-related activities—this involves gathering information about the transfer process itself, such as licensing terms and practices, contracts, conducting negotiations, and how to do the transfer most successfully.

- Finding experts—to assist in any of the above areas. A common saying in the field is, "technology transfer is a contact sport."

These information needs are often supported by service companies, such as licensing consultants, and by electronic media, including databases and online networks. Some new online networks use the Internet to help firms in these information activities.

The information-transfer process is one of the most critical steps in technology transfer. New licensing practices are designed to address this process. For example, many licenses now bundle both the basic technology and the equipment needed to utilize that technology in a single agreement. A license may also include a "know-how" agreement, which exchanges relevant trade secrets (with appropriate protections) to the licensee to help in exploiting technology. In some industries, such as petroleum exploration, firms even practice wet licensing, whereby employees of the licenser are loaned out to the licensee to teach how a technology should be properly used.

The major barrier to the increase in technology transfer among firms is organizational behavior. In the past, cultural blocks such as the "not invented here" syndrome prevented firms from even showing interest in technology transfer. New concepts along the lines of knowledge management are changing behaviors and beliefs, leading firms to realize the enormous gains to be made through the active pursuit of licensing.

Once the organization has at least started to establish ownership of the technology, there are several possible legal and/or contractual mechanisms for transferring technology from one organization to another:

- Licensing—the exchange of access to a technology and perhaps associated skills from one company for a regular stream of cash flows from another.

- Cross-licensing—an agreement between two firms to allow each other use of or access to specific technologies owned by the firms.

- Strategic supplier agreement—a long-term supply contract, including guarantees of future purchases

and greater integration of activity than a casual market relationship. One prominent example is the second-source agreements signed between semiconductor chip manufacturers.

- Contract R&D—an agreement under which one company or organization, which generally specializes in research, conducts research in a specific area on behalf of a sponsoring firm.

- Joint or cooperative R&D agreement—an agreement under which two or more companies agree to cooperate in a specific area of R&D or a specific project, coordinating research tasks across the partner firms and with sharing of research results.

- R&D corporation or research joint venture—the establishment of a separate organization, jointly owned by two or more companies, which conducts research on behalf of its owners. A notable example is Bellcore, which originally was established by the seven Regional Bell Holding Companies of the United States and which would conduct research and set standards for the local telephone system.

- Research consortium—any organization with multiple members formed to conduct joint research in a broad area, often in its own facilities and using personnel on loan from member firms and/or direct hires. The Microelectronics and Computer Technology Corporation (MCC) and Semiconductor Manufacturing Technology (SEMATECH) are examples of such organizations.

The choice of which mechanism to use in a particular technology transaction depends on many factors, including the stage of development for that technology, what the company receiving the technology is willing or able to pay, what technology or other assets it might be able to offer in place of money, the likely benefits of establishing a longer-lasting partnership between the organizations instead of a one-time transfer; and the exact legal status of ownership over that technology. For example, if a small firm simply wants to sell its technology to a large firm in exchange for money, it will probably choose to license the technology. If the small firm also wants access to the large firm's complementary assets, such as its production facilities and distribution network, it will try to negotiate a more substantial and permanent relationship, such as an R&D contract or a cooperative R&D agreement.

PRIVATE TECHNOLOGY TRANSFER

Technology transfer between private companies is most commonly accomplished through licensing, although other mechanisms such as joint ventures, research consortia, and research partnerships are also quite popular. Licensing is a big business by itself. In 2002 U.S. com-

panies received over $66 billion in payments on technology licenses from other organizations, of which $58 billion was from domestic sources.

Another growing mode of private technology transfer is the formation of research joint ventures (RJVs) between companies in the United States. For years, such joint ventures were rare, mostly due to fears among companies that joint ventures would provoke antitrust litigation from the government. Passage of the National Cooperative Research Act (NCRA) in 1984 and the National Cooperative Research and Production Act in 1993 relaxed antitrust regulation of such partnerships, leading to a substantial increase in RJVs.

Studies of the filings of RJVs registered with the Department of Justice under the NCRA shows some interesting trends:

- Although multi-firm consortia such as SEMATECH and the Microelectronics and Computer Corporation (MCC) attract the most interest, the majority of RJVs involve only two firms.

- Most RJVs focus on developing process technologies rather than product technologies, as processes are viewed as pre-competitive technologies in many industries.

- The largest concentration of RJVs focus on telecommunications, while software and computer hardware are also leading industries for RJV activity. These industries have significant impact on technological advances in other industries, and therefore attract much interest for partnering firms. Not surprisingly, RJVs are less common in the chemical and pharmaceutical industries, probably because process technologies have greater competitive impact in those industries than in others.

Research joint ventures are an advantageous means of acquiring high-risk technologies for several reasons. First, joint ventures enable the risks and costs involved in early research in technology to be shared across multiple firms, reducing the burden on each individual company. Second, the resources and expertise needed to develop certain technologies may be distributed across multiple firms, so RJVs are the only way to combine those resources in one effort. Third, in industries where technology advances quickly, RJVs are an effective way to keep up with new developments. Finally, RJVs are often used to develop and set critical technical standards in certain industries, especially telecommunications. These reasons indicate that RJVs will continue to increase in significance as a tool for technology transfer.

The software world is a realm that allows for a different type of technology transfer. For years, open-source

software has allowed private users to engage in developing, changing, and improving software products. In effect, this has led to a type of technology transfer that can result in a proliferation of newer products. Though this may not seem of use to companies, some firms have embraced open-source software and code, thus making their products more appealing.

TECHNOLOGY TRANSFER FROM GOVERNMENT TO INDUSTRY

In an effort to increase the application of government research results to industry technology problems (and therefore fuel technology-based economic growth), the U.S. government has passed a series of laws since 1980 to encourage the transfer of technologies from government laboratories to industry. Technology licensing was the earliest focus of activity, based on the notion that government laboratories were like treasure chests of available technologies that could easily be applied to corporate needs. In fact, government technology licensing activity is extremely limited, except in the National Institutes of Health. The NIH has been the source of several ground-breaking therapies and other medical technologies and enjoys close relations with the pharmaceutical industry, enabling the agency to gain large amounts of licensing revenue.

Other agencies face substantial difficulties in licensing technologies. Often, their technologies require substantial development before commercialization, reducing their value to firms. Also, most government laboratories do research in areas where there is no clear, consistent path to commercialization as exists in the pharmaceutical industry. The uncertainty of commercialization also diminishes the willingness of firms to purchase technology licenses from laboratories.

Instead, most agencies have focused on signing Cooperative Research and Development Agreements (CRADAs), a mechanism developed under the 1986 Federal Technology Transfer Act. CRADAs are contracts to conduct joint R&D projects, where the government laboratory contributes personnel and equipment, while the partner contributes these assets and funding as well. The number of CRADAs signed by government agencies has increase steadily in recent years.

There are several potential benefits and potential difficulties involved in CRADA research relationships:

- Transfer of product and process technologies can have a significant impact on recipient firms' business performance. For example, the invention of an improved method for delivering the medication paclitaxel was licensed by the National Institutes of Health to Bristol-Myers-Squibb as the product

Taxol, which has since become a leading treatment for breast and ovarian cancer. However, there is no data to show what portion of transfers are successful versus those that are not.

- Technology transfer may or may not result in commercial products. A survey of 229 technology transfer projects at 29 federal laboratories, conducted by the Georgia Institute of Technology, found that 22 percent of the projects resulted in new commercial products, while 38 percent contributed to products under development. Interestingly, in 13 percent of the projects, new product development or product improvement was never a goal.

- Laboratories' views on technology transfer can affect success. Now that most of the legal barriers to technology transfer have apparently been eliminated by congressional legislation, the true barriers are generated by the culture of the laboratories and the attitudes of researchers and laboratory administrators. For example, in several cases firms have complained that laboratory researchers were not used to meeting the strict timetables on project completion that private sector researchers must observe.

- Technology transfer, especially in joint research, can aid the government laboratory as well. A report by the GAO examining ten CRADA projects found that the laboratories can also benefit from technology transfer, for example, through enhanced expertise for researchers, development of technologies that also support the laboratory's mission, acquisition of sophisticated equipment and infrastructure, and increased laboratory revenues from industrial sources.

UNIVERSITY-INDUSTRY TECHNOLOGY TRANSFER

One of the original pieces of U.S. technology-transfer legislation, the Bayh-Dole Act, directed government agencies to encourage universities and other research organizations to license out technologies developed with federal funding. Since 1980, this activity has become a small but growing source of revenue for universities. Technology transfer from academia and other research institutions to industry continues to grow, according to the annual survey of the Association of University Technology Managers. The 2003 survey shows that increasing numbers of research institutions are forging licensing agreements with commercial entities to bring newly developed technology and products to the market. In 2003, the 165 institutions of higher education responding to the survey reported receiving close to $1 billion in licensing revenue in 2003, a 1 percent increase over 2002.

Commercial institutions pay royalties for the right to put inventions and discoveries from universities to commercial use in products such as computer-imaging technology, medical diagnostic testing, and treatment of disease. Institutions of higher education, in turn, can use the revenue to increase investments in research and development. This technology transfer also leads to sponsored research agreements between firms and universities, often to undertake additional research needed to commercialize technologies.

For industry, universities offer the best way to acquire basic technological research as those activities are curtailed within firms. Universities also house experts in very focused fields of study that are likely to have benefits to a small number of firms. Finally, joint industry-university research is viewed as an important recruiting tool in today's competition for scientific talent, since industry-funded projects are often carried out by graduate students who later go to work for their former sponsors.

Often, there are multiple players in this type of technology transfer. Venture capital firms, for example, can play a large role in helping finance the development of these technologies, resulting in startup companies. In 2007, the *New York Times* reported that some universities had developed "offices of technology transfer." The article used Neven Vision, a company that was formed through venture capital investment as well as help from the University of Southern California's technology transfer practices, as an example. The story also noted that universities profit not only through patents, but also through prospective endowments if a company should be successful.

In 2007, Harvard University licensed a slew of nanotechnology patents to a Massachusetts startup, Nano-Terra. As a result, the school also took an equity position in the company, becoming a major shareholder. Interestingly, the company itself was formed by a Harvard professor. This demonstrates the close relationships universities can have with the private sector when it comes to technology transfer.

Additionally, it is important to note that informal social arrangements can also aid technology transfer. The sociologist Manuel Castells has referred to this as a "milieu" where a region attracts a great number of knowledge workers, allowing for ideas to circulate. Additionally, the historian AnnaLee Saxenian has shown that Silicon Valley's success in the 1980s was due in part to a culture where people changed jobs frequently, a phenomenon that lead to a widespread dissemination of innovative ideas. She also compares this region favorably in relation to company cultures that were not as fast to develop and innovate because of rigid and hierarchical organizational structures and cultures.

Technology transfer is a valuable mechanism by which industry can accelerate its innovation activities and gain competitive advantage through cooperation. Technology transfer can also boost overall economic growth and regional economic development. While further study is needed to estimate the exact benefits gained from technology transfer and ways to achieve those benefits, it is clear that this is an activity that is becoming a central feature of the U.S. research and development system.

SEE ALSO *Joint Ventures and Strategic Alliances; Licensing and Licensing Agreements; Technology Management*

BIBLIOGRAPHY

Carayannis, Elias, Everett Rogers, K. Kurihara, and M. Albritton. "High-Technology Spin-offs from Government R&D Laboratories and Research Universities." *International Journal of Technovation* 18, no. 1 (1998): 1–11.

———. "Cooperative Research and Development Agreements (CRADAS) as Technology Transfer Mechanisms." *R&D Management,* Spring 1998.

Carayannis, Elias, and Jeffrey Alexander. "Secrets of Success and Failure in Commercializing U.S. Government R&D Laboratories Technologies: A Structured Case Studies Approach." *International Journal of Technology Management* 17, no. 3/4 (1998).

Castells, Manuel. *The Informational City.* Cambridge, Massachusetts: Oxford University Press, 1989.

Flanigan, James. "The Route from Research to Start-Up." *The New York Times,* 18 January 2007.

Geisler, E. "Technology Transfer: Toward Mapping the Field, a Review, and Research Directions." *Journal of Technology Transfer,* Summer-Fall 1993, 88–93.

Goldscheider, Robert, ed. *Licensing Best Practices: The LESI Guide to Strategic Issues and Contemporary Realities.* New York: John Wiley & Sons, 2002.

Ham, Rose Marie, and David C. Mowery. "Improving Industry-Government Cooperative R&D." *Issues in Science & Technology,* Summer 1995, 67–73.

Kelley, Kevin. *New Rules for the New Economy.* New York: Penguin, 1998.

Megantz, Robert C. *Technology Management: Developing and Implementing Effective Licensing Programs.* New York: John Wiley & Sons, 2002.

Mello, John P. Jr. "A Little Less 'R', a Little More 'D'." *CFO.com,* 12 March 2007. Available at http://www.cfo.com/article.cfm/8840528?f=search.

Muir, Albert E. *The Technology Transfer System.* Latham, NY: Latham Book Publishing, 1997.

Parr, Russell L., and Patrick H. Sullivan. *Technology Licensing: Corporate Strategies for Maximizing Value.* New York: John Wiley & Sons, 1996.

Saxenian, AnnaLee. *Regional Advantage: Culture and Competition in Silicon Valley and Route 128.* Cambridge, Massachusetts: Harvard University Press, 1994.

Science Commons. Available at http://sciencecommons.org/.

Shankland, Stephen. "AMD Nurtures Open-Source Graphics." *CNET News.com,* 6 September 2007. Available from: http://

news.cnet.com/AMD-nurtures-open-source-graphics/2100-7344_3-6206581.html.

Shenkar, Oded. *The Chinese Century: The Rising Chinese Economy and Its Impact on the Global Economy, the Balance of Power, and Your Job.* New York: John Wiley & Sons, 2005.

Speser, Phyllis L. *The Art and Science of Technology Transfer.* Hoboken, New Jersey: John Wiley and Sons, 2006.

Utek. 2008. Available from: http://www.utekcorp.com/.

Weisman, Robert. "Harvard Set to License 50-plus Nanotech Patents." *The Boston Globe,* 4 June 2007, F1.

TELECOMMUNICATIONS

At one time, the term "telecommunications" denoted the long-distance connection that linked television networks to their affiliates and the long-distance connections that linked telephone networks to local switching centers. Telecommunications applied both to AT&T's long-distance telephone network and to the television industry's worldwide networks—but each used very different technologies to transmit voice or video. Now with the rapid growth of the Internet, telecommunications has expanded to include data networks. The newest technologies in telecommunications are wireless devices and handhelds and wireless data plans.

Telecommunications and information-related industries continue to enjoy a rapid growth in the Internet and the wireless device and network sectors. Table 1 provides a summary of the major classes of telecommunications services and how they function.

Table 1

Telecommunications Providers and Data Networks

Local and Regional Telephone
- Regional or local phone services–from central office to residents
- Wireless phone services–from local towers to adjacent cell phones
- Commercial phone services–from central office to businesses

Long-Distance Telephone
- Phone/voice networks–backbone of the long-distance phone system

Internet and Data Networks
- Data/voice over the Internet backbone or private networks
- Internet content areas–Web sites, subscription content, private networks linked to Internet

Television
- Regional cable-TV companies–central office downloads TV programming and sends it out to residents
- Satellite TV companies–residents each have satellite dish
- Broadcast networks–content is beamed up to satellites, received by local stations, and retransmitted as conventional analog or digital signals to viewers

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THE REGULATORY ENVIRONMENT

The concept of universal service has traditionally referred to the goal that all Americans should have access to affordable communications services. As of February 17, 2009, television access will require a digital tuner, and there is increasing pressure for universal Internet access. Universal telephone access has been met by means of policies established by government regulatory bodies. Telephone or Internet services in densely populated areas promise good revenue and profits because the cost of wiring businesses and residences is lessened by the short distances. Regulations are needed to ensure that people in remote areas have access; when people move farther and farther away from population centers, the cost of bringing telecommunication services becomes increasingly expensive, but no less necessary. The trade off for making the sizable investment to equip homes and businesses for telecommunications was protection from competitors. This protection is usually provided by state public utility commissions or municipal government policies. Limiting competition and the number of wires strung along highways and into homes makes good sense, especially from an aesthetic perspective.

In 1996 the Federal Communication Commission (FCC) issued an extensive new set of regulations to increase competition in the industry. Local phone companies objected to competitors coming into their territories, especially densely populated urban and suburban locations with large client bases. But the trend has already been set by cable-TV companies partnering with long-distance companies and using their cables to offer phone, TV, premium TV, digital music, Internet access, and e-mail bundles. The Regional Bell Operating Companies have also engaged in a variety of mergers. The FCC appears to be ready to approve mergers that open up competition in local phone and cable-TV markets (e.g., AT&T was allowed to acquire TCI and other cable services), but not always the mergers between local phone companies.

The National Telecommunications and Information Administration (NTIA), an agency of the United States Department of Commerce, is the executive branch's principal voice on domestic and international telecommunications and information technology issues. NTIA works to spur innovation, encourage competition, help create jobs, and provide consumers with more choices and better quality telecommunications products and services at lower prices. Now that a considerable portion of today's business, communication, and research takes place on the Internet, access to computers, handheld devices and networks may be as or more important as access to traditional telephone services. The NTIA is preparing policy to ensure access to Internet service.

THE TELEPHONE INDUSTRY

The term telecommunications primarily applies to the long-distance carriers, such as AT&T, MCI, and Sprint, which carry transmissions and route calls between switching centers. The local telephone markets are dominated by the Regional Bell Operating Companies (RBOCs), such as Verizon, BellSouth, and SBC Communications. The RBOCs bear the responsibility for universal access, for ensuring that every residence—no matter how remote—has affordable phone service. Often these rural and remote sites pay the minimum amount, approximately $15 per month, for the minimal service. The RBOCs claim that their costs for customers exceed $15 per month; the public utility commissions at the state level help the RBOCs subsidize those customers with revenue from urban and suburban customers, as well as access fees paid by long-distance carriers. The RBOCs are guaranteed a profit by the public utility commissions, but the rates have been virtually constant with little growth in the number of phones added. Cable-TV companies are expected to further drive down long-distance prices with package plan offerings; this will undoubtedly change things for the long-distance carrier industry, perhaps pushing them into other markets or telecommunication industries.

Each local telephone center is a hub from which copper wires extend to homes and businesses. This last mile of wiring is the window or portal into millions of homes and businesses, controlling—in some ways—the services provided and the revenues generated from homes and businesses. The last mile of wiring is also the major bottleneck to providing better and faster services to those millions of sites. The twisted pair wires in virtually every home are the major problem with boosting the speed of Internet access over those lines. But those millions of miles of wires are extremely expensive to replace. In order for the regional phone companies to effectively compete against the cable-TV companies, they will have to rewire, thereby opening up the possibility of providing the full bundle of services to the home owners.

In every major city across the world, wireless phones are everywhere. The trend continues to grow exponentially as more and more workers transact business away from their desks, and as less and less time is spent at home. Wireless calls exceeded calls from hard lines for the first time in 2003 in the United States and again in Europe in 2008.

John Malone, a cable industry executive, brought the term "convergence" to telecommunications to describe bundling multiple services, such as cable-TV, premium movie channels, Internet services, digital music channels, and phone service. Convergence is made possible by advances in transmission technology; all of those services can be provided over a single cable. And that means that cable-TV companies could move into the phone business, and phone companies could move into the TV business. As convergence became a reality, competition in the telecommunications industry moved to a new level.

TELECOMMUNICATIONS TECHNOLOGIES

Almost all the major cable-TV companies provide high-speed Internet services alongside the regular TV and pay-per-view channels. All these services are offered over one coaxial cable. Cable companies employ a transmission approach called broadband. Coaxial cable can carry high-speed data and/or multiple channels of video over an insulated central copper wire wrapped in another cylindrical conducting wire, which is then shielded and wrapped in a protective cover. This wire is split into many channels by breaking out the wiring spectrum into multiple frequencies and transmitting each channel on a separate frequency. Broadband delivers large amounts of content by way of frequency division multiplexing. Part of the available frequency spectrum is dedicated to data for Internet access and another to voice for telephony.

As great as broadband sounds, it has the inherent drawback of being an analog approach for sending digital TV signals, digital sound, and for sending and receiving digital data; at both ends of the cable, a digital-to-analog or analog-to-digital conversion is required. Another potential problem is that the data channel might become overloaded as more and more customers begin to interact with Internet services; broadband was designed as a transmission approach to send multiple channels of video one way only, while e-mail service is two way.

The unshielded, twisted pair of wires in virtually every home are the major impediment to boosting the speed of Internet access over phone lines. Speed for sending and receiving data is expressed in terms of how many bits (ones or zeros) per second can be moved. The maximum speed for a telephone modem is 56,000 bits per second, which by comparison to newer technologies is quite slow. Phone companies implemented digital subscriber line (DSL), which uses four wires to carry both voice and data simultaneously in both directions. Data can be received or downloaded from the Internet at speeds up to 1.5 million bits per second, but data sent from homes moves at a much slower rate. DSL technology, however, is proving difficult and expensive to implement, especially at distances greater than two miles from the switching centers. The requisite DSL modems are also more expensive and difficult for users to install. DSL gives phone companies voice and high-speed data services, but it does not open up the lucrative premium TV market. Rewiring with coaxial or fiberoptic cables can make

regional phone companies competitive with cable-TV companies and open up the possibility of providing the full bundle of services to home owners.

Fiber-optic wiring is the preferred choice of the long distance companies and often the preferred choice of regional telephone companies as they upgrade in urban and suburban areas where demand for capacity is a concern. Fiber-optic media is much faster than electric, is unaffected by electro-magnetic interference, and is much more secure. It is also much more expensive to install because the tiny glass filaments are very difficult to align and join together. Lasers transmit pulses of light, rather than electrical signals, to send data and photo-decoders to receive the data; hence the speed of the lasers is dependent on these devices. The hair-thin strands of fiber are made of very pure flexible glass or plastic filaments, along which photons, the fundamental unit of light, move in waves or streams.

WIRELESS DEVICES

There continues to be rapid growth in the wireless device business. Prices continue to decline for phones and other handheld devices and the monthly service charges. Sprint, AT&T, and Verizon are advertising hundreds of minutes of calls anytime and to anywhere in the United States for low monthly fees, price incentives made possible due to the size and presence of national networks.

Wireless devices and data services send and receive voice and data from their antennae to local towers which are linked to adjacent towers and long-distance lines. The area within range of any tower is called a cell; most are adjacent to other cells, forming a honeycomb pattern. As wireless devices move from cell to cell, their calls are automatically switched from tower to tower.

The first cell phones were analog devices, with well-known security problems and often poor-quality reception. Cellular phones broadcast in the 800-900 MHz frequencies, which some scanners can hear. Newer digital and quad-band phones provide better security and better quality sound, but they operate at lower voltages, have shorter ranges, and require more towers. The PCS standard for digital phones has been widely accepted in the United States, but Europeans have adopted another digital standard, GSM, which made wireless communications during international travel difficult through the early 2000s before wireless devices had the capability to roam between systems.

Many varieties of handhelds now offer voice and data, including access to the Internet, e-mail, SMS and MMS messaging, and navigation systems. Some of the most popular options in handhelds are the RIM Black-Berry, the Palm Treo, and the Motorola Sidekick. Wireless companies usually offer comprehensive data and voice plans for these devices, making it affordable to use a bundle of communications and data options.

CONVERGENCE ON DIGITAL TRANSMISSION

Many long-distance companies are implementing a data networking approach, now called an IP standard from the UNIX TCP/IP protocol suite. Data, voice, and video are being sent digitally as packets of data, rather than as parts of an analog frequency. The digital approach promises faster, cheaper, and better telecommunications services; it is especially well suited to fiber-optic wiring. The widespread popularity of digital devices suggests that digital data networks make the most sense. In long-distance and wireless activity the amount of data now exceeds the amount of voice transmission, moving both voice and data to IP networking.

Cable-TV transmissions employ frequency division multiplexing to continuously send many channels one-way to TV tuners. Data and voice transmissions are two-way, often short bursts from sender to receiver. This adds considerable complexity, as TCI and Time Warner discovered during the implementation of phone and Internet services over their coaxial cables.

Phone conversations are semi-permanent sessions between sender and receiver. The phone companies use circuit-switching technology to connect the two parties by establishing a circuit, or connection, for the duration of the call for the exclusive use of the two parties. But that is preceded by establishing the link or circuit through the local switching center, the long-distance carrier, and another switching center. Here again the wire capacity is broken up into circuits using frequency division multiplexing. The traditional T-1 line provides twenty-four separate telephone circuits over copper wire; each circuit is equivalent to 64,000 bits per second digital channel.

Data network standards were established as millions of local area networks were created in businesses all over the world. Data is sent and received in packets, called "datagrams," defined by protocols, such as the dominant IP protocol. The packets have a "to" address, a "from" address, considerable digital data, and error-checking data; each packet also indicates that it is one of many in a group, to be assembled by the receiving computer. Data networks operate like the mail delivery system in that data is put into envelops. The "to" and "from" addresses contain both a single individual address as well as the area's zip code. Trucks (wires) take all the mail to central hubs, where it is again sorted and sent to the right zip code post office which delivers the envelop to the right home address. Data networks use packet switching devices, typically routers, to truck the packets from router to router along the path.

Packet switching is much more efficient for little e-mail messages or slow phone conversations. With packet switching, an exclusive circuit is not necessary as the entire bandwidth is always open to accept packets. The standard for fiber optic transmission is 2.5 Gbps (2.5 billion bits per second), so very large amounts of information can be moved in the blink of an eye. Compressed video and compressed music take up lots of bandwidth; a CD holds 600 million bytes (4.8 billion bits), but data can be compressed by half into roughly 2.5 billion bits, and sent and received in a second.

THE WEB

Access to the Internet is now largely wireless and fiber-optic. Cable-TV companies provide Internet access via cable modems to almost anywhere. The Internet and e-mail are now accessible from handheld devices. Prices for voice and data transmission are dropping consistently, making telecommunication something for everyone, not just a wealthy few. Long distance is built in to most wireless service plans and is a fraction of the cost it once was on hard lines. Companies who wish to maintain a competitive edge in telecommunications must stay ahead of the technological trends as they rapidly evolve with the changing needs of today's consumers.

The telecommunications industry is experiencing a whirlwind of activity. Rapid growth is occurring in every sector of the industry, and data networks to accommodate Internet traffic are growing as fast as companies can implement them. The industry competes globally, and having global reach appears to be a competitive edge. Bigger is better if the goal is to connect international businesses to their subsidiaries in other regions of the world. At the same time, the ability to deploy technology that is smaller, faster, and cheaper gives advantage to smaller, more agile companies. Smaller is better if, and only if, government regulations permit smaller companies to take chunks of the more lucrative business segments from the established companies.

In the short term, the best telecommunications segment is the cable-TV business. Protected by municipal regulations, cable companies have been able to raise prices for traditional packages. Broadband cable technology is the best way to provide a wide variety of services into millions of homes: TV, On Demand programming, Internet access, e-mail, telephone, and digital music. Major cable companies are billing millions of customers more than $100 per month for these kinds of bundles.

In the short term, the regional phone companies are in the worst strategic position. Competing against cable companies means rewiring millions of homes and businesses and replacing their circuit switching systems—a very costly undertaking. The traditional technology is obsolete and neither ISDN nor DSL can make telephone companies competitive against cable companies.

In the short term the wireless device and carrier business will continue to grow and prosper. The speculation that virtually every adult and adolescent in the United States will own a wireless device surprises very few people—virtually everyone in Singapore, Hong Kong, and Japan already does. Here again, having a global or national network is a powerful competitive advantage to a wireless company; offering low monthly charges for extensive data and voice plans will put any provider ahead of the pack. When calls and data can be handled by one carrier from end to end, the result is less complex, inexpensive, and better service. The handheld devices of today are generally able to transmit data and calls to and from anywhere in the world and offer a host of telecommunication options. These options paired with low cost and super-high speed will be the ultimate combination in this industry moving forward.

SEE ALSO *Computer Networks; Technology Management; Technology Transfer*

BIBLIOGRAPHY
Douskalis, Bill. *IP Telephony: The Integration of Robust VoIP Services.* Upper Saddle River, NJ: Prentice-Hall PTR, 2000.
Freeman, Roger L. *Fundamentals of Telecommunications.* 2nd ed. New York: John Wiley & Sons, 2005.
Harwit, Eric. *China's Telecommunications Revolution.* New York: Oxford University Press, 2008.
Saxtoft, Christian. *Convergence: User Expectations, Communications Enablers and Business Opportunities (Telecoms Explained).* New Jersey: John Wiley & Sons, 2008.
Schoning, Heinrich. *Business Management of Telecommunications.* Englewood Cliffs, NJ: Prentice-Hall, 2005.

THEORY OF CONSTRAINTS

The Theory of Constraints (TOC) is a management philosophy developed by Dr. Eliyahu Moshe Goldratt. According to Goldratt, the strength of any chain, process, or system is dependent upon its weakest link. TOC is a systemic view, striving to identify constraints to system success and to effect the changes necessary to remove them. Dr. Goldratt and the TOC became widely known with the 1984 publication of Goldratt's novel *The Goal.*

HISTORY

In early 1979, Goldratt introduced a software-based manufacturing scheduling program known as Optimized Production Timetables (OPT), changed in 1982 to Optimized Production Technology. With the publication of *The Goal,* Goldratt used his Socratic teaching style to

educate the world about managing bottlenecks (constraints) and his new ideas about performance. *The Goal* is a love story set in the manufacturing industry (thrice revised), detailing the tribulations of a plant manager named Alex Rogo. Rogo is faced with the shutdown of his hometown manufacturing plant. Goldratt uses Rogo's predicament to introduce his principles, which result not only in the rescue of Rogo's plant but also in the salvation of Rogo's marriage. Goldratt himself appears in the book as a character known as Jonah, Rogo's old college professor.

Goldratt used three additional novels to refine and develop the principles set forth in *The Goal. It's Not Luck,* a sequel to *The Goal,* addresses changing markets and introduces a number of methods of logical thinking that are used to make decisions, solve problems, and resolve conflict. *The Critical Chain* depicts a situation whereby TOC principles are effectively utilized in project management. *Necessary But Not Sufficient* contains Goldratt's most holistic expression of TOC and deals with the role of technology in organizations.

Goldratt also produced a number of nonliterary works that espouse his ideas. *The Race* introduced the concept of the drum-buffer-rope and buffer management. *Essays on the Theory of Constraints, What Is This Thing Called Theory of Constraints and How Should It Be Implemented?*, and *The Haystack Syndrome: Sifting Information Out of the Data Ocean* were used, among other publications, to introduce the thinking processes and other TOC concepts.

COMPONENTS OF THE THEORY OF CONSTRAINTS

Theory of constraints consists of separate, but related processes and interrelated concepts, including the following: the performance measures and five focusing steps, logical thinking processes, and logistics.

Performance Measures. According to Goldratt, there are three key performance measurements to evaluate: throughput, inventory, and operating expense. TOC emphasizes the use of these three global operational measures rather than local measures (e.g., efficiency and utilization). Goldratt places the greatest importance on increasing throughput, which is defined as the rate at which the system generates money through sales, not through production. Goods are not considered an asset until sold. This contradicts the common accounting practice of listing inventory as an asset even if it may never be sold.

In essence, Goldratt advocated a new accounting model as an alternative to traditional cost accounting procedures and measures. Inventory is defined as the money invested in goods that the firm intends to sell or material that the firm intends to convert into salable items. The concept of value-added and overhead are not considered. Operating expense includes all the money the firm spends converting inventory into throughput. The objective of the firm, therefore, is to increase throughput and/or decrease inventory and operating expense in such a way as to increase profit, return on investment, and cash flow (more global measures).

In *The Goal,* Alex explains to Jonah that his plant's use of a robot has resulted in a 36 percent improvement in one area. Jonah then asks if Alex is now able to ship more products, and if he has fired any employees or reduced inventory as a result (in other words, whether increased throughput, reduced operating expense, or reduced inventory resulted). When the reply was no, Jonah questions how there can be any real improvement; and of course, there can't.

Increasing throughput and/or decreasing inventory or operating expense should lead to the accomplishment of the firm's goal: to make money now as well as in the future. Anything that prevents a firm from reaching this goal is labeled as a constraint. Constraints may appear in the form of capacity, material, logistics, the market (demand), behavior, or even management policy. TOC thinking regards all progress toward the goal of making money as relating directly to management attention toward the constraint(s). The marginal value of time at a constraint resource is said to be equal to the throughput rate of the product processed at the constraint, while the marginal value of time at a non-constraint resource is said to be negligible.

Five Focusing Steps. The five focusing steps are a tool Goldratt developed to help systems deal with constraints. These steps ensure improvement efforts remain on track towards system-level improvements. Dettmer believes that these are collectively the most important aspect of TOC. TOC's five focusing steps are:

Step 1: Identify the system's constraint(s).

Step 2: Decide how to exploit the system's constraint(s).

Step 3: Subordinate everything else to the decisions made in Step 2.

Step 4: Elevate the system's constraint(s).

Step 5: If a constraint is broken in Step 4, go back to Step 1, but do not allow inertia to cause a new constraint.

The orientation of TOC is toward the output of the entire system, rather than a look at a discrete unit or component. The five focusing steps assist with identifying the largest constraint that overshadows all of the others.

These steps constitute an iterative process. As soon as one constraint is strengthened, the next weakest link becomes the priority constraint and should be addressed. Thus, a process of ongoing system improvement is applied to the business practice of the firm.

Logical Thinking Process. Goldratt introduced a staged logical thinking process to be used in conjunction with the five focusing steps. The thinking process assists with working through the change process by identifying the following: what to change, what to change to, and how to effect the change. The thinking processes consist of logic tools used to identify problems, then develop and implement solutions. These tools include effect-cause-effect (ECE) diagramming and its components: negative branch reservations, the current reality tree, the future reality tree, the prerequisite tree, the transition tree, the evaporating cloud, the negative branch reservation, and the ECE audit process. These tools allow an organization to analyze and to verbalize cause and effect.

The following is a brief description of the thinking process. A current reality tree, a cause-effect diagram, is drawn in order to discover the problems. These problems are known as undesirable effects. The cause of an undesirable effect is known as a root cause. The first goal is to find the causes of these undesirable effects. Each statement in a current reality tree that is not a derivative of another must be a root cause. If you build a tree that is comprehensive enough, at least one root cause will lead to most of the undesirable effects. This particular root cause is labeled a core problem, the major improvement target. The fewer root causes responsible for the undesirable effects, the better. The solution to this core problem is apparently not readily available. If it were, then the problem would have already been solved. Some conflict, therefore, must exist that prevents an immediate solution. This conflict becomes evident upon the construction of an evaporating cloud.

An evaporating cloud is a conflict-resolution tool. The process begins with a statement of the desired objective, one that is the opposite of the core problem. Then, the prerequisites necessary to achieve the requirements are listed. Any conflicts and assumptions that exist between the prerequisites are verbalized. For example, if one objective is to increase profit, then the requirements may be to improve the product and to decrease expenses. Prerequisites for each, respectively, might be to increase expenditures on capital equipment and to decrease expenditures, two obviously conflicting elements. The best solution is to remove the conflict; a compromise is not desirable. The next move involves finding an injection, a breakthrough idea that will evaporate the cloud. The "evaporating" refers to the tool's ability to dissipate conflict and to create a win-win solution. Usually, the original injection is not sufficient to fully solve the problem, but additional needed injections become clear when building the future reality tree.

A future reality tree is another cause-effect diagram. The tree starts with the proposed solution to the core problem and delineates the injection(s) and the ensuing desirable effects. The future reality tree is a "what if." It provides the opportunity to evaluate and to improve a solution before it is implemented. It is noted that one should be careful not to allow the solution to cause new undesirable effects.

A prerequisite tree describes the implementation of the injection(s) and is composed of an obstacle and an intermediate objective. This diagram breaks the implementation tasks into smaller increments, noting expected obstacles and intermediate objectives whose accomplishments will overcome the obstacles. The intermediate objectives are sequenced, displaying the necessary order of accomplishment and determining which ones can be achieved in parallel. This tool is powerful in that it does not ignore the obstacles. It uses them, rather, as the main vehicle for this phase.

Finally, a transition tree or implementation plan is constructed. This element presents a detailed description of the gradually evolving change envisioned. This task forces one to carefully examine which actions are really needed and if they are sufficient to guarantee the required change.

The thinking -process tools are powerful resources when used effectively. They have found successful use in the logistics and medicine areas of the United States Air Force, in primary education, and in the service sector. James Cox and Michael Spencer, both college professors and "Jonahs," state in *The Constraints Management Handbook* that the thinking processes may be the most important management tools developed this century.

LOGISTICS

Logistics in TOC include drum-buffer-rope scheduling, buffer management, and VAT analysis.

Drum-Buffer-Rope. Drum-buffer-rope is a TOC production application and the name given to the method used to schedule the flow of materials in a TOC facility. Srikanth and Umble (1997) define each component as follows:

- Drum. The drum is the constraint and therefore sets the pace for the entire system. The drum must reconcile the customer requirements with the system's constraints. In simpler terms, the drum is the rate or pace of production set by the system's constraint.
- Buffer. A buffer includes time or materials that support throughput and/or due date performance. A buffer establishes some protection against uncertainty so that the system can maximize throughput. A time

buffer is the additional planned lead time allowed, beyond the required setup and run times, for materials to reach a specified point in the product flow. Strategically placed, time buffers are designed to protect the system throughput from the internal disruptions that are inherent in any process. A stock buffer is defined as inventories of specific products that are held in finished, partially finished, or raw material form, in order to fill customer orders in less than the normal lead-time. Stock buffers are designed to improve the responsiveness of the system to specific market conditions.

- Rope. The rope is a schedule for releasing raw materials to the floor. The rope is devised according to the drum and the buffer. The rope ensures that non-capacity constraint resources are subordinate to the constraint. Restated, the rope is a communication process from the constraint to the gating operation that checks or limits material released into the system to support the constraint.

Buffer Management. Buffer management provides the means by which the schedule is managed on the shop floor. Buffer management is a process in which all expediting in a shop is motivated by what is scheduled to be in the buffers (constraint, shipping, and assembly buffers). Buffers can be maintained at the constraint, convergent points, divergent points, and shipping points. By expediting this material into the buffers, the system helps to avoid idleness at the constraint and missed customer due dates. Also, the causes of items missing from the buffer are identified, and the frequency of occurrences is used to prioritize improvement activities.

VAT Analysis. VAT analysis determines the general flow of parts and products from raw materials to finished products. It conceptualizes an organization in terms of the interaction of its individual component parts, both products and processes. Three general categories of production structures result from this standpoint, each necessitating a unique approach to management planning and control. The logical structure is the sequence of operations through which each product must pass in order to manufacture and assemble a product or product family. A *V* logical structure starts with one or a few raw materials, and the product expands into a number of different products as it flows through its routings. The shape of an *A* logical structure is dominated by converging points. Many raw materials are fabricated and assembled into a few finished projects. A *T* logical structure consists of numerous similar finished products assembled from common assemblies and subassemblies. The graph shows the general appearance of each structure. Once the general parts flow is determined, the system control points (gating operations, convergent points, divergent points, constraints, and shipping points) can be identified and managed. This determination focuses management's attention on a few control points where buffers can be used to protect and to maximize throughput. Five control points are used to manage the process: (1) the constraint, (2) the points of divergence (where a part or material is diverted to different routes in order to make different products), (3) the points of convergence (where two or more parts are combined in subassembly), (4) the gating operation (releases work into the shop), and (5) the shipping operation.

It is easy to see how each configuration got its name
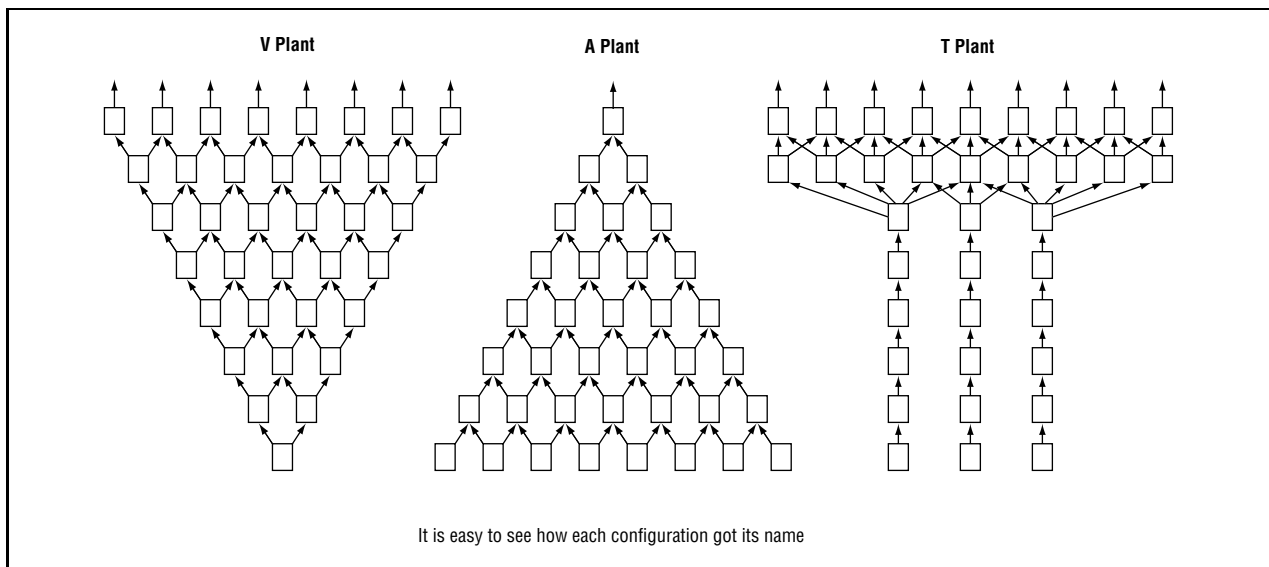
The shape of the structure determines which control points are utilized to manage production. A *T* structure focuses attention on the constraint and the gating operation. The five-step focusing process is used to manage the constraint with a buffer placed before the constraint to absorb variations in the process. The output from the gating operation is tied to the constraint; that is, since the constraint controls the amount of throughput; the gating operation cannot process more than the constraint.

A *V* structure also uses a buffer to protect the constraint and the gating operation releases orders at the same rate as the constraint as seen in the *T* structure. However, an additional control point exists in the *V* structure, the divergent point. The divergent point is controlled by a schedule derived from the shipping schedule. This derivation prevents misallocation of material to a product not currently in demand.

The *A* structure also manages the constraint and gating operation in a fashion similar to the *T* structure. Any diverging points are scheduled in accordance with the shipping schedule. In addition, an assembly buffer is used to maintain the flow into the convergent points. An additional schedule based on the shipping schedule (similar to that used in the *V* structure) is used to keep capacity from being misallocated to the wrong order. By using VAT analysis, significant improvements in the production process can result.

CONTINUING RELEVANCE

The unexpected and enormous success of *The Goal*– initially published in a small run of three thousand copies and now with over 2 million copies in print–and the further development of TOC have lead many organizations to put TOC theory into practice. Over the past three decades, a growing number of books, articles, and dissertations have appeared elaborating on Dr. Goldratt's philosophy and providing examples of TOC principles in use. Unlike other management fads from the 1970s, 1980s, and 1990s, TOC continues to be widely practiced into the twenty-first century. As of 2008, AGI (the Goldratt Institute that develops TOC ideas and conducts training courses) counted among its clients such corporations as 3M, Boeing, General Motors, Lockheed Martin, and Tyco, as well as both the Israeli and U.S. Air Forces. AGI continues to stay in touch with current trends in management, offering courses and sponsoring conferences on supply chain management, Lean, and Six Sigma, among others. It appears likely that TOC will remain an important force in the management world well into the twenty–first century.

SEE ALSO *Inventory Management; Inventory Types; Manufacturing Resources Planning; Operations Scheduling; Operations Strategy*

BIBLIOGRAPHY

Cox, James F., and Michael S. Spencer. *The Constraints Management Handbook.* Boca Raton, FL: St. Lucie Press, 1998.

Dettmer, H. William. *Goldratt's Theory of Constraints: A Systems Approach to Continuous Improvement.* Milwaukee, WI: ASQC Quality Press, 1997.

Dugdale, David, and Colwyn Jones. "Accounting for Throughput: Techniques for Performance Measurement, Decisions and Control." *Management Accounting* 75, no. 11 (1997): 52——56.

Gardiner, Stanley C., John H. Blackstone, and Lorraine R. Gardiner. "The Evolution of the Theory of Constraints." *Industrial Management* 36, no. 3 (1994): 13——16.

Goldratt Consulting Group. Available from: http://www.gold rattconsulting.com.

Goldratt, Eliyahu M. *Critical Chain.* Great Barrington, MA: The North River Press, 1997.

———. *Essays on the Theory of Constraints.* Great Barrington, MA: The North River Press, 1998.

———. *Haystack Syndrome: Sifting Information Out of the Data Ocean.* Croton-on-Hudson, NY: North River Press, 1990.

———. *It's Not Luck.* Croton-on-Hudson, NY: North River Press, 1994.

———. *Late Night Discussions on the Theory of Constraints.* Great Barrington, MA: The North River Press, 1992.

———. "What is the Theory of Constraints?" *APICS: The Performance Advantage,* June 1993, 18—20.

———. *What Is This Thing Called Theory of Constraints and How Should It Be Implemented?* Croton-on-Hudson, NY: North River Press, 1990.

Goldratt, Eliyahu M., Eli Schragenheim, and Carol A. Ptak. *Necessary But Not Sufficient: A Theory of Constraints Business Novel.* Great Barrington, MA: The North River Press, 2000.

Goldratt, Eliyahu M., and Jeff Cox. *The Goal: A Process of Ongoing Improvement.* 3rd ed. Great Barrington, MA: The North River Press, 2004

———. *The Goal: Excellence in Manufacturing.* Croton-on-Hudson, NY: The North River Press, 1984.

Goldratt, Eliyahu M., and Robert E. Fox. *The Race.* Croton-on-Hudson, NY: The North River Press, 1986.

Goldratt Institute. Available from: http://www.goldratt.com/.

Kendall, Gerald I. *Securing the Future: Strategies for Exponential Growth Using the Theory of Constraints.* Boca Raton, FL: St. Lucie Press, 1998.

Mabin, Victoria, J., and Steven J. Balderstone. *The World of the Theory of Constraints: A Review of the International Literature.* Boca Raton, FL: St. Lucie Press, 2000.

McMullen, Thomas B., Jr. *Introduction to the Theory of Constraints (TOC) Management System.* Boca Raton, FL: St. Lucie Press, 1998.

Newbold, Robert C. *Project Management in the Fast Lane: Applying the Theory of Constraints.* Boca Raton, FL: St. Lucie Press, 1998.

Noreen, Eric, Debra Smith, and James T. Mackey. *The Theory of Constraints and its Implications for Management Accounting.* Great Barrington, MA: The North River Press, 1995.

Rahman, Shams-ur. "Theory of Constraints: A Review of the Philosophy and Its Applications." *International Journal of Operations and Production Management* 18, no. 4 (1998): 336—355.

Ricketts, John Arthur. *Reaching the Goal: How Managers Improve a Services Business Using Goldratt's Theory of Constraints.* Boston, MA: Pearson, 2007.

Scheinkopf, Lisa J. *Thinking for a Change: Putting the TOC Thinking Processes to Use.* Boca Raton, FL: St. Lucie Press, 1999.

Schragenheim, Eli, and H. William Dettmer. *Manufacturing at Warp Speed: Optimizing Supply Chain Financial Performance.* Boca Raton, FL: St. Lucie Press, 2001.

Smith, Debra. *The Measurement Nightmare: How the Theory of Constraints Can Resolve Conflicting Strategies, Policies, and Measures.* Boca Raton, FL: St. Lucie Press, 2000.

Sproull, Bob. *The Ultimate Improvement Cycle: Maximizing Profits through the Integration of Lean, Six Sigma, and the Theory of Constraints.* Boca Raton, FL: CRC Press, 2009.

Srikanth, Mokshagundam L., and Harold E. Cavallaro, Jr. *Regaining Competitiveness: Putting 'The Goal' To Work.* New Haven, CT: The Spectrum Publishing Company, 1987.

Srikanth, Mokshagundam L., and Michael M. Umble. *Synchronous Management: Profit-Based Manufacturing for the 21st Century.* 2 vols. Guilford, CT: The Spectrum Publishing Company, 1997.

Stein, Robert R. *Reengineering the Manufacturing System: Applying the Theory of Constraints.* 2nd ed. New York: Marcel Dekker, Inc., 2003.

Woeppel, Mark J. *The Manufacturer's Guide to Implementing the Theory of Constraints.* Boca Raton, FL: St. Lucie Press, 2001.

Womack, David E., and Steve Flowers. "Improving System Performance: A Case Study in the Application of the Theory of Constraints." *Journal of Healthcare Management* 44, no. 5 (1999): 397—407.

THEORY X AND THEORY Y

Theory X and Theory Y represent two sets of assumptions about human nature and human behavior that are relevant to the practice of management. Theory X represents a negative view of human nature that assumes individuals generally dislike work, are irresponsible, and require close supervision to do their jobs. Theory Y, on the other hand, presents a positive view of human nature that assumes individuals are generally industrious, creative, and able to assume responsibility and exercise self-control in their jobs. One would expect, then, that managers holding assumptions about human nature that are consistent with Theory X might exhibit a managerial style that is quite different than managers who hold assumptions consistent with Theory Y.

CONCEPTUALIZATION AND DEVELOPMENT

After the Hawthorne experiments and the subsequent behavioral research of the 1930s and 1940s, the human relations approach to management joined the classical perspective as a major school of management thought. Whereas the classical school as espoused by management pioneers such as Frederick Taylor and Henri Fayol focused on principles of management, scientific selection and training, and worker compensation, the human relations approach emphasized behavioral issues such as job satisfaction, group norms, and supervisory style.

The human relations model was hailed as a more enlightened management paradigm because it explicitly considered the importance of the individual and how managers could increase productivity by increasing workers' job satisfaction. The end goal for management increased employee productivity; the assumption was that satisfied workers would be more productive compared with workers who felt antagonized by the companies they worked for.

In the 1950s, Douglas McGregor (1906-1964), a psychologist who taught at MIT and served as president of Antioch College from 1948-1954, criticized both the classical and human relations schools as inadequate for the realities of the workplace. He believed that the assumptions underlying both schools represented a negative view of human nature and that another approach to management based on an entirely different set of assumptions was needed. McGregor laid out his ideas in his classic 1957 article "The Human Side of Enterprise" and the 1960 book of the same name, in which he introduced what came to be called the new humanism.

McGregor argued that the conventional approach to managing was based on three major propositions, which he called Theory X:

1. Management is responsible for organizing the elements of productive enterprise–money, materials, equipment, and people–in the interests of economic ends.

2. With respect to people, this is a process of directing their efforts, motivating them, controlling their actions, and modifying their behavior to fit the needs of the organization.

3. Without this active intervention by management, people would be passive–even resistant–to organizational needs. They must therefore be persuaded, rewarded, punished, and controlled. Their activities must be directed. Management's task was thus simply getting things done through other people.

According to McGregor, these tenets of management are based on less explicit assumptions about human nature. The first of these assumptions is that individuals do not like to work and will avoid it if possible. A further assumption is that human beings do not want responsibility and desire explicit direction. Additionally, individuals are assumed to put their individual concerns above that of the organization for which they work and to resist change, valuing security more than other considerations at work. Finally, human beings are assumed to be easily manipulated and controlled. McGregor contended that both the classical and human relations approaches to management depend on this same set of assumptions. He called the first style of management "hard" and identified its methods as close supervision, tight controls, and coercion.

The hard style of management led to restriction of output, mutual distrust, unionism, and even sabotage. McGregor called the second style of management "soft" and identified its methods as permissiveness and need satisfaction. McGregor suggested that the soft style of management often led to managers' failure to perform their managerial role. He also pointed out that employees often take advantage of an overly permissive manager by demanding more but performing at lower levels.

McGregor drew upon the work of Abraham Maslow (1908-1970) to explain why Theory X assumptions led to ineffective management. Maslow had proposed that man's needs are arranged in levels, with physical and safety needs at the bottom of the needs hierarchy and social, ego, and self-actualization needs at upper levels of the hierarchy. Maslow's basic point was that once a need is met, it no longer motivates behavior; thus, only unmet needs are motivational. McGregor argued that most employees already had their physical and safety needs met and that the motivational emphasis had shifted to the social, ego, and self-actualization needs. Therefore, management had to provide opportunities for these upper-level needs to be met in the workplace, or employees would not be satisfied or motivated in their jobs.

Such opportunities could be provided by allowing employees to participate in decision making, by redesigning jobs to make them more challenging, or by emphasizing good work group relations, among other things. According to McGregor, neither the hard style of management based on the classical school nor the soft style of management inspired by the human relations movement were sufficient to motivate employees. Thus, he proposed a different set of assumptions about human nature as it pertains to the workplace.

McGregor put forth these assumptions, which he believed could lead to more effective management of people in the organization, under the rubric of Theory Y. The major propositions of Theory Y include the following:

1. Management is responsible for organizing the elements of productive enterprise–money, materials, equipment, and people–in the interest of economic ends.

2. People are not by nature passive or resistant to organizational needs. They have become so as a result of experience in organizations.

3. The motivation, potential for development, capacity for assuming responsibility, and readiness to direct behavior toward organizational goals are all present in people–management does not put them there. It is a responsibility of management to make it possible for people to recognize and develop these human characteristics for themselves.

4. The essential task of management is to arrange organizational conditions and methods of operation so that people can achieve their own goals by directing their efforts toward organizational objectives.

Thus, Theory Y has at its core the assumption that the physical and mental effort involved in work is natural and that individuals actively seek to engage in work. It also assumes that close supervision and the threat of punishment are not the only means or even the best means for inducing employees to exert productive effort. Instead, if given the opportunity, employees will display self-motivation to put forth the effort necessary to achieve the organization's goals. Thus, avoiding responsibility is not an inherent quality of human nature; individuals will actually seek it out under the proper conditions. Theory Y also assumes that the ability to be innovative and creative exists among a large, rather than a small segment of the population. Finally, it assumes that rather than valuing security above all other rewards associated with work, individuals desire rewards that satisfy their self-esteem and self-actualization needs.

Although McGregor did not believe that it was possible to create a completely Theory Y-type organization in the 1950s, he did believe that Theory Y assumptions would lead to more effective management. He identified several approaches to management that he felt were consistent with the precepts of Theory Y. These included decentralization of decision-making authority, delegation, job enlargement, and participative management. Job enrichment programs that began in the 1960s and 1970s also were consistent with the assumptions of Theory Y.

In the 1970s, 1980s, and 1990s, McGregor's conceptualization of Theory X and Theory Y were often used as the basis for discussions of management style, employee

involvement, and worker motivation. Empirical evidence concerning the validity of Theory X and Theory Y, however, was mixed. Some writers suggested that organizations implementing Theory Y tended to revert back to Theory X in tough economic times.

Others suggested that Theory Y was not always more effective than Theory X, but that the contingencies of each managerial situation determined which of the approaches was more appropriate. Still others suggested extensions to Theory Y. One of these, William Ouchi's Theory Z, attempted to combine the strength of American management philosophies based on Theory Y with Japanese management philosophies.

EFFECT ON MANAGEMENT FUNCTIONS

In their classic textbook *Essentials of Management* (1974), Harold Koontz and Cyril O'Donnell illustrated how the managerial functions of planning, leading, and controlling might be affected by Theory X and Theory Y assumptions. In regard to planning, Theory X assumptions might lead to the superior setting of objectives with little or no participation from subordinates. Theory Y assumptions, conversely, should lead to cooperative objectives designed with input from both employees and managers, resulting in a higher commitment by subordinates to accomplish these shared objectives.

Under Theory X, managers' leadership styles are likely to be autocratic, which may create resistance on the part of subordinates. Communication flow is more likely to be downward from manager to the subordinates. In contrast, Theory Y may foster leadership styles that are more participative, which would empower subordinates to seek responsibility and be more committed to goal achievement. Theory Y leadership should increase communication flow, especially in the upward direction.

In regard to control, Theory X is likely to result in external control, with the manager acting as a performance judge; the focus is generally on the past. Conversely, Theory Y should lead to control processes based on subordinates' self-control. The manager is more likely to act as a coach rather than a judge, focusing on how performance can be improved in the future rather than on who was responsible for past performance. Although the conceptual linkages between Theory X and Theory Y assumptions and managerial styles are relatively straightforward, empirical research has not clearly demonstrated that the relationship between these assumptions and managers' styles of planning, organizing, leading, and controlling is consistent with McGregor's ideas.

CRITICISM OF THEORY Y

The goal of managers using Theory X management styles was to accomplish organizational goals through the organization's human resources. McGregor's research suggested that when work was better aligned with human needs and motivations, employee productivity would increase. As a result, some critics have suggested that, rather than concern for employees, Theory Y style managers were simply engaged in a seductive form of manipulation. Even as managers better matched work tasks to basic human motivational needs through participative management, job rotation, job enlargement, and other programs that emerged at least partly from McGregor's work, managers were still focusing on measures of productivity rather than measures of employee well-being. In essence, critics charge that Theory Y is a condescending scheme for inducing increased productivity from employees, and unless employees share in the economic benefits of their increased productivity, then they have simply been duped into working harder for the same pay.

THEORY X AND THEORY Y IN THE TWENTY-FIRST CENTURY

Although the use of McGregor's classification had fallen out of favor by the twenty-first century, his work has had a significant impact on management thought and practice in the years since he first articulated the concepts. In terms of the study of management, McGregor's concepts are included in the overwhelming majority of basic management textbooks, and they are still routinely presented to students of management. Most textbooks discuss Theory X and Theory Y within the context of motivation theory; others place Theory X and Theory Y within the history of the organizational humanism movement.

Theory X and Theory Y are often studied as a prelude to developing greater understanding of more recent management concepts, such as job enrichment, the job-characteristics model, and self-managed work teams. Although the terminology may have changed since the 1950s, McGregor's ideas have had tremendous influence on the study of management down to the present day. Such current works as *The Psychology of Conflict and Conflict Management in Organizations* (2007) contain discussions of McGregor's classification and the underlying psychological model as a way of helping the reader make sense of more current management ideas.

In terms of the practice of management, the workplace of the early twenty-first century, with its emphasis on self-managed work teams and other forms of worker involvement programs, is generally consistent with the precepts of Theory Y. There is every indication that such programs will continue to increase, at least to the extent that evidence of their success begins to accumulate.

SEE ALSO *Theory Z*

BIBLIOGRAPHY

De Dreu, Carsten K.W., and Michele J. Gelfand. *The Psychology of Conflict and Conflict Management in Organizations.* New York: Lawrence Erlbaum Group, 2007.

Drach-Zahavy, A. "The Proficiency Trap: How to Balance Enriched Job Designs and the Team's Need for Support." *Journal of Organizational Behavior* 25, no. 8 (2004): 979–997.

Grandy, A. "Emotions at Work: Theory, Research and Applications for Management." *Human Relations* 57, no. 10 (2004): 1351–1356.

Koontz, Harold, and Cyril O'Donnell. *Essentials of Management,* 1st ed. New York: McGraw-Hill, 1974.

McGregor, D. *The Human Side of Enterprise.* New York: McGraw-Hill Book Company, 1960.

Spence-Laschinger, H.K., J.E. Finegan, J. Shamian, and P. Wilk. "A Longitudinal Analysis of the Impact of Workplace Empowerment on Work Satisfaction." *Journal of Organizational Behavior* 25, no. 4 (2004): 527–544.

THEORY Z

Theory Z is an approach to management based upon a combination of American and Japanese management philosophies and characterized by, among other things, long–term job security, consensual decision making, slow evaluation and promotion procedures, and individual responsibility within a group context. Proponents of Theory Z suggest that it leads to improvements in organizational performance.

DEVELOPMENT OF THEORY Z

Knowing the historical context in which Theory Z emerged is helpful in understanding its underlying principles. Theory Z has been called a sociological description of the humanistic organizations advocated by management pioneers such as Elton Mayo, Chris Argyris, Rensis Likert, and Douglas McGregor. In fact, the descriptive phrase, "Theory Z" can be traced to the work of Douglas McGregor in the 1950s and 1960s. McGregor, a psychologist and college president, identified a negative set of assumptions about human nature, which he called Theory X. He asserted that these assumptions limited the potential for growth of many employees.

McGregor presented an alternative set of assumptions that he called Theory Y and that were more positive about human nature as it relates to employees. In McGregor's view, managers who adopted Theory Y beliefs would exhibit different, more humanistic, and ultimately more effective management styles. McGregor's work was read widely, and Theory Y became a well–known prescription for improving management practices.

But in the 1970s and 1980s, many United States industries lost market share to international competitors, particularly Japanese companies. Concerns about the competitiveness of U.S. companies led some to examine Japanese management practices for clues to the success enjoyed by many of their industries. This led to many articles and books purporting to explain the success of Japanese companies. It was in this atmosphere that Theory Z was introduced into the management lexicon.

Theory Z was first identified as a unique management approach by William Ouchi. Ouchi contrasted American types of organizations (Type A) that were rooted in the United States' tradition of individualism with Japanese organizations (Type J) that drew upon the Japanese heritage of collectivism. He argued that an emerging management philosophy, which came to be called Theory Z, would allow organizations to enjoy many of the advantages of both systems. Ouchi presented these ideas fully in his 1981 book *Theory Z: How American Companies Can Meet the Japanese Challenge.* This book was among the best–selling management books of the 1980s.

Professor Ouchi advocated a modified American approach to management that would capitalize on the best characteristics of Japanese organizations, while still retaining aspects of management that are deeply rooted in U.S. traditions of individualism. Ouchi cited several companies as examples of Type Z organizations and proposed that a Theory Z management approach could lead to greater employee job satisfaction, lower rates of absenteeism and turnover, higher quality products, and better overall financial performance for U.S. firms adopting Theory Z management practices. The next section discusses Ouchi's suggestions for forging Theory Z within traditional American organizations.

THEORY Z AS AN APPROACH TO MANAGEMENT

Theory Z represents a humanistic approach to management. Although it is based on Japanese management principles, it is not a pure form of Japanese management. Instead, Theory Z is a hybrid management approach combining Japanese management philosophies with U.S. culture. In addition, Theory Z breaks away from McGregor's Theory Y. Theory Y is a largely psychological perspective focusing on individual dyads of employer–employee relationships, while Theory Z changes the level of analysis to the entire organization.

According to Professor Ouchi, Theory Z organizations exhibit a strong, homogeneous set of cultural values that are similar to clan cultures. The clan culture is characterized by homogeneity of values, beliefs, and objectives. Clan cultures emphasize complete socialization

of members to achieve congruence of individual and group goals. Although Theory Z organizations exhibit characteristics of clan cultures, they retain some elements of bureaucratic hierarchies, such as formal authority relationships, performance evaluation, and some work specialization. Proponents of Theory Z suggest that the common cultural values should promote greater organizational commitment among employees.

THE FEATURES OF THEORY Z

The primary features of Theory Z are long–term employment, consensual decision making, individual responsibility, slow evaluation and promotion, informal control with formalized measures, moderately specialized career path, and holistic concern.

Long–Term Employment. Traditional U.S. organizations are plagued with short–term commitments by employees, but employers using more traditional management perspective may inadvertently encourage this by treating employees simply as replaceable cogs in the profit–making machinery. In the United States, employment at will, which essentially means the employer or the employee can terminate the employment relationship at any time, has been among the dominant forms of employment relationships. Conversely, Type J organizations generally make life–long commitments to their employees and expect loyalty in return, but Type J organizations set the conditions to encourage this. This promotes stability in the organization and job security among employees.

Consensual Decision Making. The Type Z organization emphasizes communication, collaboration, and consensus in decision making. This marks a contrast from the traditional Type A organization that emphasizes individual decision-making.

Individual Responsibility Type A organizations emphasize individual accountability and performance appraisal. Traditionally, performance measures in Type J companies have been oriented to the group. Thus, Type Z organizations retain the emphasis on individual contributions that are characteristic of most American firms by recognizing individual achievements, albeit within the context of the wider group.

Slow Evaluation and Promotion. The Type A organization has generally been characterized by short–term evaluations of performance and rapid promotion of high achievers. The Type J organization, conversely, adopts the Japanese model of slow evaluation and promotion.

Informal Control with Formalized Measures. The Type Z organization relies on informal methods of control, but

does measure performance through formal mechanisms. This is an attempt to combine elements of both the Type A and Type J organizations.

Moderately Specialized Career Path. Type A organizations have generally had quite specialized career paths, with employees avoiding jumps from one functional area to another. Conversely, the Type J organization has generally had quite non–specialized career paths. The Type Z organization adopts a middle–of–the–road posture, with career paths that are less specialized than the traditional U.S. model, but more specialized than the traditional Japanese model.

Holistic Concern. The Type Z organization is characterized by concern for employees that goes beyond the workplace. This philosophy is more consistent with the Japanese model than the U.S. model.

EVALUATION OF THEORY Z

Research into whether Theory Z organizations outperform others has yielded mixed results. Some studies suggest that Type Z organizations achieve benefits both in terms of employee satisfaction, motivation, and commitment as well as in terms of financial performance. Other studies conclude that Type Z organizations do not outperform other organizations.

Difficulties in the Japanese economy in the 1990s, along with the mixed results many U.S. firms had in borrowing management methods from another culture, led some researchers to suggest that the widespread admiration of Japanese management practices in the 1970s and 1980s might have been misplaced. As a result, Theory Z fell out of favor in the West, replaced by other popular management doctrines such as total quality management (TQM), which peaked in its use during the mid–to late–1990s. By the twenty–first century, Theory Z was considered a relic of the past. While some of the ideas contained in Theory Z will undoubtedly have a lasting impact on management practices in the United States and around the world into the twenty–first century, it is unlikely that Theory Z will experience a revival. However, by positioning target research at the organizational level rather thaen the individual level, Ouchi has left an indelible mark on management practice.

SEE ALSO *Empowerment; Japanese Management; Theory X and Theory Y*

BIBLIOGRAPHY
Barney, J. "An Interview with William Ouchi." *Academy of Management Executive* 18, no. 4 (2004): 108–117.
Daft, R.L. "Theory Z: Opening the Corporate Door for Participative Management." *Academy of Management Executive* 18, no. 4 (2004): 117–122.

Leonard, D., and W.C. Swap. *Deep Smarts: How to Cultivate and Transfer Enduring Business Wisdom.* Boston: Harvard Business School Press, 2005.

Ouchi, William G. *Theory Z: How American Business Can Meet the Japanese Challenge.* Reading, MA: Addison–Wesley, 1981.

TIME-BASED COMPETITION

The widespread use of just-in-time production (JIT) and other advanced manufacturing techniques has been credited with providing such improvements as decreased inventories, set-up times, downtime and workspace. These decreases have yielded increases in inventory turns, equipment utilization, labor utilization, and ultimately, profit. Simply stated, this means that finished goods are produced and delivered just in time to be sold, subassemblies are made just in time to be assembled into finished goods, fabricated parts are collected just in time to go into subassemblies, and raw materials are gathered just in time to be transformed into fabricated parts. In effect, consumption of time has been reduced. While the JIT philosophy dictates that improvement in these areas be part of a continuous process, it does not have to stop there. Some firms have reduced the consumption of time not only in the production area, but throughout the system. Firms that manage this have gone beyond JIT and its

competitive advantages. They have an advantage in time-based competition.

WHAT IS TIME-BASED COMPETITION?

JIT was the first manifestation of time-based competition. Time-based competition is the extension of JIT into every facet of the product delivery cycle, from research and development through marketing and distribution of the final product. Even quality, while still critical to success, is not the competitive advantage it once was in many industries. Manufacturing firms then have three strategic options: seek coexistence, retreat in the face of competitors, or attack (directly or indirectly). It has been said that strategy is and always has been a moving target. For some firms who choose to attack, this target has moved to speed and time-based competition.

The term *time-based competition* came into use with its appearance in a 1988 *Harvard Business Review* article entitled "Time—The Next Source of Competitive Advantage" by George Stalk, Jr. It was further defined in a series of articles and books written by consultants from the Boston Consulting Group.

Time-based competition is a broad-based competitive strategy which emphasizes time as the major factor for achieving and maintaining a sustainable competitive advantage. It seeks to compress the time required to propose, develop, manufacture, market, and deliver its products.
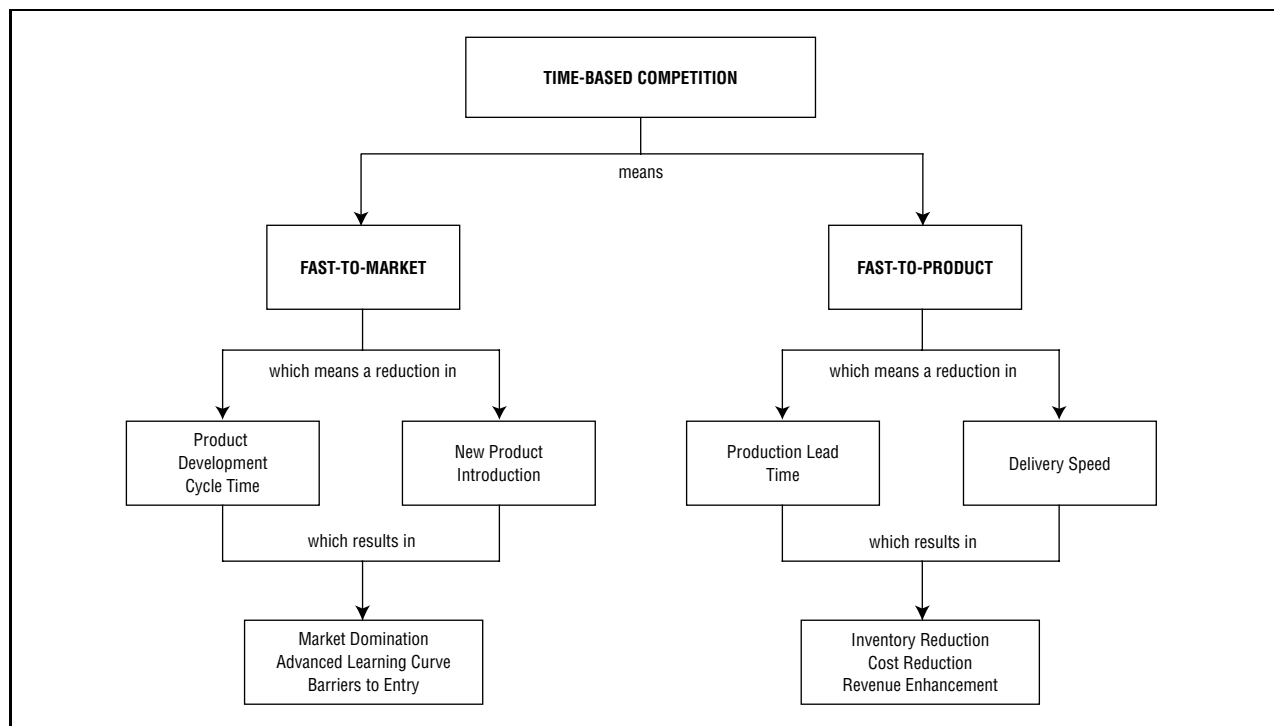
In order to do this, the firm must change its current processes and alter the decision structures used to design, produce, and deliver to the customer. Time-based competition appears in two different forms: fast-to-market and fast-to-produce. Firms that compete with to-market speed emphasize reductions in design lead-time. In other words, the firm has the ability to minimize the time it takes to develop new products or make rapid design changes. Products 50 percent over budget but introduced on time have been found to generate higher profit levels than products brought to market within budget but six months late. Also, this form allows firms to gain a market edge by being able to consistently introduce more new products or large numbers of product improvements/variations faster than its competitors, thereby dominating the market. Sun Microsystems achieved leadership in engineering workstations by reducing (by 50 percent compared to competitors) the time required to design and introduce new systems. Additionally, these firms are now moving further along the learning curve than the competition. Both factors ultimately increase barriers to entry by competitors.

Fast-to-product firms emphasize speed in responding to customer demands for existing products. Wal-Mart has been able to dominate its industry by replenishing its stores twice as fast as its competitors. Firms competing in this area focus on lead-time reduction throughout the system, from the time the customer places an order until the customer ultimately receives the product. This includes the ability to reduce the time it takes to manufacture products (throughput time) as well as the ability to reduce the time between taking a customer's order and actually delivering the product (delivery speed). These reductions in lead-time are usually accompanied by significant reductions in inventory levels. As with JIT, there is less rework, fewer supervisors, lower carrying costs, less overhead, as well as enhanced quality and on-time delivery performance. Some customers, known as impatient customers, place a great deal of value on reduced lead-time. These customers are willing to pay a premium to get their goods and services quickly. This combination of lower costs and higher revenues contributes significantly to an improved corporate performance.

While product development cycle time, new product introduction, production lead time, and delivery speed all contribute to improved business performance, not all contribute equally. A study by Shawnee Vickery, Cornelia Droge, James Yeomans, and Robert Markland found that the most consistent predictor of business performance was new product introduction. The second best predictor was product development cycle time. While production lead time and delivery speed were found to be related to business performance (respectively, in order of contribution),

their relationship to business performance was not as significant as the other two factors.

The production cycle encompasses order entry through the completion of all paperwork, through finished goods all the way to distribution of the final product. JIT methods greatly reduce the amount of time consumption from initiation of the purchase order through the transformation process, but improvement in these other areas has much potential. Studies have shown that few companies have value-added time in excess of 10 percent of average order cycle times. In fact, 95 to 99 percent of the time a product or service is not receiving value, it is waiting. Hence, time can be removed from any part of the product cycle.

Some firms have traced the complete order entry process only to find that it took longer to complete the paperwork than it did to manufacture the product. One major manufacturer compressed its manufacturing processes but still took months to convert a customer order into an approved order for manufacture. Time reductions resulting from JIT success are worth much less when orders sit at the retailer for weeks, float in the mail for a week, sit at the distributor for a week, float in the mail for another week and then begin the now shortened transformation process at the factory.

Paperwork is subject to the same delays. When paperwork moves in batches (similar to manufacturing), several days of delay can develop while the order sits in a stack awaiting enough volume for the batch to move on to the next stage in processing. Time-based competitors begin by eliminating all unnecessary paperwork. Incoming mail is categorized as fast- or slow-track, allowing the fast-track orders to be handled immediately. Also, some firms structure the paperwork process so that transactions are handled one at a time, eliminating the delay caused from batch movement. A door manufacturer managed to refine its process to the point that it could price and schedule 95 percent of incoming orders during the initial customer call.

Frequently, when delays occur, the delay time is made up at the end of the product cycle. Obviously, the last place to make up for lost time is at the distribution and transportation stage (similar to the way a delayed airline flight might make up for delayed takeoffs and manage to still land on time). If time can be reduced in these emergency situations, why not reduce it permanently and reap the benefits of time-based competition?

IMPLEMENTATION

George Stalk, Jr. relates that a firm becomes a time-based competitor by accomplishing four tasks: (1) understanding the rules of response, (2) making value-delivery systems two to three times as flexible and responsible as its

competitors, (3) pricing how customers value these capabilities, and (4) implementing a strategy for surprising its competitors with time-based advantages.

Philip Carter, Steven Melnyk, and Robert Handfield identified seven process strategies for implementing time-based competition. These include: system simplification, system integration, standardization, parallel activities, variance control, automation, and excess resources. They feel that by identifying these strategies, they have developed a linkage between lead-time reduction and the tactics needed to achieve this goal.

Shawnee Vickery, Cornelia Droge, James Yeomans, and Robert Markland identified ten steps to guide the implementation of time-based competition. They felt that implementing firms need to:

1. Perform a thorough process analysis to understand their current business operation.

2. Develop a measurement system that focuses on time.

3. Increase the speed of new product introduction times by using methods such as concurrent engineering and cross-functional teams.

4. Evaluate all managerial decision alternatives in terms of time.

5. Embrace change and develop change-oriented management practices and methods.

6. Understand the critical importance of top management support to sustain change.

7. Treat bottlenecks, downtime, and other problems as opportunities to learn.

8. Find ways to incorporate time reduction results into the employee reward structure.

9. Give employees a better understanding of how their jobs contribute to time compression.

10. Balance improvements with work disruptions in order to keep customers happy.

Some time-based firms rely on technology (e.g., more productive machinery) to reduce lead times while others seek to streamline the system and its processes. For example, Japanese manufacturers focused on single-minute exchange of dies when setting up or changing machines. Still, others use techniques such as team building and alliance building to reduce time by focusing on integrating the various components of the supply chain. Hillman Willis and Anthony Jurkus, in a 2001 *Review of Business* article, note that some firms (such as Black and Decker, Ford, and AT&T) have found success by organizing teams to work—from the time of inception—on an entire family of new products. By bringing together people from product engineering, manufacturing, marketing, and purchasing throughout the development process and giving them the authority to make real decisions, enormous time and expense has been cut from new product efforts. Also, this process facilitates the standardization of components across the family of products, thereby making them easier and less costly to assemble. Orders can then be filled by assembling the appropriate set of components, reducing both time and cost by as much as half. One firm has reported that an ad hoc cross-functional team took actions that reduced average cycle time from 18.1 hours to 9.4 hours. This 48 percent reduction in cycle time corresponds to a 92.5 percent increase in productivity.

RECENT DEVELOPMENTS

During the 1990s and into the twenty-first century, numerous works were produced developing and refining JIT and other time-based methods. The twenty-first century brought another development, Stream-of-Variation Analysis (SOVA), a generic math model that facilitates time-based competition. SOVA integrates multivariate statistics, control theory, and design/manufacturing knowledge into a unified framework to optimize manufacturing performance and identify and isolate causes of dimensional variation which occur during the pre-production stage of a product.

Although technology continues to feed improvements in time-based competition, it is not the only driving force. As Peter Fingar noted in 2006, "Time-based competition isn't about the latest gee-whiz technology; it's about a management philosophy that's determined to squeeze out time regardless of the technologies available." Time-based competitors continue to search for new and better techniques to improve their competitiveness.

With continued developments in technique and mathematical models, time-based competition is already a reality for many firms. Generally, these time-based competitors began by correcting their manufacturing techniques (often through JIT), then fixing sales and distribution, and finally adjusting their approach to innovation. Their strategy is based on the results of flexible manufacturing, rapid response, expanding variety, and increasing innovation. It is a metastrategy that improves performance through changes in the processes and structures used to design, manufacture, and deliver products to the customer, thereby impacting overall firm performance (e.g., return on investment, return on assets). Motorola, Northern Telecom, and Toyota are but a few of the companies that have found ways to increase the overall value of their delivery systems through the compression of time; however, recent studies suggest that time reductions that are not tied to viable business strategies can needlessly increase costs and dramatically reduce profits.

SEE ALSO *Cycle Time; Lean Manufacturing and Just-in-Time Production; New Product Development*

BIBLIOGRAPHY

Carter, Philip L., Steven A. Melnyk and Robert B. Handfield. "Identifying the Basic Process Strategies for Time-Based Competition." *Production and Inventory Management Journal* 1st Quarter (1995): 65–70.

Ceglarek, D., et al. "Time-Based Competition in Multistage Manufacturing: Stream-of-Variation Analysis (SOVA) Methodology—Review." *International Journal of Flexible Manufacturing Systems* 16 (2004): 11–44.

Choong, Y. Lee, Niwat Rittisakdanon, and Xiaomu Zhou. "Reengineering for Time-Based Competition: Reducing Time-to-Market by Reengineering." *International Journal of Management* 18, no. 1 (2001): 33.

Fingar, Peter. *Extreme Competition: Innovation and the Great 21st Century Business Reformation.* Tampa, FL: Meghan-Kiffer, 2006.

Shi, Jianjun. *Stream of Variation Modeling and Analysis for Multistage Manufacturing Processes.* Boca Raton, FL: CRC Press, 2006.

Stalk, George, Jr. "The Time Paradigm." *Forbes* 30 November 1998.

———. "Time—The Next Source of Competitive Advantage." *Harvard Business Review* July-August 1988.

Vickery, Shawnee K., et al. "Time-Based Competition in the Furniture Industry." *Production and Inventory Management Journal* 4th quarter (1995): 14–21.

Willis, T. Hillman, and A.F. Jurkus. "Product Development: An Essential Ingredient of Time-Based Competition." *Review of Business* 22, no. 1-2 (2001): 22–27.

TIME MANAGEMENT

Many people struggle with time management and would like to accomplish more tasks in a day, or have more time for non-work activities. There are a number of suggestions for improving time management at work and at home, and different approaches work for different people.

DELEGATE

Many of us attempt to accomplish tasks that can be easily delegated to someone else. By delegating a task, you can have more time to accomplish other important tasks in order of priority. When can a task be delegated and when should you do it yourself?

Only delegate if there is a person who is skilled enough to do the task at hand. You can delegate to employees you supervise, your colleagues, and even those above you. When you delegate a task to your subordinate—downward delegation—you have the authority to make sure that the task is done correctly, but assigning a task to an employee who lacks the skill to do it will often require more time than if you did the task yourself. Delegating to a peer, or a colleague, works well if you and the other person have complementary skills. You can trade responsibilities if you have skills that balance each other out and create synergy. Although most employees do not consider it, you can also delegate to employees above you in the organizational hierarchy—upward delegation. If you have been assigned a task that should not be yours or a task that is beyond your abilities, you can ask a superior for guidance or clarification. Your feedback may indicate to your supervisor that the task is better done by him or herself. Conversely, it can also indicate an interest in a challenging task and show a higher level of commitment to the company.

Another consideration when delegating is the type of task. There are three types of tasks that are best suited to being assigned to someone else: (1) tasks for which you do not have adequate skill or expertise, (2) tasks that you do not want to do but that others might, and (3) tasks that are easy to accomplish but detract from your value to the organization.

First, if someone else can do something more effectively than you can, doing it yourself is poor time management. For instance, if you are planning a retirement party for a colleague, you could purchase, prepare, and arrange the refreshments yourself. However, if you are not good at preparing food or creating a buffet, it would be wise to hire a caterer for this task. In addition to saving the time it takes to purchase and prepare food and drinks, by hiring a reputable caterer, you would spend considerably less energy managing the task and thinking about it.

Delegating is also wise when someone else may enjoy the task. Again, consider the example of organizing a retirement party. Perhaps you do not enjoy party planning, but your colleague does. Delegate this task to your colleague, perhaps taking on one of his tasks in return, creating a situation in which both of you feel satisfied with the work you are assigned.

Delegation also works well if there is a task that takes little skill to accomplish. For instance, if you are sending a mass mailing, stuffing the envelopes yourself is poor time management. By delegating to an assistant or intern, you are freed to complete other tasks that require more skill and attention. Since the person to whom you have delegated this task is likely to complete it just as effectively as you would have, then there is no drawback.

When should you not delegate? First, you should accomplish your major job tasks. For instance, it may be appropriate for your secretary to stuff envelopes with a letter soliciting business from former clients, but it is not appropriate for this secretary to write the entirety of this letter without your help or final approval. If you consistently have others complete your tasks, then you may find yourself replaced by another employee. Second, you should not delegate tasks in which the outcome is critical. If you have tasks that, if not completed, can lose the company a client or money, you must be responsible for this task. If you are accountable for an important outcome, you should use caution when delegating. Finally,

there are some tasks for which delegation is too expensive. While hiring a caterer for a party does not represent a large cost, there are other times in which hiring others to complete tasks (e.g., offer training or develop a Web site) can be cost prohibitive to some organizations.

PRIORITIZE TASKS

Procrastination is common to many people, even in business environments. Procrastination occurs for many reasons: not knowing where to start, not understanding a task, disliking a task, or worrying you cannot complete a task successfully. Often a person's anxiety about a task leads them to avoid it. Therefore, to accomplish more in a workday, it is best to tackle the most difficult or worrisome task first. This is beneficial because it allows you to devote the time and mental energy necessary for a difficult or unpleasant task when you are most able to. Furthermore, by reducing the anxiety associated with this task in tackling it early, you will find that work becomes easier. When the unpleasant task is finished, it no longer creates anxiety and worry, which can save time.

If a person leaves unpleasant or difficult tasks until shortly before their deadlines or until the end of the workday, he or she will have less energy to complete this task. Additionally, the anxiety and dread associated with the completion of the task that has been procrastinated may affect a person's ability to complete other tasks throughout the day. The negative emotions and anticipation associated with an unpleasant task are likely to distract from other tasks on the agenda. This can make even easy tasks more time consuming.

SET GOALS

Goals can be very effective ways to meet workplace demands in a timely manner. Goals are measurable, short-term objectives. Simply by setting an appropriate goal, you can better organize your day or week. Decades of research have supported the effectiveness of goal setting on performance in a variety of tasks. However, for a goal to be effective, it must be designed properly by being specific and challenging. Specific goals are much more effective than non-specific goals, because your progress can be assessed. For instance, setting a goal of reading twenty pages of a report is a good goal because you can determine whether or not it was accomplished. If your goal was to "read a lot of the report" then you might determine five pages into it, that you had accomplished that goal, when in reality, you had not read enough. Goals should also be challenging. A goal that is too easy, such as "respond to one e-mail today" are not motivating because they present no challenge at all. Overly difficult goals (e.g., "improve my sales by 50 percent in one month") are also not motivational; they are so unrealistic that a person may give up too soon, realizing they will never reach the goal. In addition to being appropriately specific and challenging, you are more likely to reach goals to which you are committed. A lack of interest or commitment in reaching the goal makes the goal-setting process futile.

One of the advantages of setting goals to improve time management is that, over time, you gain a more realistic understanding of what can be accomplished in a set amount of time, such as a workday. People who do not often set goals may not be aware of what their capabilities are; however, those who have set goals more consistently have a good idea of which goals they have been able to meet and which were set too high or too low.

MEET DEADLINES EARLY

Some people thrive when working under deadlines. Newspaper reporters operate each day with a set of firm deadlines. However, many other people find deadlines to be daunting and stressful. Deadlines are set to help us manage time. By always meeting deadlines, or even by meeting them early, you can appropriately manage time. If you complete deadline work early, you reduce the stress associated with your schedule, and you have more self-confidence about completing work tasks. Additionally, a person's work is likely to be higher quality if deadlines are met early on; attention to detail can suffer when a person is hurrying to finish a project. To meet your deadlines early, you can break larger tasks into smaller ones and prioritize them. In addition, setting interim deadlines before a final deadline can help you to set goals and to make a large and seemingly unmanageable project seem easier to complete. Finally, tackling more difficult tasks first, as described previously, may increase your ability to meet deadlines.

STAY ORGANIZED

Organization and time management go hand in hand. Many people waste time looking for documents, messages, or other information necessary to complete tasks in a timely manner. There are a number of steps that can help you stay organized. First, arrange your workspace in a way that promotes organization. That is, live by the old adage: have a place for everything, and put everything in its place. If you do not have a specific location for telephone messages, it is not surprising that you might spend time looking for a telephone message or even misplace one. Additionally, put the items that are most used closest to you. If you use a reference book (such as a dictionary or a computer programming reference book) frequently, putting that book across the room wastes time. Minimize the time you spend getting up from your desk to retrieve or look for items.

Spend a little time each day organizing your workspace. Discard documents and items that are no longer needed, file items that will be needed at a later time, and write to do lists for tasks that must be accomplished within specific timeframes. Some time management experts suggest that you only touch each piece of paper in your office once. That is, if you receive a memo, you should read it when you receive it and take action based on it only once, rather than reading the memo, putting it down, and having to reread it several times before acting on it.

A third suggestion it to use a calendar or day planner to stay organized; this will help you to remember important dates and deadlines. Without a calendar in which such dates are noted, some tasks or meetings will undoubtedly be forgotten; instead of planning the time you need to do certain tasks, you may have to drop everything to accomplish a task that must be done for a meeting that you forgot was later that day. For a calendar to be effective for time management, however, you must consistently note important dates. An incomplete or inaccurate calendar is useless. If part of your daily organization includes documenting important dates and times and reviewing events on a calendar scheduled for the following days, time management will be achieved more easily.

MULTITASKING

Multitasking makes it possible to achieve a great deal in much less time than handling one task at a time. When you bring tasks together that can be achieved simultaneously, you enhance your productivity and minimize the time it takes to get through your to-do list. Multitasking is not for every person, nor is it for every task. In order for multitasking to be effective, knowing how to prioritize and which tasks can be done with partial concentration is imperative. For example, collating papers while on a phone call is acceptable and effective multitasking, while writing a speech and taking a conference call simultaneously is not. Multitasking that involves getting multiple things done based on location seems to be the most effective for most people. For example, if you have three things to do away from your desk, getting them all done in one trip away from your desk may be the best time management strategy. Likewise, saving things that can be done from home for one evening a week can be more productive than taking home one item every single day.

Some people multitask very effectively by pairing tasks that must be done for work with leisure activity: walking on the treadmill while browsing e-mails on a BlackBerry, or listening to office voicemails on a Bluetooth headset while commuting home. As with all techniques, knowing your limits, prioritizing and staying aware of deadlines will make multitasking an effective tool in your arsenal of time management.

FIND YOUR PRODUCTIVE TIME

Each person has a time of the day when they are better able to concentrate or to do certain types of work. And, most people have a time of the day at which they have difficulty staying focused and getting things done. Some people are very productive in the mornings, but less able to concentrate in the afternoons. Others cannot tackle difficult tasks in the morning and prefer to wait until later in the day to do work that requires attention to detail. By determining when you are best able to do certain types of tasks, you can schedule them throughout your day so that you are most productive. For instance, if you are able to read and evaluate best in the morning, schedule those tasks for when you first arrive at work. If you find yourself getting sleepy in the afternoons, then reading quietly is not the best task for this time of day. Instead, you may choose to do tasks that involve a little bit of physical activity or that do not require as much mental concentration. Perhaps returning telephone calls or meeting with co-workers is better for afternoons.

By scheduling tasks during the times of day when you are best able to do them, you can complete your work in a more timely manner. Many people waste time trying to concentrate or solve difficult problems at times that are ineffective for them. Re-reading a memo three times because you lack concentration in the late afternoon is a poor choice when you could read the memo once in the morning.

MINIMIZE STRESS

Stress is a major barrier to effective time management. Stress created by the workplace or by personal concerns can create anxiety and worry that are distracting from work. Even ineffective time management can lead to stress, since anxiety over completing tasks in a timely manner can hinder their accomplishment. To manage stress, it is important to first recognize what is creating the stress. Is it a worry over a particular task, a work situation, or an issue at home? Once the stressor is recognized, it can be better managed. If the source of stress is unidentified, then it cannot be managed.

Once the source of stress is identified, you must determine which parts of the situation can be controlled and which cannot. For instance, if the source of stress is a looming deadline for a project, tackling or delegating elements of that project or scheduling some of the tasks may relieve stress. However, there may be parts of the project that are causing stress that cannot be managed. For instance, if part of the successful completion of the project depends on the work of another person, this may create stress that cannot be controlled unless you have

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Exhibit 1

Tips for Improving Sleep

- Create an environment in a bedroom that reduces distractions; don't do work or watch TV in the bedroom
- Make your bedroom as dark and as quiet as possible
- Go to bed and wake up at the same times every day
- Avoid caffeine late in the day
- Relax before bedtime by taking a warm bath or listening to soothing music
- Reduce worry at bedtime by writing a list of things to do the next day before going to bed
- If you are in bed but cannot sleep, get up and do something boring until you are sleepy

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some ability to monitor the work of the other person. For stressors that are out of your control, knowing how to cope and how to communicate with officemates will make all the difference.

Even when stressors have been identified and controlled to some extent, you may still experience stress. Getting an appropriate amount of sleep, exercising regularly, and eating well all contribute to minimizing the effects of stress. Many Americans are sleep deprived—skipping even an hour of sleep each night can have noticeable consequences at work. Sleeping less to allow for more time at work is not an effective approach. Getting enough sleep makes a person more productive during their working hours, requiring less time on the job. There are many suggestions for improving sleep, as detailed in Exhibit 1.

Physical exercise can also reduce stress. Sports and aerobic exercise can reduce a person's resting heart rate and blood pressure, which can help to alleviate the negative effects of stress. Many people forgo physical activity, believing that time invested in exercise will waste time needed to complete other tasks. However, much like getting enough quality sleep, even minimal physical activity can make a person more effective during working hours due to decreased stress and anxiety.

LEARN TO SAY NO

Many people who struggle with time management have too many obligations. People agree to take things on, knowing that their time is limited, but feeling that they cannot say no. People agree to take on tasks that they have little time for because they want to help others, they feel guilty for saying no, feel obligated by a superior, or misjudge the time they have available. Saying yes to people who make requests can feel good, but not having time to accomplish tasks can be a letdown to the person and the organization. So, often times, saying no to a request is a better option than taking on a task for which

there is not adequate time. Knowing when to say no is as important a time management tool as any other.

When do you say yes and when do you say no? First, you must consider what the actual commitment is; that is, how much time, effort, and energy it will take. If you do not fully explore the possible commitments required by a certain request, you may be agreeing to do something that takes much longer than you originally anticipated. Second, you must decide if agreeing to the request is a good use of your time. When comparing the proposed commitment to already scheduled tasks, which is more important? Those tasks that have very meaningful outcomes may be worth agreeing to do even when time is limited.

Even when a person knows that they do not have the time available to say yes to a new commitment, saying no can be difficult. To decline a request more effectively, you should do four things. First, explain why you are saying no. Not providing a good reason to decline the request can cause others to draw incorrect conclusions. Second, be tactful when you turn someone down because the denial may make him or her angry or hurt. Third, suggest an alternative that takes less time. By offering another option, such as a different employee who might do the task or another time when you can help, you show that you want to cooperate, while still protecting your time. Finally, tell the person "no" as soon as possible. By asking for time to think over a decision when you know that you will ultimately say no, you may cause more problems or even find yourself obligated to say yes.

REDUCE THE INTRUSION OF TECHNOLOGY

The availability of e-mail, texting, instant messaging, and wireless devices has greatly improved the ability to get work done and multitask. However, if you find that e-mails or a ringing phone is interrupting your work, you may want to ignore them, scheduling time to take calls and respond to e-mail. Setting up a system for emergency calls and messages is always a good idea if you choose to have a "no communication" time each day.

ORGANIZATIONAL APPROACHES TO IMPROVING TIME MANAGEMENT

Because time management can have an effect on employees' productivity in the workplace, some employers are now offering information and assistance for employees who want to better manage their time. Some organizations now offer time management workshops that teach skills such as those listed above. Additionally, seminars may be developed around particular models of time management, such as those presented in Steven Covey's book *The Seven Habits of Highly Effective People.*

Another approach employers can use to assist employees in time management skills is through wellness programs. Wellness programs are opportunities offered or subsidized by the organization to promote physical and emotional health and well-being, thereby reducing stress. They are intended to prevent and reduce health risks and/or emotional stress. One of the outcomes that may be associated with a wellness plan is the ability to better manage time—if people are physically well, many of the stress-related barriers to time management are reduced. Wellness plans may involve free or reduced-cost health club memberships, on-site health clubs, relaxation courses, stress-reduction courses, smoking-cessation courses, and even time-management courses. Some organizations even take the step of reducing health insurance premiums for employees who participate in a wellness plan.

Finally, many organizations now offer benefits and services intended to help employees manage non-work activities. Flexible work hours, on-site day care, leave banks, and even valet services are now being offered in some organizations. These types of services, while often improving employee recruitment and retention, may also help to reduce distractions at work, reduce employee stress, and assist employees in being more productive during working hours.

Time management is a challenge for many people, and there are a number of tips that can help employees to make better use of their time. By learning how to delegate, prioritize, set goals, meet deadlines, stay organized, and reduce intrusions, employees can improve their time management. Taking advantage of time management workshops and programs when available will also increase productivity.

SEE ALSO *Goals and Goal Setting; Organizing; Stress; Technology Management*

BIBLIOGRAPHY

Covey, Steven R. *The Seven Habits of Highly Effective People.* New York: Simon & Schuster, Inc., 1989.

Mancini, Marc. *Time Management.* New York: McGraw-Hill Professional, 2003.

Mancini, Marc. *Time Management: 24 Techniques to Make Each Minute Count at Work.* New York: McGraw-Hill Professional, 2007.

Reistad-Long, Sara. "How to Multitask Without Losing Your Mind."*O, The Oprah Magazine,* August, 2007. Available from: http://www.webmd.com/balance/features/how-multitask-without-losing-your-mind.

Tracy, Brian. *Time Power: A Proven System for Getting More Done in Less Time Than You Ever Thought Possible.* New York: AMACON Books, 2004.

TOTAL QUALITY MANAGEMENT

SEE *Quality and Total Quality Management*

TRADEMARKS

SEE *Patents and Trademarks*

TRADING BLOCS

SEE *Free Trade Agreements and Trading Blocs*

TRAINING DELIVERY METHODS

Training is a set of a systematic processes designed to meet learning objectives related to trainees' current or future jobs. These processes consist of five sequential phases: (1) needs analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. These phases are sequential because the outputs of the previous phases provide the inputs to those that follow. Figure 1 depicts the phases and their relationships. Training delivery methods consist of the techniques and materials used by trainers to structure learning experiences. Different training delivery methods are better or worse at achieving various learning objectives. During the design phase (see Figure 1) the different methods are examined to determine their appropriateness for the learning objectives. Once appropriate methods have been identified, they are applied to the training plan in the development phase.

OBJECTIVES AND METHODS

There are three categories of learning objectives: knowledge, skills, and attitudes (KSAs). Knowledge objectives are of three types: declarative, procedural, and strategic. Declarative knowledge is the person's store of factual information. Procedural knowledge is the person's understanding about how and when to apply the facts. Strategic knowledge is used for planning, monitoring, and revising goal–directed activity. Skill reflects one's proficiency at specific tasks such as operating a piece of equipment, giving a presentation, or making a business decision. Attitudes are beliefs and/or opinions about objects and events and the positive or negative affect (feelings) associated with them. Attitudes affect motivation levels, which in turn influence a person's behavior. Most training programs have learning objectives for knowledge, skill, and attitudes; these programs need to

Figure 1
Model of the Training Process
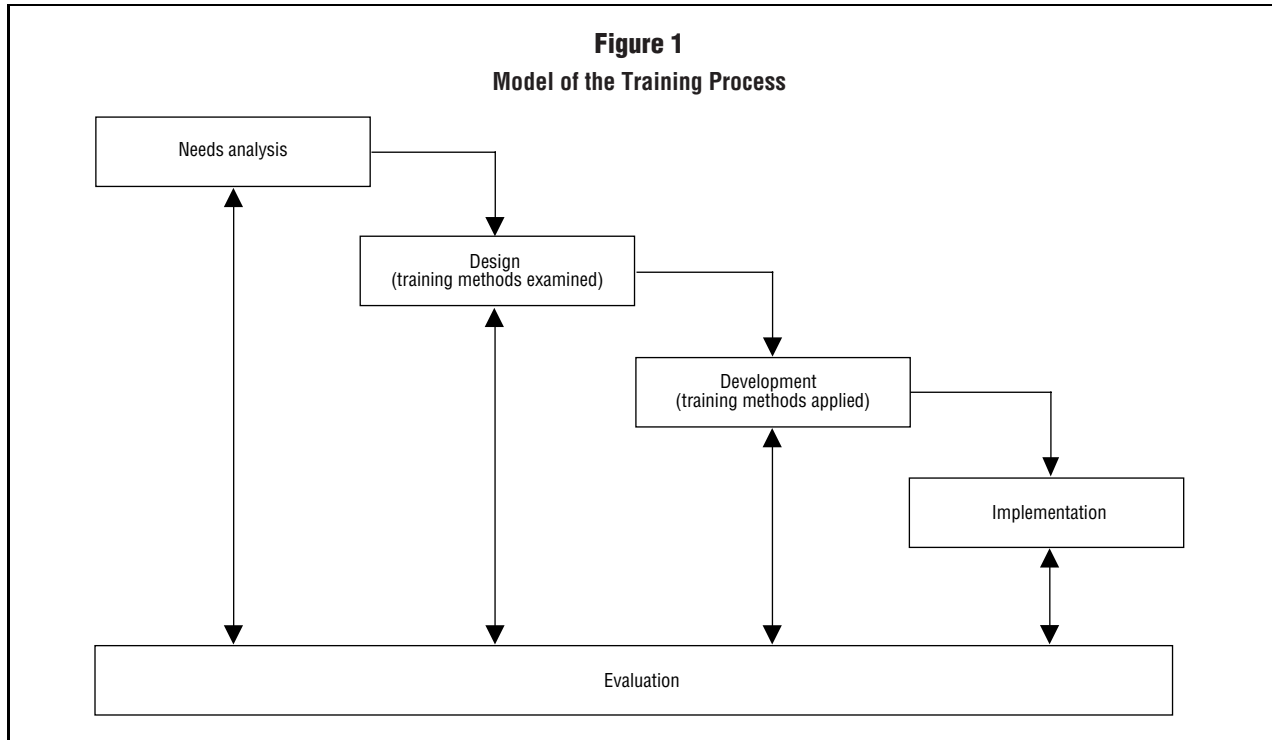
combine several methods into an integrated whole because no single method can do everything well.

The various training delivery methods are used to meet different learning objectives. These methods can be divided into three broad categories: cognitive approaches, behavioral approaches, and on–the–job training (OJT). Cognitive approaches provide information orally or in written form, demonstrate relationships among concepts, or provide the rules for how to do something. Behavioral approaches allow the trainee to practice behavior in a real or simulated fashion. They stimulate learning through experience and are best at skill development and attitude change. OJT involves the use of more experienced and skilled employees to train less skilled and experienced employees.

COGNITIVE APPROACHES

Cognitive approaches to training stimulate learning through their impact on cognitive processes and are associated most closely with changes in knowledge and attitudes. The lecture, discussion, e–learning and (to some extent) case studies are cognitive methods. Though these types of methods can influence skill development, it is not their strength.

Lecture Method. The lecture is best used for creating a general understanding of a topic. Several variations in the lecture format allow it to be more or less formal and/or interactive. In the pure lecture, communication is one way–from trainer to trainees. It is an extensive oral presentation of material. A good lecture begins with an introduction that lays out the purpose, the order in which topics will be covered, and ground rules about interruptions (e.g., questions and clarification). This is followed by the main body of the lecture in which information is given. The topic areas should be logically sequenced so that the content of preceding topics prepares trainees for the following topics. The lecture should conclude with a summary of the main learning points and/or conclusions.

During the pure lecture, trainees listen, observe, and perhaps take notes. It can be useful in situations in which a large number of people must be given a limited amount of information in a relatively short period; however, it is not effective for learning large amounts of material in a short time period. Thus, an effective lecture should not contain too many learning points. The amount of information trainees will forget information is in direct proportion to the amount of information provided. Because the pure lecture provides only information, its usefulness is limited; when the only training objective is to have trainees acquire specific factual information, better learning can be achieved at less cost by putting the information into text. This allows trainees to read the material at their leisure and as often as necessary to retain the material. The only added value provided by the lecture is credibility that may be attached to the lecturer or the focus and

emphasis provided by trainer presentation skills. Another major benefit of the lecture is that it is interactive, and that trainees can ask questions or have the presenter change the pace of the lecture if necessary.

Discussion Method. The discussion method uses two–way communication between the lecturer and the trainees to increase learning opportunities. This method uses a short lecture (twenty minutes or less) to provide trainees with basic information. This is followed by a discussion among the trainees and between the trainees and the trainer that supports, reinforces, and expands upon the information presented in the short lecture. Verbal and nonverbal feedback from trainees allows the trainer to determine if the desired learning has occurred. If not, the trainer may need to spend more time on this area and/or present the information again, but in a different manner.

Questioning (by trainees or the trainer) and discussions enhance learning because they provide clarification and keep trainees focused on the material. Discussions allow the trainee to be actively engaged in the content of the lecture, which improves recall and use in the future. Trainee questions demonstrate the level of understanding about the content of the lecture. Trainer questions stimulate thinking about the key learning points.

The pure lecture is most useful when trainees lack declarative knowledge or have attitudes that conflict with the training objectives. The discussion method is more effective than the pure lecture for learning procedural and strategic knowledge because of the discussion and questioning components. If the training objective is skill improvement, neither the lecture or discussion method is appropriate.

Both the lecture and discussion method are useful for changing or developing attitudes, though the discussion method is more effective. The lecture, and especially the discussion, modifylecture, and especially the discussion, modifies employee attitudes by providing new insights, facts, and understanding.

E–Learning. Many companies have implemented e–learning, which encompasses several different types of technology–assisted training such as distance learning, computer–based training (CBT), or web–based training (WBT). Distance learning occurs when trainers and trainees are in remote locations; typically, technology is used to broadcast a trainer's lecture to many trainees in many separate locations. Distance learning provides many of the same advantages and disadvantages as the lecture method. Distance learning can be much less expensive than paying for trainees in multiple locations to travel for a lecture, but it may reduce motivation to learn because of the remoteness of the trainer. Recent trends in e–learning include expanding into traditional areas by including simulations and "blended" or "hybrid" models, which combine computer–based instruction with traditional classroom learning.

Computer–based training and web–based training are virtually similar. With this type of training, content is delivered through the computer, using any combination of text, video, audio, chat rooms, or interactive assessment. It can be as basic as reading text on a screen or as advanced as answering quiz questions based on a computerized video that the trainee has viewed. The difference between CBT and WBT is that, with CBT, the training program is stored on a hard drive, a CD–ROM, or diskette. This means that it is not easy to update and may be more difficult for employees to access. Conversely, WBT is housed online through either a company's intranet or through the World Wide Web. This increases accessibility of training; employees may even be able to train from their home computers. Additionally, updates to content are quick and relatively easy. For example, if an error in the training content is found, one update on the training program housed on a server updates the content for every trainee who accesses it after that point. For a change made to CBT, new CD–ROMs or diskettes would have to be produced.

E–learning is an alternative to classroom–based training, and it can provide a number of advantages. E–learning can:

- Reduce trainee learning time, by allowing trainees to progress at their own pace.

- Reduce the cost of training, particularly by reducing costs associated with travel to a training location.

- Provide instructional consistency, by offering the same training content to employees worldwide.

- Allow trainees to learn at their own pace thereby reducing any boredom or anxiety that may occur.

- Provide a safe method for learning hazardous tasks with computer simulations.

- Increase access to training to learners in locations around the world.

E–learning is effective at developing declarative and, in particular, procedural knowledge. It can be useful in developing some types of skills and for modifying attitudes. E–learning develops declarative knowledge through repeated presentation of facts, using a variety of formats and presentation styles. It can do an excellent job of describing when and how to apply knowledge to various situations. Procedural knowledge is developed by allowing trainees to practice applying the knowledge to various situations simulated by the software. This training delivery method is valuable because it can automatically document

trainee's responses, interpret them, and provide appropriate practice modules to improve areas of weakness.

Using e–learning, skill development is limited by the software's ability to mimic the trainee's job environment and context. For some situations, such as training employees in the use of word processing, spreadsheets, and other computer–based software, e–learning is an appropriate choice for teaching skills. Here, the tasks and situations trainees will face on the job are easily simulated by the training software. On the other hand, it is very difficult to develop CBT software that realistically simulates interaction between two or more people or a person and an object in a dynamic environment. Other methods must be utilized for these situations.

E–learning can be effective at developing or modifying attitudes. The factual relationships among objects and events, and the consequences of particular courses of action, can be portrayed in many ways with e–learning technology. How objects, events, and their relationships are perceived can be altered by the visual and textual content presented in a CBT. However, since the objects and events are simulated, rather than real, the emotional or affective side of attitudes may not be activated. In addition, there is no opportunity during e–learning to discuss attitudes with others in a setting where a trainer can monitor, direct, and reinforce the discussion to support the desired attitudes. This may be one reason many adult learners indicate a preference for e–learning to be combined with some form of instructor–based training. Trainees often prefer blended training, which is when both computer and face–to–face training are combined, and it is used by many organizations.

There is great potential for utilizing new technologies to implement e–learning methods, but recent research shows that corporations may be slow in replacing traditional methods with e–learning. A 2004 survey reported that only about 17 percent of corporate training is delivered by computer while as much as 70 percent is delivered in the classroom. However, current trends show that e–learning is growing and will continue to gain in importance. A 2006 survey conducted by the eLearning Guild indicates that 75 percent of respondents felt that e–learning serves a useful purpose, and the market for e–learning products grew 30% from 2004 to 2005. A 2007 survey by the *E–Learning News* showed that in 2005, only about 20 percent of organizations were using over half of their training budget for e–learning methods; however, this was a marked increase from around 12 percent the previous year. If current trends continue, e–learning will become more and more central to corporate training as the twenty–first century advances. As HR consultant Josh Bersin put it, "In 2006, e–learning continued its evolution into a mainstream approach to corporate training."

It seems likely that it will be an important part of the mainstream in future years.

BEHAVIORAL APPROACHES

Like cognitive approaches, behavioral approaches can be used to change attitudes, though they do so through different means. Behavioral approaches focus on real–world situations and often involve simulations to mimic the processes, events, and circumstances of the trainee's job. Equipment simulators, business games, in–basket exercises, case studies, role playing, and behavior modeling are common types of simulations.

Equipment Simulators. Equipment simulators are mechanical devices that incorporate the same procedures, movements and/or decision processes that trainees must use with equipment back on the job. Among those trained with this method are airline pilots, air traffic controllers, military personnel, drivers, maintenance workers, telephone operators, navigators, and engineers. To be effective the simulator and how it is used must replicate, as closely as possible, the physical and psychological (time pressures, conflicting demands, etc.) aspects of the job site. To facilitate this, the equipment operators and their supervisors should be involved in the simulation design and pre–testing. This reduces potential resistance to the training and, more importantly, increases the degree of fidelity between the simulation and the work setting.

Business Games. Business games attempt to reflect the way an industry, company, or functional area operates. They also reflect a set of relationships, rules, and principles derived from appropriate theory (e.g., economics, organizational behavior, etc.). Many business games represent the total organization, but some focus on the functional responsibilities of particular positions within an organization (e.g., marketing director, human resource manager). These are called *functional simulations.* Games that simulate entire companies or industries provide a far better understanding of the big picture. They allow trainees to see how their decisions and actions influence not only their immediate target but also areas that are related to that target.

Prior to starting the game, trainees are given information describing a situation and the rules for playing the game. They are then asked to play the game, usually being asked to make decisions about what to do given certain information. The trainees are then provided with feedback about the results of their decisions, and asked to make another decision. This process continues until some predefined state of the organization exists or a specified number of trials have been completed. For example, if the focus is on the financial state of a company, the game

might end when the company has reached a specified profitability level or when the company must declare bankruptcy. Business games involve an element of competition, either against other players or against the game itself. In using them, the trainer must be careful to ensure that the learning points are the focus, rather than the competition.

In–Basket Technique. The in–basket technique simulates the type of decisions that would typically be handled in a particular position such as a sales manager or operations manager. It affords an opportunity to assess and/or develop decision–making skills and attitudes. To begin the exercise, trainees are given a description of their role (a current or future job) and general information about the situation. Trainees are then given a packet of materials (such as requests, complaints, memos, messages, and reports) which make up the in–basket. They are asked to respond to the materials within a particular time period (usually two to four hours). When the in–basket is completed, the trainer asks the trainee to identify the processes used in responding to the information and to discuss their appropriateness. The trainer provides feedback, reinforcing appropriate decisions and processes or asking the trainee to develop alternatives. A variation is to have trainees discuss their processes in a group format moderated by the trainer. Here the trainer should attempt to get the trainees to discover what worked well, what didn't and why.

Case Study. Case studies are most often used to simulate strategic decision–making situations, rather than the day–to–day decisions that occur in the in–basket. The trainee is first presented with a history of the situation in which a real or imaginary organization finds itself. The key elements and problems, as perceived by the organization's key decision makers, may also be provided. Case studies range from a few pages in length to more than a hundred. Trainees are asked to respond to a set of questions or objectives. Responses are typically, though not always, in written form. Longer cases require extensive analysis and assessment of the information for its relevance to the decisions being made. Some require the trainee to gather information beyond what was in the case. Once individuals have arrived at their solutions, they discuss the diagnoses and solutions that have been generated in small groups, large groups, or both. In large groups a trainer should facilitate and direct the discussion. The trainer must guide the trainees in examining the possible alternatives and consequences without actually stating what they are.

Written and oral responses to the case are evaluated by the trainer. The trainer should convey that there is no single right or wrong solution to the case, but many possible solutions depending on the assumptions and interpretations made by the trainees. The value of the case approach is the trainees' application of known concepts and principles and the discovery of new ones. The solutions are not as important as the appropriateness with which principles are applied and the logic with which solutions are developed.

Role Play. The role play is a simulation of a single event or situation. Trainees who are actors in the role play are provided with a general description of the situation, a description of their roles (e.g., their objectives, emotions, and concerns) and the problem they face.

Role plays differ in the amount of structure they provide to the actors. A structured role play provides trainees with a great deal of detail about the situation that has brought the characters together. It also provides in greater detail each character's attitudes, needs, opinions, and so on. Structured role plays may even provide a scripted dialog between the characters. This type of role play is used primarily to develop and practice interpersonal skills such as communication, conflict resolution, and group decision making. Spontaneous role plays are loosely constructed scenarios in which one trainee plays herself while others play people that the trainee has interacted with in the past (or will in the future). The objective of this type of role play is to develop insight into one's own behavior and its impact on others. How much structure is appropriate in the scenario will depend on the learning objectives.

Whether structured or spontaneous, role plays may also differ based on the number of trainees involved. Single, multiple, and role–rotation formats provide for more or less participation in the role play. In a single role play, one group of trainees role plays while the rest of the trainees observe. While observing, other trainees analyze the interactions and identify learning points. This provides a single focus for trainees and allows for feedback from the trainer. This approach may cause the role players to be embarrassed at being the center of attention, leading to failure to play the roles in an appropriate manner. It also has the drawback of not permitting the role players to observe others perform the roles. Having non–trainees act out the role play may eliminate these problems, but adds some cost to the training.

In a multiple role play, all trainees are formed into groups. Each group acts out the scenario simultaneously. At the conclusion, each group analyzes what happened and identifies learning points. The groups may then report a summary of their learning to the other groups, followed by a general discussion. This allows greater learning as each group will have played the roles somewhat differently. Multiple role plays allow everyone to experience the role play in a short amount of time, but may reduce the quality of feedback. The trainer will not

be able to observe all groups at once, and trainees are usually reluctant to provide constructive feedback to their peers. In addition, trainees may not have the experience or expertise to provide effective feedback. To overcome this problem, video tapes of the role plays can be used by the trainee and/or trainer for evaluation.

The role–rotation method begins as either a single or multiple role play. However, when the trainees have interacted for a period of time, the role play is stopped. Observers then discuss what has happened so far and what can be learned from it. After the discussion, the role play resumes with different trainees picking up the roles from some, or all, of the characters. Role rotation demonstrates the variety of ways the issues in the role play may be handled. Trainees who are observers are more active than in the single role play since they have already participated or know they soon will be participating. A drawback is that the progress of the role play is frequently interrupted, creating additional artificiality. Again, trainees may be inhibited from publicly critiquing the behavior of their fellow trainees.

Behavior Modeling. Behavior modeling is used primarily for skill building and almost always in combination with some other technique. Interpersonal skills, sales techniques, interviewee and interviewer behavior, and safety procedures are among the many types of skills that have been successfully learned using this method. While live models can be used, it is more typical to video tape the desired behavior for use in training. The steps in behavior modeling can be summarized as follows:

1. Define the key skill deficiencies.

2. Provide a brief overview of relevant theory.

3. Specify key learning points and critical behaviors to watch for.

4. Have an expert model the appropriate behaviors.

5. Have trainees practice the appropriate behaviors in a structured role play.

6. Have the trainer and other trainees provide reinforcement for appropriate imitation of the model's behavior.

Behavior modeling differs from role plays and games by providing the trainee with an example of what the desired behavior looks like prior to attempting the behavior. While this method is primarily behavioral, steps 2 and 3 reflect the cognitively oriented learning features of the technique. Feedback to the trainee is especially powerful when video is used to record both the model's and the trainee's performance. Through split screen devices, the performance of the model and the trainee can be shown

side by side. This allows the trainee to clearly see where improvements are needed.

Evaluation of Simulations. Simulations are not good at developing declarative knowledge. Some initial level of declarative and procedural knowledge is necessary before a simulation can be used effectively. Although some knowledge development can occur in simulations, usually other methods are required for this type of learning. Simulations provide a context in which this knowledge is applied. Improving the trainees' ability to apply knowledge (i.e., facts, procedures, strategiesand strategies) is the focus of simulations. Simulations do a good job of developing skills because they:

• Simulate the important conditions and situations that occur on the job.

• Allow the trainee to practice the skill.

• Provide feedback about the appropriateness of their actions.

Each of the different formats has particular types of skills for which they are more appropriate:

• Mechanical, machine operation, and tool–usage skills are best learned through use of equipment simulators.

• Business decision–making skills (both day to day and strategic), planning, and complex problem solving can be effectively learned through the use of business games.

• The in–basket technique is best suited to development of strategic knowledge used in making day–to–day decisions.

• Case studies are most appropriate for developing analytic skills, higher–level principles, and complex problem–solving strategies. Because trainees do not actually implement their decision/solution, its focus is more on what to do (strategic knowledge) than on how to get it done (skills).

• Role plays provide a good vehicle for developing interpersonal skills and personal insight, allowing trainees to practice interacting with others and receiving feedback. They are an especially effective technique for creating attitude change, allowing trainees to experience their feelings about their behavior and others' reactions to it.

ON–THE–JOB TRAINING

The most common method of training is on–the–job training (OJT). OJT is a combination of many methods and is effective at developing knowledge, skills, and attitudes. OJT takes many forms and can be supplemented with classroom training. Included within OJT are the

job–instruction technique, apprenticeships, coaching, and mentoring.

Formal OJT programs are typically conducted by employees who can effectively use one–on–one instructional techniques and who have superior technical knowledge and skills. Since conducting one–on–one training is not a skill most people develop on their own, *train–the–trainer* training is required for OJT trainers. In addition to training the trainers, formal OJT programs should carefully develop a sequence of learning events for trainees. The formalized instructional process that is most commonly used is called the job–instruction technique.

Job–Instruction Technique. The job–instruction technique (JIT) was developed during World War II and is still one of the best techniques for implementation of OJT nearly forty years later. It focuses on skill development, although there are usually some factual and procedural–knowledge objectives as well. There are four steps in the JIT process: prepare, present, try out, and follow up.

Prepare. Preparation and follow up are the two areas that are most often ignored in OJT programs. Preparation should include a written breakdown of the job. Ignoring this step will prevent the trainer from seeing the job through the eyes of the trainee. When the trainer is very skilled there are many things he does on the job without thinking about them. This can result in their being overlooked in training without a systematic analysis and documentation of the job tasks prior to beginning training.

Once the tasks have been documented, the trainer must prepare an instructional plan. Here, the trainer must determine what the trainee currently knows and does not know. This is the needs analysis phase of Figure 1. Interviewing the trainee, and checking personnel records and previous training completed are among the many ways of determining what KSAs the trainee currently has. This is compared to the KSAs the trainee needs to perform the tasks. The instructional plan is then completed focusing on the trainee's KSA deficiencies.

Immediately prior to the training, the trainee should be provided with an orientation to the OJT/JIT learning process. The orientation should help trainees understand their role and the role of the trainer. The importance of listening effectively and feeling comfortable asking questions should be emphasized. The trainee should become familiar with the steps in the JIT process so he or she knows what to expect and when it will occur.

Present. In this stage of JIT there are four activities: tell, show, demonstrate, and explain. When telling and showing, the trainer provides an overview of the job while showing the trainee the different aspects of it. The trainer is not actually doing the job, but pointing out important items such as where levers are located, where materials are stored, and so on. The trainer then demonstrates how to do the job, explaining why it is done that particular way and emphasizing key learning points and important safety instructions. The components of the job should be covered one at a time, and in the order they would normally occur while performing the job

Try Out. The trainee should be able to explain to the trainer how to do the job prior to actually trying to do the job. This provides a safe transition from watching and listening to doing. When the trainee first tries out the job the trainer should consider any errors to be a function of the training, not the trainee's learning ability. When errors are made they should be used to allow the trainee to learn what not to do and why. The trainer can facilitate this by questioning the trainee about his actions and guiding him or her in identifying the correct procedures.

Follow Up. During follow up the trainer should check the trainees' work often enough to prevent incorrect or bad work habits from developing. The trainer should also reassure the trainee that it is important to ask for help during these initial solo efforts. As trainees demonstrate proficiency in the job, progress checks can taper off until eventually they are eliminated.

Apprenticeship Training. Apprenticeship training dates back to the Middle Ages, when skilled craftsmen passed on their knowledge to others as a way of preserving the guilds. Today, apprenticeship programs are partnerships between labor unions, employers, schools, and the government. They are most often found in the skilled trades and professional unions such as boiler engineers, electrical workers, pipe fitters, and carpenters. The typical apprenticeship program requires two years of on–the–job experience and about 180 hours of classroom instruction, though requirements vary. An apprentice must be able to demonstrate mastery of all required skills and knowledge before being allowed to graduate to journeyman status. This is documented through testing and certification processes. Journeymen provide the on–the–job training, while adult education centers and community colleges typically provide the classroom training. Formal apprenticeship programs are regulated by governmental agencies that also set standards and provide services.

Coaching. Coaching is a process of providing one–on–one guidance and instruction to improve the work performance of the person being coached in a specific area. It differs from other OJT methods in that the trainee already has been working at the job for some time. Usually, coaching is directed at employees with performance deficiencies, but it can also serve as a motivational tool for those performing adequately. Typically the supervisor acts as the coach. Like the OJT trainer, the coach must be skilled both in how to perform the task(s) and

how to train others to do them. The amount of time supervisors devote to coaching activities steadily increased during the 1990s and will likely represent more than 50 percent of supervisors' time by the new millennium.

The coaching process, viewed from the coach's perspective, generally follows the outline below. Note the similarities between JIT and this process.

1. Understand the trainee's job, the KSAs and resources required to meet performance expectations, and the trainee's current level of performance.

2. Meet with the trainee and mutually agree on the performance objectives to be achieved.

3. Mutually arrive at a plan/schedule for achieving the performance objectives.

4. At the work site, show the trainee how to achieve the objectives, observe the trainee's performance, and then provide feedback.

5. Repeat step 4 until performance improves.

Mentoring. Mentoring is a form of coaching in which an ongoing relationship is developed between a senior and junior employee. This technique focuses on providing the junior employee with political guidance and a clear understanding of how the organization goes about its business. Mentoring is more concerned with improving the employee's fit within the organization than improving technical aspects of performance, thus differentiating it from coaching. Generally, though not always, mentors are only provided for management–level employees.

SEE ALSO *Case Method of Analysis; Continuing Education and Lifelong Learning Trends; Employee Screening and Selection; Management and Executive Development; Mentoring*

BIBLIOGRAPHY

Beer, Valorie. *The Web Learning Fieldbook: Using the World Wide Web to Build Workplace Learning Environments.* San Francisco, CA: Jossey–Bass/Pfeiffer, 2000.

Bersin, Josh. "Top trends in e–learning and corporate training." *HR Management Report.* Available from: http://www.hrmreport.com/pastissue/article.asp?art=270152&issue=203.

Blanchard, P.N., and J.W. Thacker. *Effective Training: Systems, Strategies, and Practices.* 3rd ed. Englewood Cliffs, NJ: Prentice Hall, 2006.

Decker, P., and B. Nathan. *Behavior Modeling Training: Principles and Applications.* New York: Praeger, 1985.

"E–Learning Trends & Research." *Learning Circuits.* Available from: http://www.learningcircuits.org/trends.

Gold, L. "Job Instruction: Four Steps to Success." *Training and Development Journal,* September 1981, 28–32.

Goldstein, Irwin L., and Kevin J. Ford. *Training in Organizations.* 4th ed. Belmont, CA: Wadsworth Group, 2002.

Noe, Raymond A. *Employee Training and Development.* 4th rev. ed. Boston: Irwin McGraw–Hill, 2007.

Rosenberg, Marc J. *Beyond E–Learning: Approaches and Technologies to Enhance Organizational Knowledge, Learning, and Performance.* San Francisco: Pfeiffer, 2006.

Rothwell, William J., and H.C. Kazanas. *Improving On the Job Training.* 2nd edition. San Francisco: Jossey–Bass, 2004.

Welsh, Elizabeth, Connie Wanberg, Kenneth G. Brown, and Marcia J. Simmering. "E–Learning: Emerging Uses, Empirical Results, and Future Directions." *International Journal of Training and Development* 7, no. 4 (2003): 245–258.

TRANSNATIONAL ORGANIZATION

Organizations competing on an international basis face choices in terms of resource allocation, the balance of authority between the central office and business units, and the degree to which products and services are customized in order to accommodate tastes and preferences of local markets. When employing a transnational strategy, the goal is to combine elements of global and multidomestic strategies.

A global strategy involves a high degree of concentration of resources and capabilities in the central office and centralization of authority in order to exploit potential scale and learning economies. Customization at the local level is thus necessarily low. The multidomestic strategy, on the other hand, represents the opposite view of international strategy. Resources are dispersed throughout the various countries where the firm does business, decision-making authority is pushed down to the local level, and each business unit is allowed to customize product and market offerings to specific needs. The corporation as a whole foregoes the benefits that could be derived from centralization and coordination of diverse activities. While the transnational paradigm can offer advantages, having a presence in foreign countries can present issues in terms of human and workers' rights, especially in China and India. In 2008, the United Nations presented "Indigenous Peoples and Human Rights Impacts of Transnational Corporations"—a speech delivered in Geneva that addressed the potential human rights abuses that arise as a result of transnational entities wishing to take advantage of workers in third-world regions.

A transnational strategy allows for the attainment of benefits inherent in both global and multidomestic strategies. The overseas components are integrated into the overall corporate structure across several dimensions, and each of the components is empowered to become a source of specialized innovation. It is a management approach in which an organization integrates its global business activities through close cooperation and interdependence

among its headquarters, operations, and international subsidiaries, and its use of appropriate global information technologies (Zwass, 1998). This is especially important as globalizing becomes the norm, and as firms begin to compete for the same resources on both the regional and global scales.

The key philosophy of a transnational organization is adaptation to all environmental situations and achieving flexibility by capitalizing on knowledge flows (which take the form of decisions and value-added information) and two-way communication throughout the organization. The principal characteristic of a transnational strategy is the differentiated contributions by all its units to integrated worldwide operations. As one of its other characteristics, a joint innovation by a company's headquarters and by some of its overseas units leads to the development of relatively standardized yet flexible products and services that can capture several local markets. Having a product or service that is recognizable anywhere and universal enough to capture multiple demographics in multiple regions will enable a firm to successfully develop on the global set.

Structure follows strategy, implying that a transnational strategy must have an appropriate structure in order to implement the strategy. Just as the transnational strategy is a combination or hybrid strategy between global and multidomestic strategies, the organizational structure of firms pursuing transnational strategies is a structure that draws on characteristics of the worldwide geographic structure and the worldwide product divisional structure. The combination of mechanisms needed is somewhat contradictory, because the structure must be centralized and decentralized, integrated and nonintegrated, and formalized and informalized. But firms that can successfully implement this strategy and structure often perform better than firms pursuing only multidomestic or global strategies.

Transnational companies often enter into strategic alliances with their customers, suppliers, and other business partners to save time and capital. As long-term partnerships, these alliances may bring specialized competencies to the firm, relatively stable and sophisticated market outlets that hone its products and services, and stable and flexible supply sources. This may result in a virtual corporation, consisting of several independent firms that collaborate to bring products or services to market from various points on the globe.

A transnational model represents a compromise between local autonomy and centralized decision making. The organization seeks a balance between the pressures to integrate globally and response from a local audience. Balance is achieved by pursuing a distributed strategy—a hybrid of the centralized and decentralized strategies. Under the transnational model, a multinational corporation's assets and capabilities are dispersed according to the most beneficial location for a specific objective. Simultaneously, overseas operations are interdependent, and knowledge is developed jointly and shared worldwide. It is important to understand that a transnational firm brings goods and services to locales where the culture may not always be parallel with the culture from which the goods and services originate—sensitivity in this respect is of the utmost importance. Global leaders in transnational business are established on this understanding.

Transnational firms have higher degrees of coordination with low control dispersed throughout the organization. According to Vitalari and Wetherbe, the five implementation tactics used for implementing the transnational model are:

- Mass customization: synergies through global research and development (e.g., American Express, Time Warner, Frito-Lay, MCI)

- Global sourcing and logistics (e.g., Benetton, Citicorp)

- Global intelligence and information resources (e.g., Andersen Consulting, McKinsey Consulting)

- Global customer service (e.g., American Express)

- Global alliances (e.g., British Airways and US Air; KLM and Northwest)

STUDIES

In a 2002 study of SBUs in large U.S.-based multinational firms, Wasilewski reported positive associations between transnational marketing strategies and performance. Improvements apparently resulted both from efficiencies gained from global integration and flexibility inherent in national responsiveness. In 2008, Sherise Epstein reported in "Globalization: Transnational Corporations and Economies and Culture" that transnational corporations (including McDonald's and WalMart) bring their corporate culture to parts of the world where it may—or may not—necessarily belong or behoove the native population. Subsequently, this may cause potential issues between those who appreciate the new cultural structure and those who do not.

King and Sethi define a comprehensive taxonomy of transnational strategy with five important dimensions of transnational strategy: the configuration of value-chain activities, which refers to the geographic dispersal of a firm's value-chain components; the coordination of value-chain activities; centralization; strategic alliances; and market integration, which refers to the extent to which the parent corporation views the international market as a single competitive arena.

Asea Brown Boveri (ABB) is an example of a successful transnational management model implementation. ABB, with home bases in Sweden and Switzerland, exemplifies the trend towards cross-national mergers that lead firms to consider multiple headquarters in the future. It is managed as a flexible network of units, and one of management's main functions is the facilitation of information/knowledge flow between units. ABB's subsidiaries have full responsibility for product categories on a worldwide basis. Operating transnationally brings the benefits of access to new markets and the opportunity to utilize and develop resources wherever they may be located.

Nestlé CEO Peter Brabeck recently questioned the idea of a so-called global consumer. The firm appears to be successfully implementing a transnational strategy by making centralization decisions based partly on whether value-chain activities are upstream or downstream. When interviewed in 2001 by Suzy Wetlaufer, Brabeck stated, "The closer we come to the consumer, in branding, pricing, communication, and product adaptation, the more we decentralize. The more we are dealing with production, logistics, and supply-chain management, the more centralized decision making becomes. After all, we want to leverage Nestlés size, not be hampered by it."

SEE ALSO *International Business; International Management; Organizational Structure*

BIBLIOGRAPHY

Bartlett, C.A., and S. Ghoshal. *Managing Across Borders. The Transnational Solution.* Boston: Harvard Business School Press, 1998.

———. "Managing Innovation in the Transnational Corporation." *Managing the Global Firm.* edited by C.A. Bartlett, Y. Doz, and G. Hedlund. London: Routledge, 1990.

Carillo, J. "Transnational Strategies and Regional Development: The Case of GM and Delphi in Mexico." *Industry and Innovation* 11 (2004): 127–153.

Child, J., and Y. Yan. "National and Transnational Effects in International Business: Indications from Sino-Foreign Joint Ventures." *Management International Review* 41, no. 1 (2001): 53–75.

Engle, A.D., and M.E. Mendenhall. "Transnational Roles, Transnational Rewards: Global Integration in Compensation." *Employee Relations* 26 (2004): 613–625.

"Globalization: Transnational Corporations and Economies and Culture." Available from: http://sherise.wordpress.com/2008/07/19/essay-globalization-transnational-corporations-economies-and-culture/.

Hitt, M.A., R.D. Ireland, and R.E. Hoskisson *Strategic Management: Competitiveness and Globalization: Concepts and Cases.* 6th ed., Mason, OH: South-Western Publishing, 2005.

"Indigenous Peoples and Human Rights Impacts of Transnational Corporations, United Nations Human Rights Council, 8th session, June 2–18 2008, Geneva." Available from: http://www.treatycouncil.org/section_211417112111121111322111221.htm.

Jones, M. "Globalization and Organizational Restructuring: A Strategic Perspective." *Thunderbird International Business Review* 44 (2002): 325–351.

King, William R., and Vikram Sethi. "An Empirical Assessment of the Organization of Transnational Information Systems." *Journal of Management Information Systems,* Spring 1999, 7–28.

Moran, Robert T., Sarah Moran and Philip R. Harris. "Managing Cultural Differences, Seventh Edition: Global Leadership Strategies for the 21st Century." Massachusetts: Elsevier Inc., 2007.

Sauvant, Karl P. "The Rise of Transnational Corporations from Emerging Markets: Threat or Opportunity." Massachusetts: Edward Elgar Publishing Limited, 2008.

Vitalari, Nicholas P., and James C. Wetherbe. "Emerging Best Practices in Global Systems Development." In *Global Information Technology and Systems Development.* edited by P.C. Palvia, S.C. Palvia, and E.M. Roche. Nashau, NH: Ivy League Publishing, Ltd., 1996.

Wasilewski, N. "An Empirical Study of the Desirability and Challenges of Implementing Transnational Marketing Strategies." *Advances in Competitiveness Research* 10, no. 1 (2002): 123–149.

Wetlaufer, Suzy. "The Business Case Against Revolution: An Interview with Nestle's Peter Brabeck." *Harvard Business Review* 79, no. 2 (2001): 112–121.

Zwass, Vladimir. *Foundations of Information Systems.* New York: Irwin/McGraw-Hill, 1998.

TRANSPORTATION

SEE *Logistics and Transportation*

TRENDS IN ORGANIZATIONAL CHANGE

Organizations have entered a new era characterized by rapid, dramatic, and turbulent changes. The accelerated pace of change has transformed how work is performed by employees in diverse organizations. Constant change has truly become an inherent and integral part of organizational life.

Several emerging trends are impacting organizational life. Of these emerging trends, five will be examined: globalization, diversity, flexibility, flat, and networks. These five emerging trends create tensions for organizational leaders and employees as they go through waves of changes in their organizations. These tensions present opportunities as well as threats, and if these tensions are not managed well, they can result in dysfunction and problematic outcomes at the end of any change process. These five trends and the specific tensions they produce are presented in Table 1.

Table 1

Change–Trends and Tensions in Organizations

Trends	Tensions
1. Globalization	Global versus Local
2. Diversity	Heterogeneity versus Homogeneity
3. Flexibility	Flexibility versus Stability
4. Flat	Centralization versus Decentralization
5. Networks	Interdependence versus Independence

GLOBALIZATION

Organizations operate in a global economy that is characterized by greater and more intense competition, and at the same time, greater economic interdependence and collaboration. More products and services are being consumed outside of their country of origin than ever before as globalization brings about greater convergence in terms of consumer tastes and preferences. Yet at the same time, in the midst of greater convergence, there is the opposite force of divergence at work where companies have to adapt corporate and business strategies, marketing plans, and production efforts to local domestic markets.

To stay competitive, more organizations are embracing offshore outsourcing and telecommuting. Many functions are being shifted to India, the Philippines, Malaysia, and other countries for their low labor costs, high levels of workforce education, and technological advantages. According to the 2002–2003 Society for Human Resource Management (SHRM) Workplace Forecast, companies such as Ford, General Motors, and Nestlé employ more people outside of their headquarters countries than within those countries. The 2006 Workplace Forecast, published by the SHRM, lists rising healthcare costs, safety and security, increased energy costs, and employee staffing and retention in the top ten trends forecasted for the late 2000s. These important factors are often the driving forces that make doing business abroad such an appealing option. Creating a transnational corporation allows companies to free themselves of the need to offer healthcare to employees in many cases. It also allows for more lax safety regulations and laws, allowing for less expensive means of maintaining factories and other corporate or industrial centers.

Almost any company, whether in manufacturing or services, can find some part of its process that can be done off site. Forrester Research projects that 3.3 million U.S. service- and knowledge-based jobs will be shipped overseas by the year 2015, 70 percent of which will move to India. Communication and information sharing are occurring across the globe in multiple languages and across multiple cultures. Global competition and global cooperation coexist in the new world economy.

One major consequence of globalization is greater mobility in international capital and labor markets. This creates a global marketplace where there is more opportunity, because there are more potential customers. However, there is also more competition, as local companies have to compete with foreign companies for customers.

According to Dani Rodrik, professor of international political economy at Harvard's Kennedy School of Government, the processes associated with the global integration of markets for goods, services, and capital have created two sources of tensions.

First, reduced barriers to trade and investment accentuate the asymmetries between groups that can cross international borders, and those that cannot. In the first category are owners of capital, highly skilled workers, and many professionals. Unskilled and semiskilled workers and most middle managers belong in the second category.

Second, globalization engenders conflicts within and between nations over domestic norms and the social institutions that embody them. As the technology for manufactured goods becomes standardized and diffused internationally, nations with very different sets of values, norms, institutions, and collective preferences begin to compete head-on in markets for similar goods. Trade becomes contentious when it unleashes forces that undermine the norms implicit in local or domestic workplace practices.

In his 1997 book, *Has Globalization Gone Too Far?*, Professor Rodrik concluded that "the most serious challenge for the world economy in the years ahead lies in making globalization compatible with domestic social and political stability." This implies ensuring that international economic integration does not lead to domestic social disintegration. Organizations that are confronted with this challenge will have to manage the tension created by the global integration versus local disintegration dilemma.

The overall picture as a consequence of globalization is one of turbulence and uncertainty, in which a variety of contradictory processes present a wide range of both opportunities and threats that defy established ways of doing business and working in organizations. Integration and exclusion coexist uneasily side-by-side in organizations.

For example, many apparent dichotomies or paradoxes—competition versus collaboration, market forces versus state intervention, global actions versus local solutions—are losing their sharp edges as contradictory forces appear to converge and reinforce each other in organizations across the globe. Companies that compete fiercely in some markets form strategic alliances in others; government guidance and regulation are required to make

markets work effectively; and "think globally, act locally" has been adopted as business strategy (or as a mantra) to deal with the challenges of doing business in the globalized economy. As organizations transform themselves to stay competitive, they will need to confront and resolve some, if not all, of these dichotomies or paradoxes.

On another level, because of globalization, the fates of people living and working in different parts of the world are becoming intertwined. Global events may have significant local impact. September 11, 2001 has been called the "day that changed the world." Heightened security concerns are changing expectations for people in organizations, and the role of organizations themselves. The threat of terrorism continues to be an ongoing concern worldwide. It has created a renewed focus on workplace security as employees experience a heightened sense of vulnerability in the workplace. Employee monitoring and screening are occurring more frequently. Concern over business travel is resulting in the increased use of alternate forms of communication such as teleconferencing and videoconferencing as well as instant messaging, SMS (text messaging), and handheld communications. A wider acceptance of remote offices and telecommuting has also been a result of globalization.

DIVERSITY

Globalization is impacting how organizations compete with each other. In combination with changing demographics, globalization is causing a rapid increase in diversity in organizations. Never before have people been required to collaborate with colleagues and customers from so many different cultures and countries.

Diversity is moving American society away from "mass society" to "mosaic society." Organizations now reflect this "mosaic society" in their workforce—not only in terms of race, ethnicity, and culture but also in age, sexual orientation, and other demographic variables. More than ever, people have to interact and communicate with others who come from differing backgrounds. This in turn has meant that employees need new relational skills to succeed. An emerging stream of research in international management has called these new relational skills "cultural intelligence." According to Earley, Ang, and Tan, cultural intelligence is defined as the capability to adapt effectively across different national, organizational and professional cultures. More managers take up global work assignments in industries around the world. They learn how to work with people who not only think and communicate differently but also do things differently. Managers will need to develop their cultural intelligence to manage greater diversity in organizations.

Diversity in organizations will continue to increase. As indicated by the U.S Census Bureau National Popu-

lation Projections, the Hispanic population will increase by 11.2 percent between 2000 and 2025 to become the largest minority group in the United States. All other minority groups will increase by about 9 percent, while the number of Caucasians will decrease by approximately 19 percent. The world population is growing at a high rate in developing countries, while remaining stable or decreasing in the developed world. The result will be income inequities and economic opportunity leading to increased immigration and migration within and between nations. More temporary workers will be used for specific tasks, and there will be a greater demand for highly skilled workers.

The aging American workforce population means more retirees and potential gaps in availability of experienced workers. According to American Association of Retired Persons (AARP), by 2015 nearly one in five U.S. workers will be age 55 or older. Retirees often want to keep a foot in the workplace. AARP's research shows that nearly eight of ten baby boomers envision working part time after retirement; 5 percent anticipate working full time at a new job or career; only 16 percent foresee not working at all.

People of different ethnic and cultural backgrounds possess different attitudes, values, and norms. Increasing cultural diversity in both public and private sector organizations focuses attention on the distinctions between ethnic and cultural groups in their attitudes and performance at work. This greater focus can result in the tension between finding similarities and accentuating differences in the face of greater diversity in organizations.

There is an ongoing debate between *heterogenists* and *homogenists* concerning the impact of greater diversity in organizations. *Heterogenists* contend that diverse or heterogeneous groups in organizations have performance advantages over homogeneous groups while the *homogenists* take the opposing view—that homogeneous groups are more advantageous than heterogeneous or diverse groups in organizations.

According to *heterogenists,* organizations with greater diversity have an advantage in attracting and retaining the best available human talent. The exceptional capabilities of women and minorities offer a rich pool of talent, education and experience for organizations to tap. When organizations attract, retain, and promote maximum utilization of people from diverse cultural backgrounds, they gain competitive advantage and sustain the highest quality of human resources.

Organizations with greater diversity can penetrate wider and enhanced markets. Not only do these organizations embrace a diverse workforce internally, they are better suited to serve a diverse external clientele. Organizations with greater diversity also display higher creativity

and innovation. Especially in research-oriented and high technology organizations, the array of talents provided by a gender- and ethnic-diverse organization becomes invaluable. Heterogeneous or diverse groups display better problem-solving ability as they are more capable of avoiding the consequences of *groupthink,* compared to highly cohesive and homogeneous groups that are more susceptible to conformity.

On the other hand, greater organizational diversity has its drawbacks. With the benefits of diversity come organizational costs. Too much diversity can lead to dysfunctional outcomes. Diversity increases ambiguity, complexity, and confusion. Organizations with greater diversity may have difficulty reaching consensus and implementing solutions. In many organizations, diversity can produce negative dynamics such as ethnocentrism, stereotyping, and cultural clashes.

Homogenists argue that homogeneous groups often outperform culturally diverse groups, especially where there is a serious communication problem. Cross-cultural training is necessary to enable culturally diverse groups to live up to their potential and overcome communication difficulties. The diversity movement, according to *homogenists,* has the potential to polarize different social groups and harm productivity while breeding cynicism and resentment, heightening intergroup friction, and lowering productivity, just the opposite of what managing diversity is intended to accomplish.

The challenge therefore is to manage the tension produced by heterogeneity versus homogeneity. If properly managed, organizations can reap the benefits of greater diversity. Aside from proper management, organizations need to learn to appreciate and value diversity before the benefits of diversity can be fully realized. To achieve this, diversity training programs may help people in organizations understand and value the differences in one another.

FLEXIBILITY

Globalization and diversity trends are forcing organizations to become more flexible and adaptable. To be able to function globally and to embrace diversity, leaders and employees in organizations have to become more flexible and develop a wider repertoire of skills and strategies in working with diverse groups of people in the workplace as well as in the marketplace.

The response to increased diversity has, in many cases, been increased organizational flexibility. Some organizations allow workers to have very different work arrangements (e.g. flex-time) and payment schedules. Some organizations (and workers) have found it convenient to treat some workers as independent consultants or contractors rather than employees. In certain occupations, advan-

ces in communication and information technologies have enabled *telecommuting*—working at home via computer. One consequence of this is the blurring of boundaries between work and home, and where and when work occurs. The benefits of greater flexibility may be countered by the negative consequences of working 24/7 including higher stress and burnout.

The response to increased competition, however, has resulted in a tension generated by the demands to be flexible and yet maintain some stability as changes are implemented in organizations. To stay competitive, organizations are constantly changing and restructuring to increase flexibility and decrease costs. Business process reengineering, business process outsourcing, job redesign, and other approaches that optimize business processes have been implemented to increase operational and process efficiency while reducing the costs of doing business.

Changes in business and operational processes need time to stabilize for employees to learn the new processes, become familiar with them, and be able to operate effectively and efficiently. Yet, competitive pressures can cause organizations to go through a series of changes without giving employees adequate time for learning and training, and for the benefits of the change to be fully realized in the organization. This tension is well-captured by Columbia Business School professor Eric Abrahamson in his 2004 book, *Change Without Pain* in which he discusses how organizations can go through change overload and how employees can experience change fatigue and burnout. Professor Abrahamson proposes "creative recombination" as an alternative approach to the highly destructive, destabilizing, and painful changes caused by "creative destruction."

FLAT

In a greater competitive marketplace, speed or response time is critical. How organizations respond to customers and other stakeholders or whether they are the first to market may make a significant difference, as time is at a premium. Organizations that can develop new technologies faster or adapt to changes in the market more rapidly will more likely survive the competition. To maximize response time, organizations have been flattening their hierarchies and structures, in addition to other initiatives such as downsizing and networking. Flat organizations make decisions more quickly because each person is closer to the ultimate decision makers. There are fewer levels of management, and workers are empowered to make decisions. Decision making becomes decentralized.

However, flat organizations create a new tension between decentralization and centralization. Among the drivers of decentralization are communications technologies that allow companies to push decision making away

from the core. Proponents of decentralization emphasize the idea that less hierarchical organizations mirror the efficiencies of the networks that enable them: they are faster, more resilient, more responsive, more flexible, and more innovative. Also, they argue, people who work within decentralized organizations feel empowered and energized. They do not need to focus on the chain of command and they do not feel constrained by it.

Organizations are caught between the opposing forces of centralization and decentralization. They want to leverage the opportunities offered by decentralization and create more nimble and powerful organizations, but they cannot always do so because the forces of centralization come into play. There are obvious benefits to centralization as control is comparatively tighter and accountability is more clearly cut compared to a flatter, more decentralized organizational structure. However, assumptions about how centralization or decentralization will work for each individual organization are dangerous; one style will invariably make more sense than the other, but proper due diligence and research should be the determinant factors.

Take the example of IT operations. The key to a centralized organization's success is its responsiveness. If the centralized operation can be responsive to the needs of the business, then that approach can make sense. Several companies, such as DaimlerChrysler and PepsiCo, have migrated back to centralizing IT operations after attempts at decentralization.

The debate over the centralization versus decentralization of operations in organizations is an enduring one. It is an age-old battle of standardization versus autonomy, corporate efficiency versus local effectiveness, and pressure on costs and resources versus accommodation of specific local needs.

Vacillation between centralization and decentralization is both non-productive and unnecessary. Organizations, as they desire to become flatter, will need to be clear about how they will respond to the tension between centralization and decentralization.

NETWORKS

Organizations that flatten tend to encourage horizontal communication among workers. Rather than working through the organizational hierarchy, it is often faster for workers who need to coordinate with each other simply to communicate directly. Such organizations are highly networked.

Another meaning of networked organizations refers to their relations to other organizations. Organizations that have downsized to just their core competencies must then outsource all the functions that used to be done in-house. To avoid losing time and effort managing contracts

with suppliers, organizations have learned to develop close ties to their suppliers so that social mechanisms of coordination replace legal mechanisms, which are slow and costly. In many industries, such as the garment industry in Italy, strong relationships have developed between manufacturers and suppliers, so that considerable work is done without a contract and without even working out a firm price. For these networked organizations to work, high trust and social capital between organizations are key elements.

Networked organizations are particularly important in industries with complex products where technologies and customer needs change rapidly, such as in high technology industries. Close ties among a set of companies enables them to work with each other in ways that are faster than arms-length contracts would permit, yet retain the flexibility of being able to drop the relationship if needed (as opposed to performing the function in-house). The trend towards networked organizations and structures creates a new tension between interdependence and independence. The forces of aggregation and disaggregation create new challenges for organizations; for example, the use of independent contractors, joint ventures, strategic partnerships, and alliances even with competitors.

One advantage of networks is that organizations have greater flexibility and thus they can become more competitive in the global marketplace. Another advantage is that organizations do not require that many resources such as employee benefits, office space, and financing for new ventures.

On the other hand, networks have distinct disadvantages. Organizations may find it more difficult to control the quality of goods or services when depending on partners in networks to deliver the quality that is desired. Legal and contracting expertise as well as negotiation expertise will also be important for networks. Alternative forms of quality control may need to be developed. Alternative mechanisms for coordination may also need to be developed to manage the growing constellation and sometimes tenuous nature of other partner organizations in the network.

All five trends and the tensions they produce result in greater organizational or system complexity for both leaders and employees in organizations. The tensions produced by these trends cannot be solved or "cured"; they must be managed. Effective approaches in organizational change will involve not one strategy but many alternatives and will require leaders and employees to develop greater resilience in confronting these tensions.

SEE ALSO *Diversity; Globalization*

BIBLIOGRAPHY

Abrahamson, E. *Change Without Pain.* Boston: Harvard Business School Press, 2004.

Burke, Warner W. *Organization Change: Theory and Practice.* California: Sage Publications, 2007.

Earley, P.C., Soon Ang, and Joo-Seng Tan. *CQ: Developing Cultural Intelligence in the Workplace.* Stanford, CA: Stanford University Press, 2005.

Lechner, Frank J., and John Boli. *The Globalization Reader.* Massachusetts: Blackwell Publishing, 2007.

Rodrik, Dani. *Has Globalization Gone Too Far?* Washington, DC: Institute for International Economics, 1997.

SHRM Workplace Forecast: A Strategic Outlook 2000–2003. Alexandria: Society for Human Resource Management.

U.S. Census Bureau. *Current Population Survey.* Washington, DC: GPO, 2005. Available from: http://www.census.gov.

U

UNIFORM COMMERCIAL CODE

The Uniform Commercial Code (UCC) is a collection of recommended laws covering many different issues that arise during commercial transactions, such as sales contracts, leases, negotiable instruments, letters of credit, bank collections, and secured transactions. The impetus behind the creation of the UCC was the hope that each state would adopt it as a statute, thereby giving uniformity throughout the country to the area of commercial law. The UCC is a joint project of the National Conference of Commissioners on Uniform State Laws (NCCUSL) and the American Law Institute (ALI).

HISTORY AND REVISION

The first draft of the UCC was created in the fall of 1951 by an editorial board consisting of representatives from the National Conference of Commissioners on Uniform State Laws and the American Law Institute. Pennsylvania adopted the draft as state law in 1953, but no other state enacted it until the editorial board issued a revised code in late 1956. After the revision, Massachusetts and Kentucky were the first to adopt the UCC. Today, all of the states (except Louisiana, which has only adopted certain parts) and the District of Columbia have adopted the UCC.

The UCC has been revised a number of times since 1956. Two more articles have been added to the UCC since the creation of the first nine articles. Article 2A, approved in 1987, covers leases of personal property (not apartments or offices). Article 4A, added in 1989, regulates the issuance, acceptance, and payment of electronic funds transfers. In 2001, the general provisions of Article 1 were revised to bring it in line with revisions in other articles; however, only twenty states had adopted these revisions as of 2007.

The most significant recent revision was completed in 2003. Article 2 of the UCC, which is widely considered to be the "bible" for contracts concerning the purchase or sale of goods in the United States, underwent a decade–long revision process. The major impetus behind the changes was updating Article 2 to accommodate electronic commerce.; Hhowever, as of 2007, no states had yet enacted these revisions.

Another revision to Article 2, originally called "Article 2B," is intended to bring uniformity to the rules that apply to information technology transactions. Article 2B met with resistance in the ALI, and the NCCUSL responded by renaming the revision as the Uniform Computer Information Transactions Act (UCITA). The UCITA is not officially a part of the UCC, and only Maryland and Virginia have adopted the UCITA.

TOPICS COVERED BY THE UCC

Until 1987, the UCC consisted of nine articles. Each article was separate and distinct from the other articles, and covered a specific topic in commercial law.

Article 1 is entitled "General Provisions," and sets forth general definitions and principles of interpretation for all of the articles.

Article 2, "Sales," controls every stage of a transaction for the sale of goods, from general obligations, construction of a contract, and performance under that contract to breach, repudiation, and excuse of a sales contract.

Article 2 also provides remedies for problems that may occur during a sales transaction.

Article 3 covers negotiable instruments, which include checks, cashiers' checks, travelers' checks, promissory notes, and certificates of deposit. This article regulates all transactions involving negotiable instruments, such as negotiation and endorsements; payment on the instruments; liability of parties such as the endorser, drawer, and acceptor; and dishonor of the instrument.

Article 4, "Bank Deposits and Collections," regulates collect items and post deposits, and governs the relationship among depository, collecting, and payer banks, and between a payer bank and its customer.

Article 5 addresses letters of credit, including the issuer's obligations, warranties that arise, and remedies that are provided for problems during the issuance process or after a letter of credit has been issued.

Article 6 was revised and changed in 1989 from covering bulk transfers to governing bulk sales. It regulates the obligations of a buyer of a bulk sale. A bulk sale generally involves the sale of more than half of the seller's inventory, not in the ordinary course of a seller's business, when the buyer has (or after inquiry would have had) notice that the seller is not going to continue to operate a similar business after the sale, including auction and liquidation sales. There are specific provisions for notice to claimants (such as creditors of the seller), distribution of the sale's proceeds, filing notices of bulk sales, and liability for noncompliance. This ensures that creditors are not bypassed when a company decides to end its business.

Article 7 governs warehouse receipts, bills of lading, and other such documents relating to ownership and transportation of goods.

Article 8, "Investment Securities," includes rules regulating the issuance of security certificates, the transfer and registration of securities, and the obligations of an intermediary who holds them.

Article 9 covers secured transactions, which occur when one party gives another a secured interest in a piece of property, usually to secure payment of a debt. The provisions of this article determine when a security interest may arise, the types of property that may be covered, the validity of the underlying security agreement, and the issue of default. Article 9 also covers the rights of third parties through a process called *perfection* of a security interest, which occurs when the holder of the security interest files notice of it with the state, so that other creditors know of the existence of the security interest.

SEE ALSO *Exporting and Importing; International Management*

BIBLIOGRAPHY

Editors of the American Bar Association. *The ABC's of the UCC, Article 1: (Revised) General Provisions.* Rev. ed. Chicago: American Bar Association, 2002.

Gabriel, Henry D. *The ABC's of the UCC, Article 2: (Revised) Sales.* Rev. ed. Chicago: American Bar Association, 2005.

Hakes, Russell A. *The ABC's of the UCC, Article 9: Secured Transactions.* Rev. ed. Chicago: American Bar Association, 2000.

Murray, John, Jr. "What the Updated UCC Means to You." *Purchasing,* 6 May 2004.

Rumbaugh, Charles E. "The New (and Improved) Article 2 to the UCC." *Contract Management,* December 2004.

"Uniform Commercial Code." Cornell University Law School. Available from: http://www.law.cornell.edu/ucc/ucc.table.html.

White, James J. and Robert S. Summers. *Uniform Commercial Code.* 5th ed. St. Paul, MN: West Publishing Co., 2000.

UPSELLING

Upselling is a method of optimizing business sales and revenues by presenting customers with an alternative product range with similar or relative characteristics to particular types of products that customers intend to purchase. Upselling aims at influencing buyers to purchase multiple products, switch to higher-end products, get exposed to new products in the market, encourage add-on purchases, or purchase complete sets of products that are used together (such as a printer and inkjet cartridge). Many retail businesses practice upselling techniques in varying scales depending on the prices, qualities, and types of products on offer.

Upselling is a technique that has been synonymous with the restaurant businesses for many years. Restaurants are known to use upselling to initiate increased sales volumes at the point of sale while increasing customer satisfaction at the same time. More often than not, when customers place orders, waiters or waitresses suggest additional appetizers, drinks, or desserts suitable for accompanying particular customer orders. In situations where customers have to wait for a given period of time for an order to be prepared, waiters and waitresses always ask customers whether they mind taking beverages or appetizers to whet their appetites while waiting for their orders to be ready. Such initiatives prompt customers to purchase items that they may not have intended to purchase before, and as a result, sales volumes increase.

UPSELLING TECHNIQUES

The process of adopting upselling techniques in a business begins with establishing past trends with the objective of using the past trends to determine forecasts for future trends. Apart from facilitating the identification of top

customers to be targeted, tracking of past trends also facilitates adequate stocking of relevant varieties of product mix suitable for upselling campaigns. Intensive employee training must be conducted to ensure that all sales employees in the business understand the techniques of how to interact with customers and when to initiate sales pitches whether online, on the telephone, or across the counter. Firms can adopt two main types of broad-based upselling techniques to enhance sales revenues; value perception and information technology (IT) systems.

VALUE PERCEPTION

Creation of value perception among customers regarding particular product combinations or alternatives should be the guiding principle for promoting upselling initiatives. For example, the aspects of durability, convenience, and greater utility value should come out clearly when suggesting an alternative product that is of a higher price than that of a particular product that a customer intends to purchase. Microsoft uses such strategies to convince customers seeking to purchase old software versions of Windows operating systems (such as Windows 2000) to consider purchasing the latest but more expensive versions of the Windows operating system (such as Windows Vista) by highlighting the extra features of the latest versions of Windows operating systems that older versions do not have.

Therefore, the customer must be provided with adequate reasons as to why purchasing a given set of products increases the utility value of the products. Testimonials and recommendations from past customers can play a great role in shaping the perceptions of prospective customers regarding the utility value of particular products or product combinations. Many electronic retail stores such as Amazon.com have user interface elements in their electronic systems that allow customers to summarize the experiences they have had using products such as books, jewelry, shoes, electronic items, or clothes purchased through these systems. Prospective buyers refer to these testimonials and recommendations when seeking products with the best durability and utility values.

TECHNOLOGICAL SYSTEMS

Automated computer software systems are widely applied by businesses to perfect web-based and e-commerce upselling initiatives. Leading retail stores such as Wal-Mart and Tiffany's are perfecting the use of Web sites and e-commerce sites to utilize the full potential of upselling techniques and achieve high sales targets. Such web businesses enjoy the advantage of automated data mining and web analytics tools that analyze the purchasing trends of customers and determine product combination preferences. For example, Amazon.com and eBay online automated systems

base product add-on suggestions on the browsing habits of online buyers.

Use of automated IT systems is more effective when combined with other forms of strategic approaches, such as providing free shipping for certain product combinations or product values and including a direct *add to cart* checkbox of additional product suggestions close enough to the main product. Amazon.com, in particular, uses its trademark tag, "Customers who purchased this item also purchased the following items" to prompt online buyers to make additional product purchases from three other suggestions provided by the system. Search engine optimization tools and Web sites can also be used to provide highlighted links to similar products of higher qualities and prices that customers can then view.

Managers must always strive to ensure that all upselling activities and initiatives fit within the overall framework of organizational structures and strategies. Employees who demonstrate increased sales and revenues through upselling techniques should be duly recognized and motivated. Generating of increased sales revenues, increased customer loyalties, and sustainable market share must always remain the overriding motives for upselling.

SEE ALSO *Sales Management*

BIBLIOGRAPHY
Chaffey, Dave. *E-Business and E-Commerce Management* 3rd ed. Marketing Insights Limited, 2007.

Clow, Kenneth, E., and Donald Baack. *Integrated Advertising, Promotion, and Marketing Communications.* Upper Saddle River, NJ: Prentice Hall, 2007.

Jobber, David, and Geoff Lancaster. Selling and Sales Management. 7th ed. Pearson Education Limited, 2007.

Kotler, Philip, and Gary Armstrong. *Principles of Marketing,* 12th ed. Upper Saddle River, NJ: Prentice Hall, 2008.

Smalley, Carrol. "Guide to Cross-Selling and Up-Selling Your Products: Maximize Every Sales Encounter to Increase Your Bottom Line." 2008. Available from: http://www.business.com/directory/advertising_and_marketing/sales/selling_techniques/

UTILITY THEORY

Utility theory provides a methodological framework for the evaluation of alternative choices made by individuals, firms and organizations. Utility refers to the satisfaction that each choice provides to the decision maker. Thus, utility theory assumes that any decision is made on the basis of the utility maximization principle, according to which the best choice is the one that provides the highest utility (satisfaction) to the decision maker.

UTILITY THEORY IN CONSUMER BEHAVIOR

Utility theory is often used to explain the behavior of individual consumers. In this case the consumer plays the role of the decision maker that must decide how much of each of the many different goods and services to consume, so as to secure the highest possible level of total utility subject to his/her available income and the prices of the goods/services.

UTILITY THEORY AND DEMAND

In addition to providing an explanation of consumer disposition of income, utility theory is useful in establishing individual consumer demand curves for goods and services. A consumer's demand curve for a good or service shows the different quantities that consumers purchase at various alternative prices. Factors that are held constant are consumers' tastes and preferences, income, and price.

UTILITY FUNCTIONS

In all cases the utility that the decision maker gets from selecting a specific choice is measure by a utility function U, which is a mathematical representation of the decision maker's system of preferences such that: $U(x) > U(y)$, where choice x is preferred over choice y or $U(x) = U(y)$, where choice x is indifferent from choice y–both choices are equally preferred.

Utility functions can be either cardinal or ordinal. In the former case, a utility function is used to derive a numerical score for each choice that represents the utility of this choice. In this setting, the utilities (scores) assigned to different choices are directly comparable. For instance, a utility of 100 units towards a cup of tea is twice as desirable as a cup of coffee with a utility level of 50 units. In the ordinal case, the magnitude of the utilities (scores) are not important; only the ordering of the choices as implied by their utilities matters. For instance, a utility of 100 towards a cup of tea and a utility level of 50 units for a cup of coffee simply state that a cup of tea is preferred to a cup of coffee, but it cannot be argued that a cup of tea is twice as desirable as a cup of coffee. Within this setting, it is important to note that an ordinal utility function is not unique, since any monotonic increasing transformation of an ordinal utility function will still provide the same ordering for the choices.

ASSUMPTIONS ON PREFERENCES

Irrespective of the type of utility function, utility theory assumes that preferences are complete, reflexive and transitive. The preferences are said to be complete if for any pair of choices x and y, one and only one of the following is stated: (1) x is preferred to y, (2) y is preferred to x, or (3) x and y are equally preferred. The preferences are said to be reflexive if for any pair of choices x and y such that x is equally preferred to y, it is concluded that y is also equally preferred to x. Finally, the preferences are said to be transitive if for any three choices x, y, z such that x is preferred over y, and y is preferred over z, it is concluded that x is preferred over z. The hypotheses on reflexivity and transitivity imply that the decision maker is consistent (rational).

MARGINAL RATE OF SUBSTITUTION

A further assumption of utility theory is that decision makers are willing to trade one choice for another. The existing trade–offs define the marginal rate of substitution. For example, suppose that two investment projects are considered by a decision maker. Project x has a return of 6 percent and a risk of 4 percent, whereas the return for project y is 5 percent and its risk is 2 percent. Furthermore assume that the decision maker considers both projects to be equally preferred. With this assumption it is clear that the decision maker is willing to increase the risk by 2 percent in order to improve return by 1 percent. Therefore, the marginal rate of substitution of risk for return is 2. In real world situations, the marginal rates of substitution are often decreasing. Such situations correspond to diminishing marginal utilities (marginal utility is defined as the change in total utility resulting from a one–unit change in consumption of the good or service). In the above example, we can assume that the decision maker is willing to take higher risks in order to get higher return, but only up to a specific point, which is called the saturation point. Once the risk has reached that point, the decision maker would not be willing to take any higher risk to increase return, and therefore the marginal rate of substitution at this risk level would be zero.

MULTI–ATTRIBUTE UTILITY THEORY

The traditional framework of utility theory has been extended over the past three decades to the multi–attribute case, in which decisions are taken bymade according to multiple criteria. Multi–attribute utility theory has been evolved as one of the most important topics in multiple–criteria decision making, with many real–world applications in complex real–world problems.

First popularized in the nineteenth century by such social philosophers as Jeremy Bentham and John Stuart Mill, the concept of utility became an important part of neoclassical economics. Utility is used to analyze individual consumer behavior, to explain individual consumer demand curves, and to model the decision makers' preferences. The utility theory has been a research topic of major importance for the development of economics, decision theory, and management for over a century.

Utility theory still attracts the interest of researchers who both support and question this classic model. In the past several decades, the utility theory has led to research on alternative decision models, although most of these alternatives use utility theory as their point of departure, focusing on the ways that observed behavior strays from the conclusions drawn by utility theory. As the authors of *The Handbook of Utility Theory* (2004) note, "In the past twenty–five years, an enormous amount of work has been done to develop new decision theories which can accommodate patterns of choice that contravene expected utility theory." It seems unlikely that any of these alternatives will displace utility theory as the dominant model in neoclassical economics, but refinements and alternatives will continue to be a central research topic for economists, businesspeople, and decision theorists alike.

SEE ALSO *Consumer Behavior; Economics*

BIBLIOGRAPHY

Aleskerov, Fuad, Denis Bouyssou, and Bernard Monjardet. *Utility Maximization, Choice and Preference.* 2nd ed. Heidelberg: Springer Verlag, 2007.

Belton, V. and T.J. Stewart. *Multiple Criteria Decision Analysis: An Integrated Approach.* Boston: Kluwer, 2002.

Hammond, J.S., R.L. Keeney, and H. Raiffa. *Smart Choices: A Practical Guide to Making Better Decisions.* Boston: Harvard Business School Press, 2002.

Keeney, R.L. and H. Raiffa. *Decisions with Multiple Objectives: Preference and Value Tradeoffs.* Cambridge University Press, Cambridge, 1993.

Salvador, Barbera, Peter Hammond, and Christian Seidl, eds. *Handbook of Utility Theory* Boston: Kluwer, 2004.

V

VALUE–ADDED TAX

A value–added tax (VAT) is a fee assessed against businesses at each step of the production and distribution process, usually whenever a product is resold or value is added to it. A VAT is levied on the difference between the purchase cost of an asset and the price at which it can be sold (i.e., the amount of value added to it). Producers and distributors typically pass the cost of the VAT on to the final consumer in the form of price increases. Tax is added to a product's price each time it changes hands until delivery to the customer takes place, when the final tax is paid.

Value–added tax falls under the general category of a consumption tax, meaning taxes on what people buy rather than on their earnings, savings, or investments. VAT has also been referred to as a sort of national sales tax, though it functions very differently. Sales tax is imposed on the total retail price of the item sold, while VAT tax is imposed on the value added at each stage of production and distribution. And though more complicated than sales tax, value–added tax systems have more checks against tax fraud because the tax is assessed at more than one point in the distribution process.

THE VAT ASSESSMENT PROCESS

The process of assessing value–added tax occurs roughly as follows:

1. Manufacture adds value to a product; the amount of value added can be described as the difference between the cost of the materials used to make the product and the price charged to the customer (often a wholesaler).

2. The manufacturer pays value–added tax (a percentage of the value added), which is then included in the purchase price charged to the customer (wholesaler).

3. The manufacturer gets a rebate from the government for VAT paid on the materials.

4. The customer (wholesaler) pays a VAT on the value they add, which can be described as the difference between what they paid to the manufacturer and the price at which they sell it to their customer (retailer). This VAT amount is included in the price charged to the retailer.

5. The wholesaler gets a rebate from the government for the VAT paid to the manufacturer.

6. The retailer pays value–added tax on the value they add, which can be described as the price charged to customers less the wholesale cost, and includes the VAT in the final sales price of the product.

7. The retail store collects value–added tax from the person buying the product (retail price thus includes all VATs collected at each stage of this process) and gets a rebate for the VAT paid to the wholesaler.

Value–added tax is a primary source of tax revenue in many European and other developed countries. With the exception of the United States, all countries of the Organization for Economic Cooperation and Development (OECD) use a VAT or similar tax on consumer expenditures. Though a value–added tax system has not been extensively used in United States, some presidents have examined the idea.

HISTORY OF VALUE–ADDED TAX

Value–added tax was first suggested in Germany during the post-World War I period as a replacement to the country's turnover tax. The turnover tax was similar to the value–added tax system but did not provide rebates for the taxes paid at each stage. Other proponents of VAT suggested that the United States adopt it as a substitute for excise taxes imposed after the War. However, it was not until 1953 that the value–added tax system was put in place in the United States or Europe. That year, Michigan adopted a modified VAT, termed a Business Activities Tax, and used the system for fourteen years. France was the first country to begin using value–added tax to partially replace its own turnover tax system.

In 1967 the Council of European Economic Community (EEC) issued directives for widespread adoption of value–added tax to replace existing turnover taxes and link EEC members with a common tax system. The Council also hoped the new system would increase foreign trade, which was hindered by the complex regulatory practices of the turnover tax system. After the directive, countries outside the EEC such as Austria, Sweden, Brazil, Greece, and Peru also adopted some variation of the VAT, either in addition to or as a replacement for their own national tax structures.

A 1983 *U.S. News* & *World Report* article titled "What's Wrong with the System?" examined alternatives to the current tax system in the United States, citing problems such as complexity of tax laws, the expense of hiring professionals to prepare tax documents, and IRS backlog. One of the cited alternatives was value–added tax, by then widely used across Europe and other developed countries.

VATs continued to spread throughout the world during the 1980s, 1990s, and 2000s. China, Thailand, the Philippines, and Bangladesh all implemented the policy during the mid–1990s, and a value–added tax was introduced in many eastern European countries and former Soviet republics following the fall of communism. By the early 2000s, VAT had become a key component of the tax systems in more than 120 countries, with tax rates varying from 5 to 25 percent. Writing in *Finance and Development,* Liam Ebrill claimed that "the rapid rise of the value–added tax was the most dramatic–and probably most important–development in taxation in the latter part of the twentieth century, and it still continues." Schenk and Oldman wrote in 2007: "The VAT has spread around the world more quickly than any other new tax in modern history." The major exception to this trend remains the United States, which continues to operate without a VAT.

CHARACTERISTICS OF VALUE–ADDED TAX

There are three types of value–added tax used around the world, each different in the ways that taxes on investment (capital) expenditures are handled. The most common is the consumption method, which allows businesses to immediately deduct the full value of taxes paid on capital purchases. The second is the net income method, which allows gradual deduction of VAT paid on capital purchases over a number of years, much like depreciation. The third type, gross national product method of value–added tax, provides no allowance for taxes paid on capital purchases. The name of this type of tax is derived from the fact that the tax base is approximately equal to private GNP. The consumption method is most favored among general populations because it most equally taxes income from labor and capital and promotes capital formation.

In theory, value–added tax systems with a uniform rate are neutral to all forms of productive input. However, countries across the world have had to modify the VAT system with multiple rates and exemptions to meet political, economic, and social needs. Most nations do not assess any tax on necessities such as food, medicine, and shelter. And because of the difficulty in computing value added, professional services such as banking, accounting, and insurance are often exempt. The largest variation from uniform tax rates is the zero tax rate on exports. Since taxes will likely be assessed at a product's destination, many do not impose a tax on the final selling price of exports. To compensate, the VAT is applied to imported products. Working together, countries seek more balanced trade.

IMBALANCES IN THE VAT SYSTEM

Financial services have traditionally been exempt from value–added tax because no one has found a systematic, easy way to tax these services, partially because of the difficulty in determining the nature of services provided. Also, some wonder if it is fair to charge a tax on services often related to saving and investment.

Though some services are exempt from value–added tax, they must still pay the VAT on expenses such as office equipment; additionally, these business are ineligible for rebates on the VAT they pay. Therefore, exempt business sectors pay the total VAT on any good and service purchased. Often the cost of paying value–added tax is rolled into fees charged for the services offered. As a result of this imbalance, competition becomes greater, as companies can import services tax free, instead of buying services from a company whose price probably is inflated to absorb some or all of the hidden VAT taxes paid.

To remove such distortions in the economic effect of a value–added tax, a new method of taxing financial services would need to be devised. If these services were no longer exempt from value–added tax, they could reclaim prepaid VATs on equipment, etc., but they would also be required to charge VAT on any services offered. What complicates the matter further is categorizing which services are

performed specifically on a customer's behalf and which are performed on the institution's behalf. Additionally, services performed for the institution as a whole still indirectly benefit consumers. These issues make for murky ground when computing the value a service provider should be taxed upon.

The benefit of staying with the current system is that people are accustomed to it. The option of charging VAT to financial services means added resources must be committed to changing existing VAT coverage and finding a way to measure value added for financial institutions. A third option is to look for a distinct way of taxing services while remaining under the value–added tax system. As an example, the European Commission was exploring the idea of taxing services on a cash–flow basis, taxing cash movement.

THE BENEFITS OF VALUE–ADDED TAX

One of the best reasons for instituting a value–added tax, according to VAT proponents, is that the system encourages personal savings and investment–principal elements of a healthy economy–by taxing only consumption. In the current United States tax structure, citizens pay taxes twice on money they save–once when income tax is withdrawn from their paycheck, and again when they pay taxes on the interest earned from savings and gains from investments. Similarly, the tax system in place in the United States encourages corporations to use debt financing, in which interest payments made by the company are tax deductible. Any dividends earned are subject to double taxation. And because taxes on capital purchases cannot be immediately deducted (only later as depreciation expense), the costs of capital investment increase. If a company does have a large asset base, it must generate more income to increase investor returns, subjecting itself again to higher tax payments.

Another benefit touted by VAT supporters is a more constant revenue flow. Tax revenues under the current U.S. structure rise and fall as a result of changing economic conditions, decreasing during recessions and growing during an economic boom. During recessionary periods, revenues may fall enough that government financial requirements utilize all available funds, and economic recovery becomes further delayed. Proponents of value–added tax believe it results in more financial stability and revenue flow.

Supporters of VAT for the United States view the system as a supplementary tax that could help make up for revenue lost due to personal income taxes, and believe imposition of a VAT may also result in general lowering of income–tax rates. They also assert that items such as food, medicine, and shelter should be exempt (as they are in other countries with a value–added tax structure) in

order to maintain fair practices for those who must expend the majority of their income on basic necessities. It would also mean people who save and invest money realize benefits. Finally, VAT advocates maintain that the current tax system in the United States cannot raise sufficient revenue to support minimal government expenses.

A value–added tax would in theory eliminate the need for federal tax expenditures, which are largely responsible for depletion of federal revenues and increases in the national debt. Also, since the VAT is a consumption tax, people will be more motivated to save and invest disposable income. Additionally, a VAT would in some way reduce bias toward those who earn higher incomes. Tax write–offs can usually be taken advantage of only by those who itemize,—meaning that they are available only to a small percentage of U.S. citizens, usually those with the highest incomes.

DRAWBACKS OF VALUE–ADDED TAX

Dropping the current tax system in the United States in order to adopt a VAT would require additional taxes on state and local services and products as well. Because value–added tax is similar to implementing a national sales tax, it impinges on territory currently occupied by states and local governments, and could add to the expenses incurred by cities and states by making them responsible for collection and enforcing compliance to the VAT system. It would require that every state rewrite its tax code, and could also add another tax layer for cities already charging state and local sales taxes. And while some cities could benefit from nontaxable export sales, others that depend primarily on domestic industry could face large losses in sales, resulting in declining revenues and lost jobs.

The prospect of a value–added tax also raises questions such as: Which goods and services purchased by cities would be federally taxed? Which provided by cities would be federally taxed? There would be no provisions for tax–exempt municipal bonds, which could mean an increase of up to 30 percent of finance costs for some municipalities. Deductions for state and local taxes, mortgage interest, investment in enterprise zones, housing, and jobs would also be eliminated. And cities with citizens who have less disposable income could stand to lose significant revenues with a consumption tax, revenues that would affect the public infrastructure and its investment in schools, roads, and utilities. VAT critics feel a de facto national sales tax will also reduce the amount of local funding states can expect from the local sales tax.

Because those with higher incomes spend a lesser proportion of their total wealth on consumption, households with lower income would still realize disadvantages and pay more tax proportionately than those who make more.

However, adjustments can be made to value–added taxes so that taxation of food, housing, clothing, and medicine are given a zero or low tax rate. Also affecting citizens with lower incomes would be the fact that charitable contributions would no longer be deductible expenses.

Adding to the drawbacks, some economists feel that instituting a value–added tax would result in increasing prices and, as a result, inflation. U.S. economists have estimated the net effect of a VAT implementation as a 5 percent price increase. Also, assumptions that administrative costs would decrease with a value–added tax system may be erroneous. VAT–compliance costs to business would be higher, especially with special exemptions and multiple rate levels to consider. And the VAT would not eliminate income or payroll taxes completely, meaning the VAT would only add to administrative costs incurred.

A fairly recent complication in the administration of VAT systems involves electronic commerce. Though the sales of online retailers accounted for an ever–increasing percentage of overall sales of software, videos, and music, such sales were not subject to VAT. Governments in the EU and elsewhere planned to implement a VAT for electronic commerce in order to protect traditional retailers from unfair competition and create a new source of revenues. "New technologies are steadily drawing VAT into the realms of competition between tax regimes and presenting its architects with the problem of how legislation can be redesigned to reflect previously unimagined transactions, while preserving neutrality with the existing ones," Graeme Ross wrote in *International Tax Review*.

VAT IN THE UNITED STATES

Though the concept of value–added tax has met with considerable success outside the United States, U.S. policy makers have not yet warmed to the idea. The topic has been debated by economists since the post-World War I period but attracts only mild, sporadic support. The suggestion to adopt a VAT policy in the United States has been formally proposed numerous since the early 1970s. Supporters are firmly convinced problems with the existing tax structure could be corrected with its adoption through the generation of revenues and subsequent stimulation of production.

Michigan is the one state in the United States that has used a form of the VAT, called the Single Business Tax (SBT). This tax was adopted in 1975, replacing eight different business taxes then in use. Michigan repealed this tax, effective January 1, 2008, when the state legislature approved a 2006 voter initiative to repeal the SBT. The state replaced this tax with a tax on business income.

Although the United States does not have a VAT or a national sales tax, many U.S. businesses must take the VAT into account. As the authors of *Value Added Tax: A Com-*

parative Approach (2007) point out, "a U.S. business operating in or shipping goods or transferring services to developed or developing countries with VATs must consider the VAT implications of exports to or imports from those countries." Supporters of a U.S. VAT point to this fact, and also argue that the U.S.'s large trade deficit could be reduced by using a VAT system. As provided by the General Agreement on Tariffs and Trade (GATT), prices for export goods can be discounted for some taxes, but not for income and social security taxes. But countries that use the VAT system can reduce prices by the total amount of VAT paid, giving them an economic advantage over the corporate and payroll taxes U.S. firms must pay. By adopting a VAT system and reducing the level of corporate, income, and payroll taxes, the United States could increase its export volume because U.S. firms could charge competitively low prices.

The idea of a national VAT continues to have supporters in the U.S. As recently as 2006, the Congressional Research Service (CRS) prepared a report on the benefits of imposing a VAT in the United States. The report noted that five bills had been introduced between 2005 and 2007 to levy some kind of VAT in the United States. However, President Bush's tax commission, charged with considering reforms to the U.S. tax system, rejected the idea of a national sales tax and expressed doubt over the use of European–style VATs. Although the idea of a VAT in the United States is most likely here to stay, it seems as though the United States will not be fundamentally altering its taxation system any time soon.

SEE ALSO *Exporting and Importing; International Management; Product Design; Product Life Cycle and Industry Life Cycle; Production Planning and Scheduling*

BIBLIOGRAPHY

Bickley, James. "Value–Added Tax: A New Revenue Source?" *Congressional Research Service*, 22 August 2006. Available from: http://opencrs.com/rpts/RL33619_20060822.pdf.

Ebrill, Liam, et al. "The Allure of the Value–Added Tax." *Finance and Development,* June 2002.

"Get the VAT Out: Tax Refund." *U.S. News & World Report,* 28 April 1997.

Hooper, Paul, and Karen A. Smith. "A Value–Added Tax in the U.S.: An Argument in Favor." *Business Horizons,* May–June 1997.

"Introduce VAT to Halt Sales Tax War Among States." *Business Line,* 19 May 1999.

Ogley, Adrian. *Principles of Value–Added Tax–A European Perspective.* International Information Services, Inc., 1998.

Ross, Graeme. "Indirect Taxation–Designing Its Future." *International Tax Revenue,* October 2004.

Schenk, Alan, and Oliver Oldman. *Value Added Tax: A Comparative Approach.* New York: Cambridge University Press, 2007.

Scott, Andrew. "Taxing Financial Services: A Future with Options." *OECD Observer,* January 1999.

"What's Wrong with the System?" *U.S. News* & *World Report,* 18 April 1983.

VALUE ANALYSIS

Value analysis, also known as value engineering, was developed by Lawrence D. Miles at General Electric during World War II. The technique simultaneously pursues two complimentary objectives: maximizing the utility provided by the product or service and minimizing or eliminating waste. Toward this end, the value content of the product or process realized by the consumer is defined. Using the user's definition of value as a filter, the product's components or the steps in the production or service–delivery process are classified as either value–added or non–value–added. The analyst's goal is to eliminate as much many of the non–value–added elements as possible by reengineering the design of the product or process. Equally important, the analyst also considers the possibility of substituting functionally equivalent elements for the value-added elements of the product or process design. In the latter case, a substitution is justified when the functionality of the element is maintained or enhanced at a reduced cost to the producer.

Value analysis may be applied to the design and redesign of products, services, and processes. All that is required is that the item under analysis be capable of being divided into mutually exclusive and collectively exhaustive elements. In the case of a product design, the product's bill of materials provides the necessary list of components. In the case of a service delivery or production process, a list of the individual tasks performed to achieve the ultimate objective are sufficient. The function of each product or process element is then identified and classified. Then the analyst must operationally define value within the context established by the product or process under review. Using this definition, each function is analyzed to determine whether or not and how it adds value, and how. Finally, design changes may be proposed to eliminate, reduce, or replace elements that fail to add sufficient value to the overall product or process.

DEFINING VALUE

The first task facing the value analyst is to operationally define value within the context of a particular product or process. In doing so it is important to acknowledge that value is subjective. Just as beauty lies in the eyes of the beholder, value is highly dependent upon perspective. Therefore, it is useful to recall that all products and processes have multiple stakeholders. Indeed, in operationally defining value, the analyst might consider the perspectives of end consumers, individuals making the purchasing decision, suppliers, employees, managers, creditors, investors, regulators, and even the local community. While not all of these potential stakeholders will be concerned with every product or process, an initial consideration of which perspectives to consider is helpful in identifying a robust definition of value to drive the extended analysis. Frequently, the analyst will discover that the different perspectives will lead to conflicting definitions of value. While this complicates the task at hand, honing in on an acceptable definition of value often requires balancing competing demands.

The value–definition phase begins with the gathering of information. The value analyst should have a clear idea of the scope of the review expected. Then each stakeholder's perspective should be explored to determine what they consider to be valuable. What are the utilities expected to be provided by the product or the objectives to be achieved by the process? Are there specific operational goals that should be considered? For example, is there an expectation that all telephone orders will be delivered within twenty–four hours? At this initial stage, each stake holder's experience with the product or process should be broadly considered in order to facilitate the consideration of integrating complimentary elements in the product or process design. Information regarding stake holder requirements may be revealed through direct observation, focus groups, interviews, surveys or other methods.

IDENTIFYING THE CURRENT STATE

The next step is to identify the as–is state of the product or process under review. In the case of a product design, this may be as simple as developing a bill of materials detailing the relevant components. In the case of a service delivery or production process, a flowchart is commonly used to graphically illustrate the tasks performed to achieve the current output. One of the primary purposes of creating an as–is representation is to ensure that existing problems are not duplicated in a new design. Information about component failures, warranty claims, and customer complaints can be quite valuable at this stage. A physical walk–through to observe the flow of a process or dismantling of a product may also provide useful information. Any deviations between the as–is documentation and what the analyst sees should be recorded. It is also useful to note any differences between how different employees perform the same task or any variation of the same component provided by different suppliers.

FUNCTION ANALYSIS

The next step of the analysis is to determine the function of each element (each product component or each process task) identified in the as–is documentation. The convention is to use a verb–noun pair to describe the intended result or

objective for each element—essentially what contribution the element makes. The verb answers the question "What is to be done?" The verb sets the action to be taken. The noun answers the question "What is it being done to?" The noun signifies what is acted upon. The activity of generating these pairs is more complicated than it appears to be. In practice, it is common to generate several verb–noun pairs that describe the objective or intended result of that element. For example, the function of a light bulb filament might be alternatively described as "to generate light" or "to convert energy." Each function is then classified as either primary or secondary. The primary functions are the basic reasons that the product or process exists. Secondary functions are those that serve to support or make possible the primary functions. These secondary functions are generally a consequence of the specific design chosen to achieve the product or process' primary function. Therefore, the design elements that provide only secondary functions are prime candidates for elimination or improvement. They also provide a framework for evaluating the elements that provide the associated prime function. The analyst can examine the element providing the primary function to determine whether it can be replaced or redesigned in such a way that the need for the secondary support function is eliminated.

Distinguishing primary and secondary functions is sometimes difficult in practice. To address this concern, Charles Bytheway developed the Function Analysis System Technique (FAST) at Univac in 1964. FAST builds on the VA verb–noun pair analysis by linking those verb–noun pairs to describe complex systems. Bytheway's technique relied on a series of standardized fill–in–the–blank questions. By inserting the verb–noun functions identified through value analysis into the standardized questions, FAST seeks to identify the cause–and–consequence relationships among the various product or process elements. These relationships can then be graphed as a network diagram, with the verb–noun pairs representing the product or process elements as the nodes and the causal relationships represented as the arcs. FAST then identifies those elements that are essential to providing the product or process basic function as the critical path. Everything that falls outside this critical path is then considered as a prime candidate for elimination or improvement.

Bytheway's set of original questions for FAST includes the following:

1. What subject or problem would you like to address?

2. What are you really trying to do when you _____?

3. What higher level function has caused _____ to come into being?

4. Why is it necessary to _____?

5. How is _____ actually accomplished or how is it proposed to be accomplished?

6. Does the method selected to _____ cause any supporting functions to come into being?

7. If you did not have to perform _____, would you still have to perform the other supporting functions?

8. When you _____, do apparent dependent functions come into existence as a result of the current design?

9. What or who actually _____?

VALUE–ADDED ASSESSMENT

The function of each design element is then reviewed against the operational definition of value to determine whether and how it contributes to the worth of the product or process. Although each situation is unique, several functions are commonly considered to be non–value–added. The following list is a small sample of highly suspect verbs:

- Administration: allocates, assigns, records, requests, or selects.

- Waiting or delay: files, sets up, stages, updates, or awaits.

- Motion or transportation: collates, collects, copies, delivers, distributes, issues, loads, moves, or receives.

- Oversight or control: approves, expedites, identifies, inspects, labels, maintains, measures, monitors, reviews, or verifies.

- Rework or repair: adjusts, changes, reconciles, repairs, returns, revises, or cancels.

However, identifying non–value–added design elements is only one aspect of the value assessment. The value–added elements should also be appraised. For example, assume that our evaluation has determined that the function of a bolt is to "attach component." Our initial analysis reveals that this is a secondary function that supports the overall operation of our product and is therefore value–added. However, during the information–gathering phase of our analysis we discovered that several warranty claims can be traced to the failure of this bolt. Based upon this information, we should then consider whether a substitute component might provide a higher level of value. In this situation we might consider a bigger, stronger bolt. If the revised design leads to fewer failures, our customers might experience fewer field failures. In addition, even though the new component presumably costs more than the original, we may find the overall product profitability improved if the reduced warranty claims offset the higher production costs. We might also choose to extend our analysis to consider other functionally equivalent components to the original bolt. Returning to our example, the function of the bolt was to "attach component." Several other design elements might perform the same fastening

function at either a reduced cost or improved performance level. A more complete analysis might consider substituting a screw, a rivet, adhesive, or even a weld for the troublesome bolt. Each potential substitution has its own implications for production costs and stakeholder satisfaction.

COMPARING ALTERNATIVE DESIGNS

A useful device for communicating the relative improvement of one design over another is to measure the value–added content of each product or process design. When evaluating alternative process designs, a common unit of measurement is elapsed time. This is generally accomplished by calculating the percentage of time allocated to performing value–added tasks relative to the total process throughput time. In general, the process with the higher percentage of value–added activity will also have the shortest total throughput time. If this is not true, it probably indicates that the process output is significantly improved in the longer, but more value–added, process. In these cases, the absolute values for value–added and non–value–added activity may be more relevant. Another common unit of measure is manufacturing costs. In general, the accounting techniques of activity–based costing are used to allocate the costs to specific design elements. Again, either percentage or absolute measures may be appropriate for evaluating alternative designs. A third common objective, particularly for comparing product designs, is weight. The underlying rationale is that a lower weight generally indicates less material used—-hence lower manufacturing costs. In addition, handling, transportation, and operating costs are also commonly reduced in proportion to product weight. Ultimately, the appropriateness of any unit of measure is dependent upon the product or process under review and the intentions of the value analyst.

Value analysis has been an important management tool for organizations of all types since its development during World War II. The U.S. Navy adopted value analysis in 1945, and it has since been used by a wide variety of government agencies. A 1996 federal law, still in effect, mandates that "Each executive agency shall establish and maintain cost–effective value engineering procedures and processes." Value analysis is also an important tool in the private sector. Its use is advocated by management and production manuals such as *Value Analysis Tear–Down: A New Process for Product Development and Innovation* (2004) and *Value Driven Product Planning and Systems Engineering* (2007).

SEE ALSO *Competitive Advantage; New Product Development; Value Creation*

BIBLIOGRAPHY
Akiyama, Kaneo. *Function Analysis: Systematic Improvement of Quality and Performance.* Cambridge, MA: Productivity Press, 1991.

Cook, H.E., and L.A. Wissmann. *Value Driven Product Planning and Systems Engineering.* London: Springer, 2007.

Emblemsvag, Jan. *Life-Cycle Costing: Using Activity–Based Costing and Monte Carlo Methods to Manage Future Costs and Risks.* New York: John Wiley & Sons, 2003.

Fleisher, Craig S., and Babette Bensoussan. *Business and Competitive Analysis: Effective Application of New and Classic Methods.* Upper Saddle River, NJ: FT Press, 2007.

Kaufman, Jerry, and Yoshihiko Sato. *Value Analysis Tear–Down: A New Process for Product Development and Innovation.* New York: Industrial Press, 2004.

Shillito, M. Larry, and David J. De Marle. *Value: Its Measurement, Design and Management.* New York: Wiley–Interscience, 1992.

ten Have, Steven. *Key Management Models.* Englewood Cliffs, NJ: Prentice-Hall, 2002.

Trischler, William E. *Understanding and Applying Value–Added Assessment: Eliminating Business Process Waste.* Milwaukee, WI: ASQC Quality Press, 1996.

VALUE-CHAIN MANAGEMENT

Value-chain management (VCM) is the integration of all resources starting with the vendor's vendor. It integrates information, materials, labor, facilities, logistics, etc., into a time-responsive, capacity-managed solution that maximizes financial resources and minimizes waste. In other words, efficient and effective VCM optimizes value for the customers' customer. The following sections discuss the development of VCM, integrated supply-chain planning and scheduling, full-resource management, cycle-time responsiveness, chain-wide resource optimization, and information integration.

DEVELOPMENT OF VALUE CHAIN MANAGEMENT

Using the previous definition as a basis, it is helpful to review how VCM was developed. Traditional industries focused on vertically integrated operations. For example, if you manufactured a product, you wanted to control the material sources, the transportation, the warehousing, the production, and possibly even the retailing of your product. The theory held that more vertical elements that were under your direct control, the more efficiently you were able to perform.

International competitive pressures caused organizations to realize that they simply were not good at everything; thus, they began to focus on what they did best. In other words, they focused on their core competencies. This shift away from vertical integration encouraged organizations to look outside of themselves for services. For example, a manufacturer would have a shipping company do all their packaging and shipping. This introduced more steps in the vendor-to-customer linkage, making the management of this process more complex.

The trend toward operational diversification focused organizations on developing a supply chain whereby an organization would establish a relationship with shippers, vendors, and customers so that all the links in the supply chain could be effectively integrated. These interrelationships became extremely complex to manage. Initially, the management of these relationships and affiliations was primarily performance-based. Having too many links in the supply chain would often cause unresponsiveness to customer demands. Time-to-market became the buzzword of successful competitive positions; the organization that managed its supply chain most effectively tended to have the competitive advantage, at least in terms of customer responsiveness and order fulfillment. In addition, globalized ventures—even small ones—will increase profitability by implementing a well thought-out value chain and utilizing it to move product and services with a spot price (a price quoted for an item one to two days before delivery).

Soon, managers realized that time responsiveness was not the only important element in customer satisfaction. The supply-chain linkages—the links among upstream suppliers, manufacturers, and downstream distributors—also had a cost element and resource-efficiency element associated with them. This realization generated a need for value-chain management, which is the management of all the interlinking parts of the supply chain in the most efficient way. Sometimes this includes the elimination of elements of the supply chain; for example, Web merchandising has taken the place of retail outlets. Amazon.com is a well-known example of eliminating the need for physical "bricks-and-mortar" retail locations. Another example is Amazon Kindle—the wireless device available through Amazon.com that allows readers to wirelessly download any of hundreds of thousands of texts onto an "electronic paper" device much like a handheld mobile device. This innovative wireless media removes the need for ordering book after book and even offers downloadable college textbooks and other reference materials, making Kindle the smallest single source for data that doesn't require a personal computer. Kindle has been available since early 2007 and costs less than $400. Texts, magazines, newspapers, and other media are ordered using the device through the Kindle store.

Returning to the definition of value-chain management, we can now look at the key aspects that are incorporated in VCM. These include:

- Integrated supply chain planning and scheduling
- Full resource management
- Cycle-time responsiveness
- Chain-wide resource optimization
- Information integration

INTEGRATED SUPPLY-CHAIN PLANNING AND SCHEDULING

The planning process for managing the supply chain is easy and has existed for many years. Systems like material requirements planning (MRP), manufacturing resource planning (MRP II), distribution requirements planning (DRP), theory of constraints (TOC), just-in-time (JIT), critical path method (CPM), and program evaluation and review technique (PERT) have performed the planning process effectively for the last thirty years. However, under these environments, capacity has been treated largely as an afterthought, and therefore scheduling has been plagued with performance challenges. The introduction of capacity management tools like finite capacity scheduling (FCS) into the existing planning environments has allowed the development of schedules that were optimizable both in timing and in cost. Most planning systems still do not include these scheduling elements, but rather focus on achieving delivery performance through the utilization of an overriding expedite process. FCS enhancements are a key piece in the development of efficient VCM environments.

FULL RESOURCE MANAGEMENT

Traditional environments focused on managing only the material resources, assuming all the other resources had an infinite capacity. This logical fallacy came from the limitations of the planning systems previously discussed. In a centrally-controlled environment where authoritarian rule existed, the expediting process could make this management style operational. Unfortunately, in a multi-stage supply-chain integration, the scheduler needs to make sure that capacity limitations are considered at all steps in the supply chain. Expediting across the links of the supply chain was extremely difficult, if not impossible. For example, the constrained resource at one link in the supply chain may be entirely different from the constrained resource at another step in the supply chain. For one step, the constrained resource could be labor while at another step it could be truck capacity. Therefore, a scheduling system that analyzed and constrained all the resource elements at all steps became a critical piece in VCM.

CYCLE-TIME RESPONSIVENESS

Total cycle-time measures are needed because they have, in many cases, become more important than cost when it comes to competitive advantage. Strategic positioning requires a supply chain to be able to supply a customized product at speeds quicker than anyone else, even if the product is not customized. Therefore, a measure of cycle-time performance, measuring the time from when the order for a customized product is placed until it is delivered to the customer, becomes as important as price.

CHAIN-WIDE RESOURCE OPTIMIZATION

Value-chain management adds the evaluation not only of all the traditional resources like labor, materials, machinery, etc., but also the optimal management of time and financial resources. Realizing that the supply chain has more steps than existed in the traditional vertical model in which a single firm integrated many supply chain processes and functions within a single organization, the profit margins of each step have become smaller as firms disintegrated in order to focus on one or only a few core competencies. This disintegration has created the need for profits to be available at multiple points throughout the value chain because each step in the chain needs to share a smaller piece of the overall margin. In order to accomplish this, value-chain management focuses on value-added optimization (also referred to as waste elimination). Some organizations have interpreted this to include the elimination of steps in the supply chain, like the elimination of retailers at Amazon.com and elimination of the need for college bookstores by Atomic Dog Publishing. The efficient performance of all the remaining links in the supply chain is also carefully evaluated by each link.

INFORMATION INTEGRATION

VCM is meaningless if a near-total sharing of information does not exist among all elements of the supply chain. This incorporates multiple levels of information, from the operational information (which includes capacities and work loads), to the strategic levels (which include vision and mission statements). This sharing of information has to be fully accessible and interactive, which often suggests some sort of Web-based database. Each link of the supply chain will need to be able to evaluate the efficiencies and performances of all the other links in the supply chain. However, this information network should not be available to elements outside of the immediate supply chain, like competitors. The shared information within the chain will primarily be utilized by each of the elements of the supply chain for their specific planning and scheduling. It will also be utilized by the sales/marketing functions to generate realistic schedules for the customer and end-consumer of the supply-chain process. An overall finite capacity scheduling process that projects realistic and feasible schedules while simultaneously optimizing cost and timing will be necessary.

In summary, value-chain management increases the number of steps in the supply chain by focusing on core competencies. VCM attempts to optimize the integrated efficiency of these steps in the management of resources, including the response time and the cost resource. Moving forward, VCM will become increasingly important as globalization becomes the mainstay, competition shrinks industry profits, and new, international market entrants challenge existing competitors. VCM has shaped how large corporations do business in the United States and abroad and has helped to sustain profitability for many entities during the onset of economic crisis in 2007 and 2008.

SEE ALSO *Cycle Time; Supply Chain Management*

BIBLIOGRAPHY

Chopra, S., and M.S. Sodhi. "Managing Risk to Avoid Supply-Chain Breakdown." *MIT Sloan Management Review* 46, no. 1 (2004): 53–62.

Cooper, R., and R. Slagmulder. "Achieving Full-Cycle Cost Management." *MIT Sloan Management Review* 46, no. 1 (2004): 45–53.

Kannegiesser, Matthias. "Value Chain Management in the Chemical Industry: Global Value Chain Planning of Commodities." Berlin, Germany: Physica-Verlag Heidelberg, 2008.

Lee, H.L., M.L. Fisher, A. Raman, and V.G. Narayanan. "Smarter Supply Chains." In *Harvard Business Review (On Point Collection.* Boston: Harvard Business School Press, 2004.

Lejeune, M.A., and N. Yakova. "On Characterizing the 4 C's in Supply Chain Management." *Journal of Operations Management* 23, no. 1 (2005): 81–100.

Plenert, G. *Making Innovation Happen: Concept Management Through Integration.* Boca Raton, FL: St. Lucie Press, 1998.

VALUE CREATION

Value creation is the primary aim of any business entity. Creating value for customers helps sell products and services, while creating value for shareholders (in the form of increases in stock price) insures the future availability of investment capital to fund operations. From a financial perspective, value is said to be created when a business earns revenue (or a return on capital) that exceeds expenses (or the cost of capital). But some analysts insist on a broader definition of "value creation" that can be considered separate from traditional financial measures. "Traditional methods of assessing organizational performance are no longer adequate in today's economy," according to Value Based Management.net. "Stock price is less and less determined by earnings or asset base. Value creation in today's companies is increasingly represented in the intangible drivers like innovation, people, ideas, and brand."

When broadly defined, value creation is increasingly being recognized as a better management goal than strict financial measures of performance, many of which tend to place cost–cutting that produces short–term results ahead of investments that enhance long–term competitiveness and growth. As a result, some experts assert that value creation is a more fundamental way of understanding and planning for a firm's success. As the authors of *Value Driven Product Planning and Systems Engineering* (2007) put it, "The

'bottom–line' metrics of cash flow, demand, price, and return on investment are driven by a second set of financial metrics represented by value to the customer, cost, and the pace of innovation. Get them right relative to competition and impressive bottom–line results should follow."

The first step in achieving an organization–wide focus on value creation, is to reach an understanding about the sources and drivers of value creation within the industry, company, and marketplace. Understanding what creates value will help managers focus capital and talent on the most profitable opportunities for growth. "If customers value consistent quality and timely delivery, then the skills, systems, and processes that produce and deliver quality products and services are highly valuable to the organization," Robert S. Kaplan and David P. Norton wrote in their book *Strategy Maps: Converting Intangible Assets into Tangible Outcomes* (2004): "If customers value innovation and high performance, then the skills, systems, and processes that create new products and services with superior functionality take on high value. Consistent alignment of actions and capabilities with the customer value proposition is the core of strategy execution."

Although the intangible factors that drive value creation differ by industry, some of the major categories of intangible assets include technology, innovation, intellectual property, alliances, management capabilities, employee relations, customer relations, community relations, and brand value. According to Kaplan and Norton, the link between these intangible assets and value creation is corporate strategy. It is important to note that investments made to enhance intangible assets (research and development, employee training, and brand building, for example) usually provide indirect rather than direct benefits. In this way, focusing on value creation forces an organization to adopt a long–term perspective and align all of its resources toward future goals. The underlying idea, as the authors of *Value Creation* (2008) note, is that value creation "can be leveraged to drive sustainable competitive advantage and superior financial performance."

SEE ALSO *Competitive Advantage; Entrepreneurship; Intrapreneurship; Value Analysis; Value-Chain Management*

BIBLIOGRAPHY
Cook, H.E., and L.A. Wissmann. *Value Driven Product Planning and Systems Engineering*. London: Springer, 2007.
"Creating Value: Value Creation Index." *Value Based Management.net*. Available from: http://www.valuebasedmanagement.net/methods_valuecreationindex.html.
Kaplan, Robert S., and David P. Norton. *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*. Cambridge: Harvard Business School Press, 2004.
Kapoor, Amit. "Creating Value." *Financial Times,* 13 March 2003.
Madden, Jim. "Creating Corporate Value." *Financial Executive,* March–April 2004.
Perla, Michael L. "Financial Value Creation." *CFO Refresher,* 2003. Available from: http://www.refresher.com/archives14.html.
Strauss, Ron, and William Neal. *Value Creation*. Mason, OH: South–Western Cengage Learning, 2008.

VENDOR RATING

Vendor rating is the result of a formal vendor evaluation system. Vendors or suppliers are given standing, status, or title according to their attainment of some level of performance, such as delivery, lead time, quality, price, or some combination of variables. The motivation for the establishment of such a rating system is part of the effort of manufacturers and service firms to ensure that the desired characteristics of a purchased product or service is built in and not determined later by some after–the–fact indicator. The vendor rating may take the form of a hierarchical ranking from poor to excellent and whatever rankings the firm chooses to insert in between the two. For some firms, the vendor rating may come in the form of some sort of award system or as some variation of certification. Much of this attention to vendor rating is a direct result of the widespread implementation of the just–in–time concept in the United States and its focus on the critical role of the buyer–supplier relationship.

Most firms want vendors that will produce all of the products and services defect–free and deliver them just in time (or as close to this ideal as reasonably possible). Some type of vehicle is needed to determine which supplying firms are capable of coming satisfactorily close to this and thus should be retained as current suppliers. One such vehicle is the vendor rating.

In order to accomplish the rating of vendors, some sort of review process must take place. The process begins with the identification of vendors who not only can supply the needed product or service but is a strategic match for the buying firm. Then, important factors to be used as criteria for vendor evaluation are determined. These are usually variables that add value to the process through increased service or decreased cost. After determining which factors are critical, a method is devised that allows the vendor to be judged or rated on each individual factor.

It could be a numeric rating or a Likert–scale ranking. The individual ratings can then be weighted according to importance, and pooled to arrive at an overall vendor rating. The process can be somewhat complex in that many factors can be complementary or conflicting. The process is further complicated by the fact that some factors are quantitatively measured and others subjectively.

Once established, the rating system must be introduced to the supplying firm through some sort of formal

education process. Once the buying firm is assured that the vendor understands what is expected and is able and willing to participate, the evaluation process can begin. The evaluation could be an ongoing process that occurs regularly, such as on a quarterly basis, or it could occur within a predetermined time frame, such as quarterly. Of course the rating must be conveyed to the participating vendor, andwith some firms may actually choose to publishing overall vendor standings. If problems are exposed, the vendor should formally present an action plan designed to overcome any problems that may have surfaced. Many buying firms require the vendor to show continuing improvement in predetermined critical areas.

CRITERIA FOR EVALUATION

Vendor performance is usually evaluated in the areas of pricing, quality, delivery, and service. Each area has a number of factors that some firms deem critical to successful vendor performance.

Pricing factors include the following:

- Competitive pricing. The prices paid should be comparable to those of vendors providing similar product and services. Quote requests should compare favorably to other vendors.

- Price stability. Prices should be reasonably stable over time.

- Price accuracy. There should be a low number of variances from purchase–order prices on invoiced received.

- Advance notice of price changes. The vendor should provide adequate advance notice of price changes.

- Sensitive to costs. The vendor should demonstrate respect for the customer firm's bottom line and show an understanding of its needs. Possible cost savings could be suggested. The vendor should also exhibit knowledge of the market and share this insight with the buying firm.

- Billing. Are vendor invoices are accurate? The average length of time to receive credit memos should be reasonable. Estimates should not vary significantly from the final invoice. Effective vendor bills are timely as well asnd easy to read and understand.

Quality factors include:

- Compliance with purchase order. The vendor should comply with terms and conditions as stated in the purchase order. Does the vendor show an understanding of the customer firm's expectations?

- Conformity to specifications. The product or service must conform to the specifications identified in the

request for proposal and purchase order. Does the product perform as expected?

- Reliability. Is the rate of product failure within reasonable limits?

- Reliability of repairs. Is all repair and rework acceptable?

- Durability. Is the time until replacement is necessary reasonable?

- Support. Is quality support available from the vendor? Immediate response to and resolution of the any problem is desirable.

- Warranty. The length and provisions of warranty protection offered should be reasonable. Are warranty problems resolved in a timely manner?

- State–of–the–art product or service. Does the vendor offer products and services that are consistent with the best in its industry state-of-the-art? The vendor should consistently refresh product life by adding enhancements. It should also work with the buying firm in new product development.

Delivery factors include the following:

- Time. Does the vendor deliver products and services on time; is the actual receipt date on or close to the promised date? Does the promised date correspond to the vendor's published lead times? Also, are requests for information, proposals, and quotes swiftly answered?

- Quantity. Does the vendor deliver the correct items or services in the contracted quantity?

- Lead time. Is the average time for delivery comparable to that of other vendors for similar products and services?

- Packaging. Packaging should be sturdy, suitable, properly marked, and undamaged. Pallets should be the proper size with no overhang.

- Documentation. Does the vendor furnish proper documents (packing slips, invoices, technical manual, etc.) with correct material codes and proper purchase order numbers?

- Emergency delivery. Does the vendor demonstrate extra effort to meet requirements when an emergency delivery is requested?

Finally, these are service factors to consider:

- Good vendor representatives have a sincere desire to serve. Vendor representatives display a courteous and professional approach, and handle complaints effectively. The vendor should also provide up–to–date catalogs, price information, and technical information.

Does the vendor act as the buying firm's advocate within the supplying firm?

- Inside sales. Inside sales should display knowledge of the buying firm's needs. It should also be helpful with customer inquiries involving order confirmation, shipping schedules, shipping discrepancies, and invoice errors.

- Technical support. Does the vendor provide technical support for maintenance, repair, and installation situations? Does it provide technical instructions, documentation, general information? Are support personnel courteous, professional, and knowledgeable? The vendor should provide training on the effective use of its products or services.

- Emergency support. Does the vendor provide emergency support for repair or replacement of a failed product?.

- Problem resolution. The vendor should respond in a timely manner to resolve problems. An excellent vendor provides follow–up on the status of problem correction.

A 2001 article in *Supply Management* notes that while pricing, quality, delivery, and service are suitable for supplies that are not essential to the continued success of the buying firm, a more comprehensive approach is needed for suppliers that are critical to the success of the firm's strategy or competitive advantage. For firms that fall into the latter category performance may need to be measured by the following 7 C's.

1. Competency–managerial, technical, administrative, and professional competence of the supplying firm.

2. Capacity–supplier's ability to meet physical, intellectual and financial requirements.

3. Commitment–supplier's willingness to commit physical, intellectual and financial resources.

4. Control–effective management control and information systems.

5. Cash resources–financial resources and stability of the supplier; profit, ROI, ROE, asset–turnover ratio.

6. Cost–total acquisition cost, not just price.

7. Consistency–supplier's ability to exhibit quality and reliability over time.

If two or more firms supply the same or similar products or services, a standard set of criteria can apply to the vendor's performance evaluation. However, for different types of firms or firms supplying different products or services, standardized evaluation criteria may not be valid. In this case, the buying firm will have to adjust its criteria for the individual vendor. For example, Honda of America adjusts its performance criteria to account for the impact of supplier problems on consumer satisfaction or safety. A supplier of brakes would be held to a stricter standard than a supplier of radio knobs.

AWARDS, CERTIFICATIONS, AND RATINGS

Many buying firms utilize awards and certification programs to rate vendors. Attainment of certification status or an award serves as an indicator of supplier excellence. Certification and awards–program recognition represents a final step in an intense journey that involves rigorous data collection under the total–quality–management rubric, as well as multitudes of meetings with suppliers and purchasing internal customers. Serious buying firms view these programs as an integral part of their overall efforts to improve the total value of the company.

The attainment of a supplier award usually serves as an indication that the vendor has been very highly rated. Some firms utilize a hierarchy of awards to indicate varying degrees of performance from satisfactory to excellent. For example, DaimlerChrysler awards its best suppliers the Gold Pentastar Award. Several hundred vending firms receive this award per year, while only a handful (less than a dozen) of DaimlerChrysler's vendors are good enough to garner the Platinum Pentastar Award. Intel uses a single award to recognize their very best suppliers; in 2007, the Supplier Continuous Quality Improvement Award (SCQI) went to only ten companies.

For other firms, supplier certification is desirable. Supplier certification can be defined as a process for ensuring that suppliers maintain specific levels of performance in the areas of price, quality, delivery, and service. Certification implies that participating firms have reached a level of excellence that other firms were unable or unwilling to achieve. For example, a quality certified firm maintains a level of quality such that the customer receiving the inspection may be utilized made to undergo it with decreasing frequency up to the point where it is eliminated altogether. Theoretically, this will ensure that all of the supplier's products meet the customer's product specifications. In this case, the goal of supplier certification is quality at the source.

While it is uncertain whether individual firms are consistent in the manner in which they certify vendors, a quality certification would likely require that the vending firm be part of a formal education program, utilize statistical process control (SPC), and have a quality assurance plan (set written procedures).

Other firms use an internal ranking system to evaluate vendors and vendor risk. The author of *Auditing Vendor Relationships* (2003) recommends that vendor ranking be done annually or whenever a new vendor is added. More

commonly, consulting firms provide ratings of vendors for use by their clients and businesses in general. For example, Gartner Research issues its vendor ratings to rate IT vendors. Such ratings are often used by vendors themselves to advertise their reliability or excellence. Sun Microsystems widely publicized its 2007 Gartner rating, as did Hewlett–Packard, both of which were upgraded to a "positive" overall rating.

BENEFITS

Benefits of vendor rating systems include:

- They help minimize subjectivity in judgment and make it possible to consider all relevant criteria in assessing suppliers.

- They provide feedback from all areas in one package.

- They facilitate better communication with vendors.

- They provide overall control of the vendor base.

- They require specific action to correct identified performance weaknesses.

- They establish continuous review standards for vendors, thus ensuring continuous improvement of vendor performance.

- They build vendor partnerships, especially with suppliers having strategic links.

- They develop a performance–based culture.

Vendor ratings systems provide a process for measuring those factors that add value to the buying firm through value addition or decreased cost. The process will continually evolve and the criteria will change to meet current issues and concerns.

For example, some feel that supplier evaluation must now reflect the strategic direction of the buying company's environmental initiatives. As a result, some firms have recently developed supplier evaluation systems that place significant weight on environmental criteria. It would seem that the concept will remain valid for some time.

SEE ALSO *Purchasing and Procurement; Quality and Total Quality Management; Supply Chain Management*

BIBLIOGRAPHY
"Measure for Measure." *Supply Management,* 1 February 2001, 39.
Muralidharan, C., N. Anantharaman, and S.G. Deshmukh. "Vendor Rating in Purchasing Scenario: A Confidence Interval Approach." *International Journal of Operations and Production Management* 21, no. 9/10 (2001): 1305–1325.
Salamasick, Mark. *Auditing Vendor Relationships.* Altamonte Springs, FL: Institute of Internal Auditors, 2003.
Trent, Robert J., and Robert M. Monczka. "Purchasing and Supply Management: Trends and Changes throughout the 1990s." *International Journal of Purchasing and Materials Management,* Fall 1998, 2–11.
"Understanding Vendor Ratings." Gartner Research. Available from: http://www.gartner.com/pages/story.php.id.9328.s.8.jsp.
Walton, Steve V., Robert B. Handfield, and Steven A. Melnyk. "The Green Supply: Integrating Suppliers into Environmental Management Processes." *International Journal of Purchasing and Materials Management,* Spring 1998, 2–11.

VENTURE CAPITAL

Venture capital refers to money that is invested in companies during the early stages of their development. Such funds may come from wealthy individuals, government-backed Small Business Investment Companies (SBICs), or professionally managed venture capital firms. Since investing in an unproven business venture is highly speculative, venture capitalists generally target companies that they believe offer significant potential for growth, and therefore an opportunity to earn a high rate of return in a relatively short period of time. In exchange for providing capital, as well as a source of management assistance and industry contacts for growing firms, the investors usually require a percentage of equity ownership in the company, some measure of control over its strategic direction, and payment of assorted fees. "Private equity provides capital and access to a network that can transform a company into an industry player," Karen E. Klein noted in *Business Week.* "But the price is high: a chunk of your business." According to Klein in another article, "Attracting Venture Capital in 2008," the venture capital market will be heading in two converse directions: in one direction, financial institutions that offer venture capital will thrive; in the other direction, firms that tend to make their business primarily on venture capital investments will cave in on themselves due to unpaid loans on risky investments that collapsed, resulting in thousands of defaulted loans.

Like other sources of equity financing, venture capital offers both advantages and disadvantages. The main advantage is that the business is not obligated to repay the money. For a start-up company, this frees up important cash flow that might otherwise be needed to service debt. The involvement of high-profile investors may also help increase the credibility of a new business. The main disadvantage to venture capital financing is that the investors become part owners of the business, and thus gain a say in business decisions. The company's founders face a dilution of their ownership positions and a possible loss of autonomy or control.

Even for business owners willing to make the trade-off, venture capital is scarce and often difficult to obtain. Venture capitalists tend to be highly selective in choosing investments. Some will only consider investments in specific technologies, industries, or geographic areas. In fact, the larger venture capital firms typically reject more than

90 percent of the requests for funding that they receive. Conversely, venture capitalists can be a great alternative for startup companies that represent too significant of a risk for banks and other more traditional lending institutions. Capitalists that are willing to take greater risks can be handsomely rewarded for their faith and financial investment and often do well in rapidly growing sectors like technology, communications, and healthcare.

Firms often evaluate requests thoroughly, and at considerable expense, before selecting a few that closely match the investors' areas of expertise and offer the best earnings potential. As a result, private equity financing is more likely to be an option for existing businesses with a solid track record and good prospects for future growth than for start-up companies that pose a much greater risk. It is a particularly good choice for fast-growing companies that have few tangible assets to use financing as collateral for loans.

For a business owner, the process of obtaining venture capital begins with a formal proposal. The most important element of this proposal is a detailed business plan describing the company's goals and strategies on a timeline. The proposal should also include recent financial statements, projections of future growth, a brief history of the company, biographies of key managers and executives, the amount of capital requested, and a description of how the funds will be used. Experts recommend that companies seeking equity financing evaluate several venture capital firms before entering into a deal. Managers should also hire professionals to help them understand the terms of the agreement before signing to avoid giving away too much control.

On receiving a proposal of interest, a venture capital firm usually follows up with a thorough investigation of the company's investment potential. This process might include analyzing financial statements, interviewing employees, customers, and suppliers, and meeting with the management team. If the venture capital firm remains interested following the evaluation phase, it usually responds with a proposal of its own, known as a term sheet. The term sheet acts as a blueprint for the investment deal, with provisions covering such issues as the valuation of the investment, voting rights, and liquidation options.

The final terms are decided through negotiations between the business managers and the venture capital firm, generally through the legal counsel of both parties. One of the most important factors in the negotiation process is agreeing upon the valuation of the business, which determines the amount of equity in the company that is required in exchange for the venture capital (a business with a low valuation must provide a high percentage of equity, and vice versa). As a general rule, venture capital firms seek to control between 30 and 40 percent of equity in the companies in which they invest. This amount allows the venture capital firm to exercise influence without assuming control or eliminating the management team's incentive to grow the business. The venture capital firm usually hopes to achieve a return of three to five times the original investment within five years, by selling its equity either to the company's management and executives or on the public stock markets.

Overall, venture capital can provide a valuable source of financing for growing businesses. Many analysts suggest that the nature of venture capitalism is cyclical—that it experiences waves of popularity in varied industries and with businesses of various sizes before becoming problematic for both lenders and recipients who both eventually retreat, causing traditional lending channels to again become the popular choice. This cycle repeats throughout good and bad economic times, giving companies in need of a lender an option regardless of the financial climate.

Because of the risks associated with venture capital, experts generally suggest that it be viewed as one of a number of potential sources of financing and be used in combination with debt financing whenever possible. "Private equity isn't for the faint of heart," Klein acknowledged. "But then again, entrepreneurs aren't known for being timid."

SEE ALSO *Due Diligence; Entrepreneurship; Financial Issues for Managers; Financial Ratios*

BIBLIOGRAPHY

"Attracting Venture Capital in 2008." Available from: http://www.businessweek.com/smallbiz/content/dec2007/sb20071226_721429.htm.

Bartlett, Joseph W. *Fundamentals of Venture Capital.* Lanham, MD: Madison Books, 1999.

Cardis, Joe, et al. *Venture Capital: The Definitive Guide for Entrepreneurs, Investors, and Practitioners.* New York: Wiley & Sons, 2001.

Klein, Karen E. "A Private Equity Affair: Getting the Most from Venture Capital." *Business Week,* 1 November 2004, 47.

Lerner, Josh, F. Hardymon, and A. Leamon. "Venture Capital and Private Equity: A Casebook." New Jersey: John Wiley & Sons, 2008.

McKimmie, Kathy. "Funding Fundamentals: Where to Turn for Startup and Expansion Capital." *Indiana Business Magazine,* January 2004, 24–27.

Stancill, James McNeill. *Entrepreneurial Finance: For New and Emerging Businesses.* Mason, OH: Thomson/South-Western, 2004.

Weiss, Jeffrey M. "Venture Capital Tips." *Detroiter,* May 2002, 19.

Worrell, David. "Raising Money: All in the Delivery." *Entrepreneur,* May 2004.

VIRTUAL CORPORATIONS

The online collaboration activities of today's business world have led to an environment where multiple firms can come together to meet customer demands, forming temporary partnerships known as virtual corporations (often called "virtual organizations" or "virtual enterprises"). These hyper-agile entities move through the business world, dissolving and reforming as necessary to complete supply or production chains and to market products to consumers. Instead of operating by the formal contracts and carefully constructed procedures traditional companies use in partnerships, virtual corporations are brought together by specialization and efficiency, working on a customer by customer basis without using long-term contracts.

BUSINESS IN THE INTERNET AGE

The modern online tools of communication make the success of virtual corporations possible. Companies use these tools to collaborate on production. One business may be able to specialize at manufacturing beverages, and have an online relationship with another firm that specializes in the distribution of beverages. These two companies work together, interacting shipment to shipment to move the products to consumers. Email is, of course, an integral part of this process, but social networking and other Web 2.0 applications also help. Thanks to online forums, employees from both companies can meet to discuss particular issues or work details whenever necessary, communicating necessary information instantly. Blogs are used for updates throughout the virtual corporation, while chat rooms can be used for meetings and wikis for research or paperwork purposes. One of the most important Internet concepts for virtual corporations is the paperless business, where legal documents are emailed and signed by certified e-signatures without the need to send or receive physical packages. A complete virtual organization will, in the end, be able to conduct nearly all of its business through online platforms, especially its communication with partnering companies.

There are three distinct types of virtual organizations, based on how companies conduct their business:

- **Online**. Online virtual organizations operate in the e-commerce realm with fully electronic business structures. These organizations uses online applications to provide services, with the least amount of physical office space required. Amazon.com and eBay are both cited as examples of popular online organizations. These companies usually participate in some form of virtual corporation to distribute or produce their products

and services, but they are not part of a partnering network.

- **Collaborative**. Collaborative virtual organizations are those which make use of IT applications to find other companies online which can provide necessary services. Skills, areas of expertise, and knowledge resources are combined to create an effective supply chain which the business would not otherwise be able to provide. These companies have established specialties and usually a physical location, but not the means to fully produce or distribute their goods or services. From this collaborative definition comes the most common concept of the virtual corporation, an online partnership of companies that work together to provide the full range of services a traditional company would normally possess within a single entity. Because each one of the collaborative companies specialize, higher quality is achieved in production and service.

- **Hybrid**. Hybrid companies switch between being merely online organizations, and being collaborative organizations in a virtual corporation. In certain areas they are able to achieve goals independently, but in other processes they depend on their virtual corporation to carry tasks to completion.

A virtual corporation will be able to react immediately to cultural trends and sudden market changes, adapting to situations by picking up or dropping departmental competencies from collaborating companies. Partners may be separated in many different ways—they may be in separate cities, separate countries, or merely separate buildings, but they must always be accessible through online communication. Videoconferencing can be used if face to face meetings are required, while instant messaging (IM) and smartphone technologies can be used by employees on the move. The level of online communication the corporation has will control how efficiently it will respond to such changes.

ESTABLISHING A VIRTUAL CORPORATION

There are three different levels in which companies can integrate effective electronic communication in their partnerships, gradually working toward a fully online collaboration:

- The first level is physical system integration. This is the connection of physical departments and employees within the organization to each other and to the other organizational members of the virtual corporation. This is simple communication and transference of data by employees through online networks such as intranets, the sending and receiving

of basic files. If this capability is in place, then this first level has been reached.

- The second level is application integration, also known as information integration. This level pertains to any applications that the virtual corporation is using to communicate. Now that the physical barrier has been crossed by online capability, the partnering companies move forward into developing particular ways to collaborate. These can include wikis, forums, chat sites, blogs, social networks, IM, audio and video conferencing, and VoIP (voice over Internet Protocol) service. The particular services must be agreed upon by all companies in the virtual corporation and be formatted the same way so that information can be communicated quickly and easily. All employees should be trained in these applications.

- The third level is business integration, in which the companies are coordinating their efforts into single supply chains, utilizing their specialties to achieve maximum efficiency and quality. At this stage, businesses work together to form better ways of distributing their products or marketing their services, creating new practices through innovation. Although no formal contracts are made between the partners of the virtual organization, this step does bind the companies closer together and makes it less likely that they will separate.

HR AND IMPRESSION MANAGEMENT

Human resource (HR) departments have a key role to play in establishing virtual corporations. Employees will be representing themselves over online communication instead of face-to-face or phone conversations, and this can lead to certain misunderstandings unless the HR department takes steps to ensure everyone understands proper ways to correspond over the Internet. This is called *impression management*.

Time and spelling are both good examples. If an employee responds to an electronic message late at night, it may give the impression that the employee is industrious and hard-working. On the other hand, if the employee waits a while before responding to an electronic message, they may appear to be lazy or inattentive, or they may be showing that the message (or the sender) is not important to them. The spelling within the message will show how professional the sender is, along with other more subtle information. An English partner will spell some words differently from an American correspondent, and even within the geographical areas of the United States, different contractions are used to communicate varied meanings. The same can be said of vocabulary.

Managers in charge of impression management have several ways to minimize online misunderstanding. The first is to have a policy of full disclosure: employees should give as much information as they can that involves the current subject, trying to make sure that no gaps are left in what they are trying to communicate. Consistent, complete honesty will help create an atmosphere of confidence between virtual partners, increasing the effectiveness of collaborative efforts.

Problems can also be solved through use of questions and precision. Any doubt in electronic communication should immediately be removed through careful questioning of the exact meaning in the message. Questions can clear up misunderstanding before it even begins. Precise communication will eliminate the need for questions—if an employee reads what she has just written and finds an area of uncertainty, she should add whatever phrases or graphics are needed to create a clear meaning.

In the future, it is expected that video conferencing will become much more common, allowing employees to see each other's dress, hair, facial expressions, and eyes, along with any nonverbal cues the correspondent may be sending. This will make certain parts of virtual communication less prone to error, but impression management training will probably always be needed for purely text communication.

ISSUES WITH VIRTUAL CORPORATIONS

As can be seen by the efforts of impression management, much of the success with virtual corporations lies in trust. The partnering companies must be willing to trust each other both legally and ethically, and this is not always easy. When virtual documents are used, how valid are the e-signatures from a legal perspective? If one of the partners is convicted of wrongdoing or an unethical practice, how culpable are the other partners in the corporation? If one of the partners is unsatisfied with the quality of another partner, how is the problem resolved? Because legal issues regarding virtual corporations are so nebulous, many states in America have made it difficult for such organizations to formally announce their connections. A notable exception is Vermont, which in 2008 passed legislation designed to make it easier for companies to register as fully online corporations, legalizing the authenticity of electronic documents and other such time-and-space hurdles that give virtual organizations their flexibility. It remains to be seen if this legal incorporation of VCs will continue.

BIBLIOGRAPHY

Bernard, Alain. *Methods and Tools for Effective Knowledge Life-cyle Managment.* Springer Publishers, 2008.

Burn, Janice, Peter Marshall, and Martin Barnett. *E-Business Strategies for Virtual Organizations.* Butterworth-Heinemann, 2001.

Innis, Pauline B., Robert L. Heneman, and David B. Greenberger. *Human Resource Management in Virtual Organizations.* IAP, 2007.

Legrand, Roland. "The Virtual Corporation, possibly a milestone in the collaboration era." *Metanomics,* 2008. Available from: http://metanomics.net/28-jun-2008/virtual-corporation-possibly-milestone-collaboration-era..

Zemliansky, Pavel, and Kirk St. Amant. *Handbook on Research of Virtual Workplaces and the New Nature of Business.* Idea Group Inc, 2008.

VIRTUAL ORGANIZATIONS

The term *virtual organization* is used to describe a network of independent firms that join together, often temporarily, to produce a service or product. Virtual organization is often associated with such terms as virtual office, virtual teams, and virtual leadership. The ultimate goal of the virtual organization is to provide innovative, high-quality products or services instantaneously in response to customer demands.

The term *virtual* in this sense has its roots in the computer industry. When a computer appears to have more storage capacity than it really possesses it is referred to as virtual memory. Likewise, when an organization assembles resources from a variety of firms, a virtual organization seems to have more capabilities than it actually possesses.

BACKGROUND

Traditional organizations integrate work vertically; that is, they delegate authority in a pyramidal, hierarchical structure. As the pyramid shape suggests, power is concentrated primarily among the handful of individuals at the top. This organizational form, shown in Figure 1, was first developed in the United States in the late 19th century with the advent of mass production.

The prominent industrial engineer and theorist of traditional hierarchical organizations, Frederick Winslow Taylor, introduced the principles for designing and managing mass-production facilities in his book, *Principles of Scientific Management,*. The text offers examples of traditional design such as Ford's automobile factory in Michigan and Carnegie's steel works in Pittsburgh.

The hierarchical structure was designed to manage highly complex processes like automobile assembly where production could be broken down into a series of simple steps. Hierarchical corporations often controlled and managed all activities of a business from, the raw materials to their allocation to consumers. A centralized managerial hierarchy controlled the entire production process, with white-collar workers establishing rules and procedures to manage a blue-collar workforce.

Figure 1
The Traditional Hierarchy
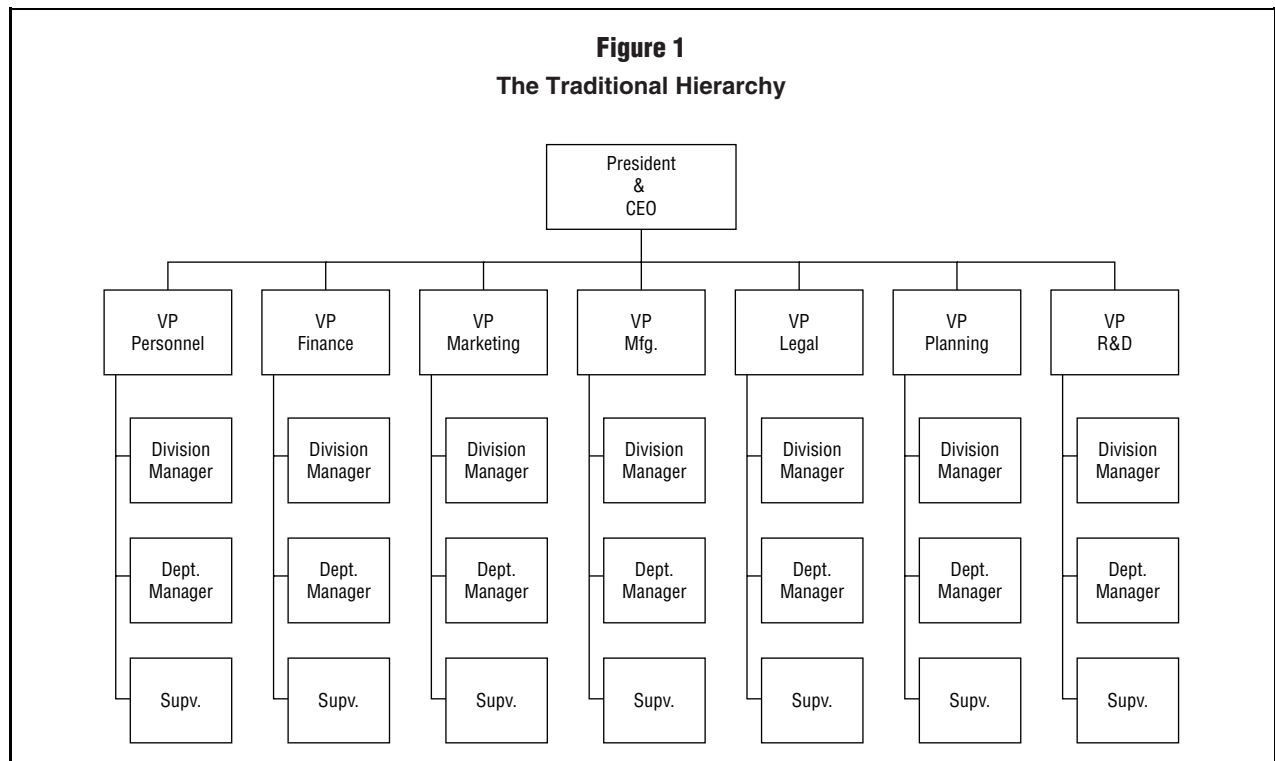
From World War II until the early 1980s, the trend was to build increasing layers of management with more staff specialists. This centralized hierarchical structure was seen as effective for managing a large number of workers, but lacked agility and was unable to process information rapidly throughout the organization.

NEW DEMANDS ALTER ORGANIZATIONAL FORMS

Since the 1980s, many organizations have flattened their structures by shifting authority downward, giving employees increased autonomy and decision-making power. Advantages of flatter organizations include a decreased need for supervisors and middle management, faster decision making, and the ability to process information faster because of the reduced number of layers in the organization.

A consequence of flatter organizations, though, is that employees tend to be more dispersed both geographically and organizationally. Responding to this problem of dispersion, many organizations have eliminated superfluous processes and begun focusing on their core, value-added business. Flat organizations using joint ventures and strategic alliances are providing increased flexibility and innovation, and are replacing many traditional hierarchies.

THE NEW BUSINESS FORM

Ray Grenier and George Metes discuss the shift to this new organizational structure as a response to unprecedented customer expectations and alternatives, global competition, time compression, complexity, rapid change, and increased use of technology. They describe the virtual model as a lead organization that creates alliances with groups and individuals from different organizations who possess the highest competencies to build a specific product or service in a short period of time (see Figure 2).

Grenier and Meters further explain that these alliances are virtual because products and services are not produced in a single corporation whose purpose is longevity. Rather, these new virtual organizations consist of a hybrid of groups and individuals from different companies that might include customers, competitors, and suppliers who have a focused purpose of bringing a high-quality product or service to market as rapidly as possible. These alliances may be temporary with short concept-to-delivery cycles.

William Davidow and Michael Malone, authors of *The Virtual Corporation,* claim that virtual corporations will be central to the new business revolution. Their concept of the virtual corporation brings diverse innovations together such as just-in-time supply, work teams, flexible manufacturing, reusable engineering, worker empowerment, organizational streamlining, computer-aided design, total quality, and mass

Figure 2
The Virtual Corporation - A network of organizations working independently to bring a product to market
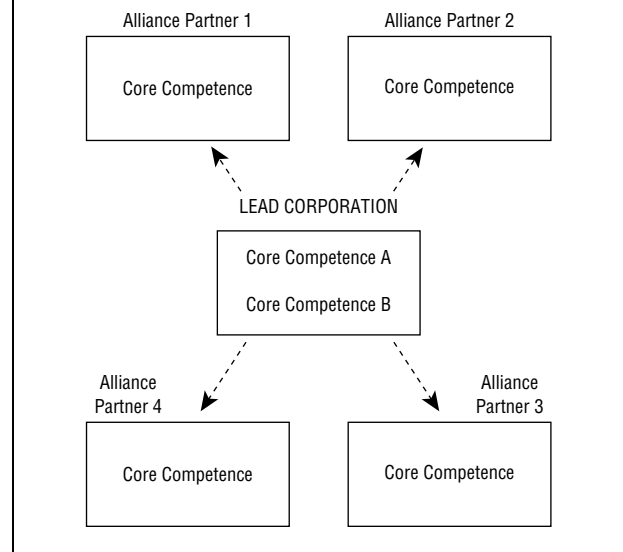
customization into a coherent vision for the twentieth century corporation.

The virtual corporation is more permeable than traditional organizational forms. Interfaces in a virtual organization between company, supplier, and customers continuously change, resulting in a blurring of traditional functions. Work groups and job responsibilities may shift regularly and may or may not take place in an established setting like a home office. The virtual organization may not have a central office or an organizational chart; employees on all levels of the company may work from home offices or smaller offices dispersed across the region or the world. Suppliers, customers, and even competitors may spend time alongside one another in the virtual organization. This can mean long hours in front of e-mails, on instant messenger systems, or teleconferencing.

CHARACTERISTICS OF A VIRTUAL ORGANIZATION

Partners in virtual organizations share risks, costs, and rewards in pursuit of a global market. The common characteristics of these organizations include a purpose that is motivated by specific market opportunities, world-class core competence, information networks, interdependent relationships, and permeable boundaries. The most successful partners in the virtual setting are those that are flexible and willing to accept that a virtual organization offers a different kind of environment to the firm—one which allows for higher levels of productivity and profit but will most likely

fit into personal life differently than the traditional paradigm. The days of leaving the office to go home and completely sign off from work have been replaced by a lifestyle of more intermittent work and play.

Virtual organizations represent structures that are motivated by specific market opportunities. Once the alliance has been formed and the opportunity has been exploited, partners may move on to new partnerships and alliances. Each partner in a virtual corporation contributes a world-class core competence, such as design, manufacturing, or marketing. This ability of multiple firms to create synergies among world-class functions and processes creates untold possibilities.

As organizations create these new linkages, advanced information technology becomes key to the success of a virtual organization. Computerized information systems allow employees from geographically dispersed locations to link up with one another. The virtual office may use desktop videoconferencing, collaborative software, and intranet systems to enhance the flow of information among team members. Besides the need for instantaneous communication with one another, members of these autonomous-virtual teams have increasing requirements regarding the amount and quality of information they need to do their work.

Members of the virtual organization, in turn, create a network of interdependent relationships. These relationships require firms to be much more dependent on one another than they have been in the past, demanding unprecedented levels of trust. Strong interdependencies cause organizations' boundaries to be blurred as competitors, suppliers, and customers enter into cooperative agreements. These new relationships among firms obligate organizations to use innovative management practices.

VIRTUAL TEAMS

Virtual teams are often the group structure used in virtual organizations. In their 1997 book, Jessica Lipnack and Jeffrey Stamps define virtual teams as "a group of people who interact through interdependent tasks guided by a common purpose." Unlike conventional teams, a virtual team performs work across space, time, and organizational boundaries connected by interactive communication technologies. Virtual teams may include employees, management, customers, suppliers, and government working together to achieve common goals. These teams often stay together only to perform its episodic task. They may work jointly on a new project, but when the product is designed and goes into production, the project is finished and the virtual team dissolves.

Lipnack and Stamps offer three key features for a successful virtual team. First is the choice of team members with the appropriate skills and knowledge for the task; second is the definition of a purpose to steer the group; and third is the effective linking of team members, including communication channels, interactions, and relationships.

Virtual team members are required to learn a new set of skills. One skill is the ability to interact effectively despite infrequent or total lack of face-to-face contact. Another is the ability to assimilate quickly and effectively into new teams. Virtual team members should be technically adept to deal with the variety of required computer-based technologies. Additionally, virtual team members may need intercultural skills and experience to work effectively in multi-national organizations.

VIRTUAL LEADERS

Greiner and Metes discuss the new leadership skills required to lead in the virtual environment, including the ability to manage a network of interdependent firms, to design virtual operations, to create and sustain virtual relationships with internal as well as external constituents, to support virtual teams, and to keep virtual teams focused. The leader of a virtual organization demands a new set of skills unlike the skills required in a traditional hierarchy.

VIRTUAL LEARNING

Another critical element to the success of the virtual organization is the ability of the organization to create world-class learning systems. These learning systems help leaders sustain or create world-class competencies. Effective learning systems can create pathways throughout the organization, in network fashion, enhancing the innovative capabilities of the organizational members. An organization's ability to sustain a leadership position in the world economy demands that organizations be on the cutting edge to develop rapid and elegant solutions to emerging consumer demands.

EXAMPLES OF VIRTUAL ORGANIZATIONS

An industry that is known for its use of partners and alliances is the entertainment industry, which has partnered with the computing, communications, consumer electronics, and publishing industries to convert movies, textbooks, and other software into digital formats.

Increasing numbers of firms are moving to these new organizational forms. Corning, the glass and ceramics maker, is one such firm known for making partnerships work to their advantage. Corning has partnered with such firms as Siemens, Germany's electronics conglomeration, and Vitro, Mexico's largest glassmaker. Alliances are so important to Corning's business strategy that the corporation has defined itself as a network of organizations. This gives the conglomerate the access to the machines

and labor force needed to make and quickly bring to market the newest technologies in glass and ceramics.

Computer organizations that have successfully implemented forms of this new structure include Apple Computer and Sun Microsystems. When Apple Computer linked its easy-to-use software with Sony's manufacturing skills in miniaturization, Apple was able to get its product to market quickly and gain a market share in the notebook segment of the PC industry.

Sun Microsystems has been considered another highly decentralized organization comprised of independently operating companies. Sun positions information systems as a top priority, trying to achieve faster and better communication. With numerous "SunTeams," members operate in shifts across time, space, and organizations to address critical business issues. Sun managers identify key customer issues and then form teams with the critical skills and knowledge needed to address issues. A team might include sales people, marketing personnel, finance, and operations from various places around the globe; customers and suppliers may become episodic members as necessary. Weekly meetings may take place via conference calls. Critical to the team's success is the selection of talent from the organization, defining a clear purpose for the team's efforts, and establishing communication links among the team members.

Sun has been working on further development of technologies such as EDI (Electronic Data Interchange) and RFID (Radio Frequency Identification technology). Both EDI and RFID will impact information exchange globally and across numerous industries. In fact, Wal-Mart, the world's largest retailer, has already started using RFID to keep track of both warehouse and on-shelf inventory. Analysts suggest the RFID system will take the place of the SKU system altogether at some point.

CHALLENGES

Virtual organizations can be very complex and problematic; they fail as often as they succeed. Among the many challenges of the virtual organization are strategic planning dilemmas, boundary blurring, a loss of control, and a need for updated managerial skills.

Strategic planning poses new challenges as virtual firms determine effective combinations of core competencies. Common vision among partners is essential to cooperating firms. Focused on a common goal, firms develop close interdependencies that may make it difficult to determine where one company ends and another begins. The possibility of boundaries being blurred demands that they be managed effectively. Coordinating mechanisms are critical elements for supporting these loose collections of firms.

Virtual structures can create a loss of control over some of the operations within the organization. This loss of control requires communication, coordination, and trust among the various partners, as well as a new set of managerial skills. Employees are exposed to increased ambiguity about organizational membership, job roles and responsibilities, career paths, and superior-subordinate relationships. This ambiguity requires management to rethink rewards, benefits, employee development, staffing, and other employee-related issues. Developing leaders who are able to create and sustain these organizational forms is critical.

Les Pang offers a list of best practices, based on a review of successful implementations of virtual organizations.

- Foster cooperation, trust and empowerment.

- Ensure each partner contributes an identifiable strength or asset.

- Ensure skills and competencies are complementary, not overlapping.

- Ensure partners are adaptable.

- Ensure contractual agreements are clear and specific on roles and deliverables.

- If possible, do not replace face-to-face interaction entirely.

- Provide training that is critical to team success.

- Recognize that it takes time to develop the team.

- Ensure that technology is compatible and reliable.

- Provide technical assistance that is competent and available.

FUTURE OF VIRTUAL ORGANIZATIONS

The business environment will no doubt require firms to become even more flexible, more agile, and to bring products and services to market at an increasing rapid pace. Traditional organization forms are no longer capable of sustaining the needs of this relentless pace in most sectors of the globalized economy. New forms of organizing, such as the virtual organization, hold promise as organizational leaders experiment and learn new strategies for managing in the twenty-first century and beyond. These new structures, however, will require managers and leaders to face exciting challenges as they move into an environment of increased uncertainty and volatility.

SEE ALSO *Lean Manufacturing and Just-in-Time Production; Organizational Structure; Teams and Teamwork; Trends in Organizational Change*

BIBLIOGRAPHY

Camarinha-Matos, L., H. Afsarmanesh, and M. Ollus, eds. *Virtual Organizations: Systems and Practices.* New York: Springer, 2005.

Davidow, W.H., and M.S. Malone. *The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century.* New York: Harper Collins Publishers, 1992.

Greiner, R., and G. Metes. *Going Virtual: Moving Your Organization into the 21st Century.* Upper Saddle River, New Jersey: Prentice Hall, Inc., 1995.

Hilty, L.M., E.K. Seifert, and R. Treibert, eds. *Information Systems for Sustainable Development.* Hershey, PA: Idea Group Publishing, 2005.

Kirkman, B.L., B. Rosen, P.E. Tesluk, and C.B. Gibson. "The Impact of Team Empowerment on Virtual Team Performance: The Moderating Role of Face-to-Face Interaction." *Academy of Management Journal* 47, no. 2 (April 2004): 175–192.

Klobas, Jane E., Paul D. Jackson. "Becoming Virtual: Knowledge Management and Transformation of the Distributed Organization." New York: Physica-Verlag Heidelberg, 2008.

Levary, R.R., and R. Mathieu. "Supply Chain's Emerging Trends." *Industrial Management* 46, no. 4 (July/August 2004): 22–27.

Lipnack, J., and J. Stamps. *Virtual Teams: Reaching Across Space, Time and Organizations with Technology.* New York: John Wiley and Sons, 1997.

Pang, Les. "Understanding Virtual Organizations." *Information Systems Control Journal* 6 (2001): 42–47.

Taylor, F.W. *The Principles of Scientific Management.* New York: Harper, 1911.

Vakola, M., and I.E. Wilson. "The Challenge of Virtual Organization: Critical Success Factors in Dealing with Constant Change." *Team Performance Management* 10, no. 5-6 (2004): 112–120.

Wailgum, Thomas. "Wal-Mart is Dead Serious About RFID." *CIO Enterprise Applications Newsletter* January, 2008. Available from: http://www.cio.com/article/173702/Wal_Mart_Is_Dead_Serious_About_RFID.

VISION STATEMENTS

SEE *Mission and Vision Statements*

W

WAREHOUSING AND WAREHOUSE MANAGEMENT

Warehousing is the storage of goods for profit. The physical location, the warehouse, is a storage facility that receives goods and products for the eventual distribution to consumers or other businesses. A warehouse is also called a distribution center. Warehouse management is the process of coordinating the incoming goods, the subsequent storage and tracking of the goods, and finally, the distribution of the goods to their proper destinations. Significant changes have taken place in this industry during the 1990s and 2000s as changing business conditions have forced warehousers into adapting new methods and dramatically improving their technologies.

HISTORY

Warehousing's roots go back to the creation of granaries to store food, which was historically available for purchase during times of famine. As European explorers began to create shipping–trade routes with other nations, warehouses grew in importance for the storage of products and commodities from afar. Ports were the major location for warehouses.

As railroads began to expand travel and transportation, the creation of rail depots for the storage of materials became necessary. In 1891 the American Warehousemen's Association was organized to challenge the railroad companies' control over freight depots. President Theodore Roosevelt significantly strengthened the Interstate Commerce Commission with passage of the Hepburn Act in

1906. Commercial warehousing began to grow after the government placed more restrictions on railroads.

World War II impacted warehousing in several ways, including the need to increase the size of warehouses and the need for more mechanized methods of storing and retrieving the products and materials. As mass production grew throughout manufacturing, the need for efficient and effective warehousing capabilities grew with it.

WAREHOUSE FUNCTIONS

Warehousing is a key component of the overall business supply chain. The supply chain consists of the facilities and distribution options for the procurement of materials from manufacturer to customer and all points in between. It includes the production of materials into components and finished products and then the distribution to customers.

Warehouse functions include:

- Storing goods to permit the management of product flow or to accommodate longer production runs
- Serving as a mixing point where products from different suppliers are mixed and then distributed to fulfill customer orders
- Serving as a sales branch and customer service location
- Serving as a source of supplies for production
- Serving as a staging area for final packaging or finishing

WAREHOUSE OPERATIONS

Warehouses operate in several ways. Public warehousing involves the client paying a standard fee for storing merchandise. Private warehousing is storage and operations

controlled completely by a single manufacturer. Leased warehousing is an option for more stable inventory. Contract warehousing clients pay fees regardless of whether they are using the space or not; this ensures the space is always available for them to use. According to *Overview of Warehousing in North America,* contract warehousing accounts for more than 60 percent of the U.S. commercial market.

A warehouse stands empty without some form of product. Delivery of goods and materials takes place either by truck, rail, or boat on a dock or loading area. The goods are received, processed, and then sent into the warehouse for storage.

The storage of goods has been the primary function for warehouses. Once the goods have been received from the manufacturer and/or shipper, they are compactly stored to maximize space within the facility. Products are placed on pallets, which allow for more consistent stacking and moving within the facility.

Contract and public warehouses receive goods and products from a multitude of manufacturers and shippers. A crucial aspect of warehouse management is inventory control. Inventory control is the ability to locate and track a given product within the warehouse to facilitate quick selection and loading for order fulfillment. It is also the process of maintaining sufficient amounts of product to meet customer demands, while at the same time balancing the expense of keeping product in storage. Perpetual, annual, physical, and cycle counting are all methods of keeping track of inventory.

Order picking is the process of selecting products to fulfill an order. There are several picking methods:

- Discrete or pick–by–order: Specific products are selected on a per order basis.

- Batch or pick–by–article: Multiples of a product are selected to fulfill multiple orders. The products are sorted in the staging area and combined with other products to fulfill the orders.

- Wave: Products are gathered based on specific routing or shipping criteria.

- Reverse–order: This is used when part of an order is held to be combined with another order.

Reverse–order picking is related to cross–docking, another function of warehouses. Cross–docking is a direct flow of goods from receiving to shipping, with little if any storage. Cross–docking is contingent on the timely delivery of products, accurate management on the loading dock, and effective ordering by the customer.

Warehousing is also involved in the packaging and labeling of a product as it moves through the facility. Proper packaging is necessary for effective storage and to guard against damage. Labeling, or tagging, is an important element of the packaging. Proper labeling improves the ability to identify, track, store, and select the correct product for order fulfillment.

Once the product has been selected, or picked, it is brought to a staging area for final processing and shipment. The loading dock is a hub of activity as products are arriving for storage and being staged for distribution. Effective management of this area is crucial for warehouse success. It is here that cross–docking takes place.

The final stage of warehousing is the transportation facet of delivering and shipping goods.

WAREHOUSE MANAGEMENT

In the past, warehouse management was very paper–intensive in its coordination of a multitude of activities. This has changed with the introduction of warehouse management system software.

Warehouse management systems (WMS) assist managers in tracking products throughout the entire storage and distribution process. These systems span from simple computer automation systems to high–end, feature–rich management programs that improve order picking, facilitate better dock logistics, and monitor inventory management.

TRENDS

Since the mid–1990s, warehousing and distribution operations have faced a wide variety of emerging business trends, including the rise of the Internet, a large number of mergers and acquisitions, and an increase in global trade. The warehouse industry found itself recovering from a recession at the start of the twenty–first century, partially brought on by the hype of the dot–com bubble and the excess production created after it burst. It also coped with new methods of distribution, such as just–in–time (JIT) production, where warehousing is unnecessary because products are shipped directly to customers. Additionally, the buying habits of everyone from manufacturers to consumers have dramatically changed, partly in response to improved communications technology and greater global competition. According to a 2004 *Warehousing Management* survey, competition in warehousing has become extremely tight because businesses seek warehouse firms with extremely thin margins. Companies are succeeding by remaining flexible and investing in the technological advances that are required to improve product tracking and increase efficiency.

Warehousing companies are now striving to become more than simply storage facilities. They are transforming themselves into third–party logistics providers or "3PLs" that provide a wide array of services and functions. In addition to packing and staging pallets, contemporary warehousing facilities offer light manufacturing, call centers,

labeling, and other non–storage options. An outcome of increased 3PL activity is a wave of mergers that are consolidating the industry. Customer demands for one–stop shopping and new technologies are a driving force behind this consolidation. A further development is the rise of fourth–party logistics providers (4PLs), who are essentially asset-less companies that use computer resources to supply 3PL services.

Other trends in warehousing include radio frequency identification (RFID) tags, transportation management systems, pick–to–light technology, and voice–activated receiving and packaging. Voice–activated receiving and packaging allows for warehouse personnel to speak requests into the WMS, thus speeding the entire process. Transportation management systems provide an advanced level of detail on goods prior to their arrival and also provide a more specific time of delivery. RFID has dramatically improved the ability to effectively manage inventory and track the location of specific goods within the warehouse. Pick–to–light technology improves order picking along warehouse conveyor belts by monitoring and identifying products for specific shipments. Continuous improvements are being made in these technologies. For example, in 2007 a Danish company introduced a passive RFID with privacy features that include encryption, a built–in firewall, and a silent mode. Also in 2007, Hitachi introduced an RFID device thin enough to be embedded in a sheet of paper.

Warehousing is a mature industry seeking methods to maximize profits and striving to add services to compete for customers. The warehousing industry is a key component of the supply chain and will likely remain so as long as there are manufacturers and consumers.

SEE ALSO *Lean Manufacturing and Just–In–Time Production; Location Strategy; Logistics and Transportation; Supply Chain Management*

BIBLIOGRAPHY

Ackerman, K.B. *Practical Handbook of Warehousing.* 4th ed. New York: Van Nostrand Reinhold, 1997.

Albright, B. "Recession Impacts Supply Chain Markets: WMS Growth Slows; Transportation and Events Software Picks Up Speed." *Frontline Solutions* 3, no. 6 (2002): 10–12.

Bolten, E.F. *Managing Time and Space in the Modern Warehouse.* New York: American Management Association, 1997.

Emmet, Stuart. *Excellence in Warehouse Management: How to Minimise Costs and Maximise Value.* Hoboken, NJ: John Wiley & Sons, 2005.

Forger, G. "Leading Trends in Manufacturing, Warehousing & Distribution." *Modern Materials Handling* 59, no. 13 (2004): 38.

Friedman, D. "How to Select the Best Warehouse Management System." *Material Handling Management* 60, no. 1 (January 2005): 28–29.

Harrington, L.H. "How to Solve the Warehousing Puzzle." *Logistics Today* 44, no. 9 (2003): 32–38.

Hertz, Susanne and Monica Alfredsson. "Strategic development of third party logistics providers". *Industrial Marketing Management*, 32, no. 2 (2003): 139–149.

Johnson, J.R. "Warehousing's Crystal Ball." *Warehousing Management* 9, no. 6 (2002): 24–28.

"An Overview of Warehousing in North America–Market Size, Major 3PLs, Benchmarking Prices and Practices." *North America Warehousing Market Report 2004.* Stoughton, WI: Armstrong & Associates, Inc., 2004.

Rushton, Alan, Phil Croucher, and Peter Baker. *The Handbook of Logistics and Distribution Management.* 3rd ed. London: Kogan Page Limited, 2006.

Singer, T. "Trends in Warehousing and Distribution." *Industrial Maintenance & Plant Operation* 65, no. 11 (2004): 12–18.

WEB 2.0

The term *Web 2.0* refers to new social applications and methods of communication implemented over the Internet. Most of the technology and structure behind Web 2.0 has been used since the first days of the web (the end of the twentieth century). The concepts of Web 2.0, however, are new, and they refer to the social or commercial advancement of all web users. The combination of multiple Web sites into one, the creation of online communities and social networks, the spread of web services, the increased communication over wikis and online organizations—these are the faces of Web 2.0, representing the integration of social exchange with Internet capabilities.

The Web 2.0 language and concept was popularized by Tim O'Reilly as a definition for the ways in which the Internet was being used by business and society and a forecast of future advances in e-commerce and social networking. In the first years of the Internet, people used its services as individuals or corporations, taking care of personal needs in two-way communication channels. Now, with the newer online applications, the world wide web can embrace Web 2.0 philosophies of social interaction, group participation, and highly complex channels of trade and innovation. O'Reilly calls Google the "standard bearer" for Web 2.0, with its concentration on services and continuous improvement to meet user needs.

WEB 2.0 FOR BUSINESS

Although the basic technology remains unchanged from previous online systems, business benefits from Web 2.0 are seen as manifold. Web 2.0 platforms are meant to encourage ideas, increase efficiency, help teams reach their goals more easily, and improve collaboration throughout the company. Other terms have sprung from Web 2.0, including "Marketing 2.0," "PR 2.0," "Jobs 2.0," and "Identity 2.0," all attempting to create a more flexible, intuitive, people-friendly way of reaching goals. Companies are beginning to depend on "2.0" concepts to receive

input from consumers concerning taste, demand, and needed services, a bottom-up approach that characterizes the newer web platforms and is commonly referred to as "Enterprise 2.0". Other companies may wish to use Web 2.0 ideas to combine departmental tools into corporation-wide events that are accessible by all employees.

Specific types of Web 2.0 advancements include:

- LinkedIn: This social networking site is made for business networking and resume-spreading. It is the largest business-focused social network, and one of the few Web 2.0 applications to prove profitable for its owners.

- Facebook: Though it started as a college network, it has expanded to become a vast social system of sharing information and ideas among added online "friends."

- Twitter: Like instant messaging (IM), Twitter shares instant communication between members, but it is designed to make running comments, such as while viewing a specific movie or sitting in the same meeting.

- Dopplr: This keeps track of employees on business trips and updates peers as to their current location.

Modern advances in Internet speed allow Web 2.0 services to operate quickly enough to be useful for business, unlike earlier stages of the Internet when the same interactions were possible but hampered by bandwidth limits. Now, the more users that social networks and collaborative web functions have, the more efficiently they tend to function. Suggestions and influence created by group participation tend to have positive effects in today's online world, as themes emerge and are built upon by social interaction. Indeed, one of the emerging capabilities Web 2.0 presents is open API, or application program interface, which allows anyone to participate in maintaining social network sites such as Facebook, MySpace, and Google platforms.

POTENTIAL PITFALLS 2.0
Web 2.0 applications, however, require more upkeep than older Internet functions. Social networks and larger online Web sites require highly competent data management. Companies must also have plans for steady improvement and constant innovation to meet consumer demands in a fast-changing environment. Web 2.0 security issues can also be an issue in some businesses protective of their information.

BIBLIOGRAPHY
Bicknell, David. "Make Web 2.0 Deliver Business Benefits." *Computer Weekly.com.* Reed Business Information Ltd, 2008.
Kirkpatrick, David. "Web 2.0 Gets Down to Business." *CNNMoney.com,* 2008. Available from: http://money.cnn.com/2008/03/19/technology/web2.0_goofing.fortune/index.htm.

O'Reilly, Tim. "What is Web 2.0?" *O'Reilly.* O'Reilly Media Inc, 2008.
"Web 2.0: Beyond the Buzz Words." *Computer Weekly.com* Reed Business Information Ltd, 2007.

WHISTLEBLOWER
Employees who report wrongdoing they have discovered at work are known as *whistleblowers*. Wrongdoing may refer to illegal actions taken by the company or its employees, such as immoral choices regarding customers and unethical practices used by the corporate board. Thanks to several major corporate scandals in the early 2000s, policies and practices regarding whistleblowers have become a popular topic. Whistleblowers have exposed a wide variety of issues, including environmental actions (such as toxic waste dumping), illegal benefit packages for executives, unethical hiring or lay-off procedures, violation of workplace safety laws, and unfair employee reimbursement.

In earlier years of American companies, such as the 1960s, corporations rarely encountered whistleblowers; then, more focus was placed on company loyalty and more freedom granted in layoffs. The rise of lawsuits against companies for dangerous business practices in the 1970s and 1980s led to a business society more tolerant of whistleblowing activity, and such legislation as the 1989 Whistleblower Protection Act and the Sarbanes-Oxley Act made corporate whistleblowing an even easier and more common practice.

Famous whistleblowers include Cynthia Cooper, Sherron Watkins, and Peter Rost. Cynthia Cooper spearheaded an internal audit of the company WorldCom, continuing even when she was asked to postpone the investigation; Cooper discovered fraud dealing with billions of dollars. Sherron Watkins is considered one of the primary whistleblowers in the Enron scandal, from her actions in notifying Enron's C.E.O. Kenneth Lay concerning fraudulent activity to her testimony before U.S. Congress. Peter Rost, known for his book *The Whistleblower*, also gave testimony concerning fraudulent activity he had witnessed at the pharmaceutical giant Pfizer and other pharmaceutical companies.

WHISTLEBLOWING FOR EMPLOYEES
Whistleblowing is a very serious choice for employees to make, and it may come with a very high cost, especially if they do not have thorough proof of wrongdoing or are not willing to take all the necessary measures in reporting illegal behavior. There are several very important facets to consider:

- The whistleblower must be sure what the consequences of whistleblowing will be. How much damage has been done to the environment, investors,

or others should be ascertained, along with how these groups will benefit from whistleblowing. Sometimes, there is no clear benefit to reporting an illegal activity. Whistleblowers should also be sure that the illegal activity merits a full declamation to authorities, or a recourse to ethical standards set within the corporations.

- Whistleblowers should keep in mind the time involved in the illegal activity. Has it been going on for a long time? Will the harmful effects of the wrongdoing be immediately apparent? Can people be saved from unethical practices if immediate action is taken by the whistleblower?

- The whistleblower should be very careful when considering physical and emotional closeness to the wrongdoing. Is the whistleblower near to the source of wrongdoing in their function within the company? Does he or she have an emotional connection to the issue that may cloud judgment?

WHISTLEBLOWING FOR EMPLOYERS

Companies are becoming increasingly concerned about inappropriate whistleblowing by disgruntled employees seeking to make a profit at their corporation's expense. Certain parts of recent legislation, such as the Sarbanes-Oxley Act, grant protection to employees who voluntarily report wrongdoing, and it penalizes companies being investigated for illegal practices. These new penalties have made many corporations wary of trusting their employees to perform legitimate whistleblowing actions. Fortunately, a company with a well-constructed ethical system can deal with whistleblowers appropriately. Professor Ariane David, with the *Graziadio Business Report*, gives several steps for companies to take when planning for whistleblowing:

- Companies should know what they really want. Many corporations can proclaim acceptance and encouragement of whistleblowing activity while managing ingrained company attitudes and systems that in fact block whistleblowers. When companies agree to encourage whistleblowing and fair standards, they should be sure that the proper communication channels are available for them to keep their word.

- Official policies should make it clear that unethical practices are not tolerated. This makes it more likely that employees, when confronted with wrongdoing, will take steps to solve the problem within the company rather than seeking outside authority. The company should have steps in place to thoroughly investigate and remedy any report of unethical behavior.

- Companies should walk their walk, and truly protect whistleblowers from any kind of retaliation. The way

in which companies carry out their ethical standard policies is just as important as creating the standards in the first place.

- Companies should reward whistleblowers who report illegal activity in a timely and responsible fashion.

- When whistleblowing occurs, companies should stick to their policy of response, following their own steps strictly. They should listen carefully to employees and respond immediately to the situation.

RETALIATION

One of the main issues that arises from whistleblowing is retaliation, or further unethical activity on the part of the company toward the whistleblower. Retaliation usually falls into four different categories: nullification, isolation, defamation, and expulsion. Nullification occurs when a manager attempts to block the whistleblower's report through intimidation or control of communication channels. Isolation is the act of removing any information or resources from the employee that may lead to proof of illegal activity. A company may also try to publicly degrade the whistleblower's character, sanity, or reputation, a process known as defamation. Other companies may attempt to push the employee out of the organization, through either reassignment or termination, an activity called expulsion.

Current laws regarding retaliation are complex, but give guilty companies very heavy penalties. Usually, a company inspected for illegal retaliation is forced to pay for the inspection, the legal costs for the employee, and any settlement that may be given as a result of the ruling.

BIBLIOGRAPHY
David, Ariane. "Whistleblowers." *Graziadio Business Report.* Pepperdine University, 2008. Available from: http://gbr.pepperdine.edu/054/whistleblower.html.

England, Liz. *Business Ethics.* U.S. Department of State, Bureau of Education and Cultural Affairs, 2008.

Katz, David M. and Julia Homer. "Worldcom Whistleblower Cynthia Cooper." *CFO Magazine.* February 2008.

Ravishankar, Lilanthi. "Encouraging Internal Whistleblowing in Organizations." *Santa Clara University.* Markkula Center for Applied Ethics, 2008.

Somerville, Leigh. "Wayward Whistle-Blowers." *The Business Journal.* American City Business Journals, 2003.

WIMAX

Worldwide Interoperability for Microwave Access, or WiMax, is a new technology created in 2001 as a label for the wireless broadband standard IEEE 802.16. WiMax allows for cheaper wireless Internet access at a greatly increased distance. The current applications of Wi-Fi (a form of wireless network) need many hubs to operate within

a business or campus setting, transferring data at no more than a hundred feet and often less. WiMax, on the other hand, promises to transmit data at only slightly slower speeds over distances of miles, possibly tens of miles in the future. This technology can be used with either fixed or mobile protocols; the fixed WiMax supports only point-to-point Internet access, while mobile WiMax supports access from mobile handheld devices. The technology is seen as a "last mile" connector, or the step where Internet service providers connect their clients to the Web. This last mile is often the most expensive for providers, who need to set up multiple wireless hubs or run broadband cables branching from house to house. It is in this step that WiMax saves both time and cost.

NOT QUITE READY FOR PRIMETIME

WiMax has been marketed as the next revolutionary technology in Internet access, and it is expected to be developed and sold by many providers by 2009, but there are steps left to complete before the WiMax market is fully running. The demand for the new technology is currently low, and many people prefer their Wi-Fi connections, already well established. It remains to be seen if—when the longer-reaching service is established—customers will be willing to switch. Products such as laptops and smart-phones will need to begin including WiMax technology within their applications for the market to become established, and currently there is little incentive for producers to do so. Although future providers hope to cover entire cities with a few well-placed hubs, there is simply no WiMax structure yet in place.

Several companies, however, have invested heavily in the wireless technology. In 2007, Sprint and Clearwire formally declared their intent to provide WiMax throughout America, but the agreement dissolved when Sprint's investors forced the CEO to resign and the WiMax initiative was deemed in need of further analysis. In May of 2008, however, Sprint and Clearwire resolved their problems and went forward in the creation of a combined WiMax company. Other companies will also play a large part in the spread of WiMax, including cable companies Time Warner and Comcast, hardware maker Intel, and Google.

However, current tests of WiMax technology have not been fully promising. The 2009 deadline will probably not be met because it takes years to set up a complete WiMax system, and even then there are significant problems. Some reports have WiMax broadcasts reaching only a mile or two, with the transmission quality fading as users progressed further indoors and into offices to use the connection. In some cases there is also a lag in data transference, a delay that may make many Internet services difficult to use, especially audio components like voice over internet protocol (VoIP).

BIBLIOGRAPHY

Dix, John. "WiMax Gains Full Head of Steam." *NetworkWorld*, 2008. Available from: http://www.networkworld.com/columnists/2006/101606edit.html?zb&rc=wireless_wimax.

Gardiner, Bryan. "Australian Company Calls WiMax a Disaster." *Wired*. Wired Blog Center, 2008.

Reed, Brad. "Will WiMax Impact Your Business This Year?" *InfoWorld*, 2008. Available from: http://www.infoworld.com/article/08/06/24/Will_WiMax_impact_your_business_this_year_1.html.

Worthen, Ben. "WiMax: If You Build It, Will Businesses Come?" *Wall Street Journal*, 2008. Available from: http://blogs.wsj.com/biztech/2008/05/07/wimax-if-you-build-it-will-businesses-come/.

WOMEN AND MINORITIES IN MANAGEMENT

The role of women and minorities in the American workplace has developed radically over the past century, especially with regard to roles and contributions. These developments have enriched organizations of all types and sizes and allowed free enterprise to move in a more positive, profitable, and productive direction.

For thousands of years, women have served their families by taking charge of the activities that create a home. As times changed and economic opportunities moved from farms to factories, the roles of women evolved. Instead of staying home working for the family, women began looking for jobs outside the home. While many women took up work as teachers and nurses, others worked in factories or low-paying clerical and labor jobs. The industrial revolution forever changed the way the American economy operated, and with that change, more and more women chose to work and supplement family income.

Additionally, the demographic mix within the twenty-first century workplace has become much more diverse because many workers now entering the workforce are neither white, male, nor English-speaking. People of color continue to increase their share of the labor force. The rates of growth for these groups are projected to be faster than the rate for whites.

WOMEN AND MINORITIES IN THE LABOR-FORCE

In 1950 only about one in three women were members of the workforce. By 1998, approximately three out of every five women of working age were working outside of the home. By 2003, close to 60 percent of all women aged sixteen and older were in the labor-force. The U.S. Department of Labor projects this figure will continue to increase

at a slower rate and is projected to reach nearly 63 percent by the year 2015.

At the beginning of the twentieth century, women made up less than 20 percent of the United States workforce. By 1950, this percentage increased to 33.9 percent. By the year 2000, women comprised more than 46 percent of civilian workers. Therefore, within roughly the past fifty years, the number of women in the American workforce has multiplied by more than 240 percent. As of February 2005, there were almost 67 million civilian women employed. The U.S. Department of Labor estimates that women over the age of twenty participated in full- or part-time work at a rate of 62 percent in 2004. Furthermore, the increase of women participating in the workforce will cover many racial groups, with women of color enjoying the fastest growth rate.

Interestingly, however, the rate of growth of women in the labor-force has slowed somewhat during the last decade of the twentieth century. One cultural shift that appears to be contributing to this curiosity is the renewed emphasis on having a family; regardless of marital status or sexual preference, the desire to start a family is on the rise for almost every demographic. At one time men were expected to be the primary wage earners of the family, while women were expected to make the home. Renewed societal emphasis on these traditional roles for men and women during the 1990s arguably placed greater pressure on men and women. Some researchers attribute the slower growth rate to factors such as increased educational attainment by married women, the recession of the early 1990s, a rising birthrate, and a slowdown in women's return to work after giving birth. These conditions have not led to lower employment rates for women as compared to men, and with the advent of the Internet, telecommuting, and remote home offices, more women work today than ever before—while also caring for their families.

Minorities. Minority labor-force, including women, is expected to continue to increase especially for Latino-dominant non-whites. Latinos are predicted to be the second largest group in 2025, accounting for 17 percent of the total workforce. Furthermore, as of 2000, Latinos have a larger share of the market than African Americans, 13 percent versus 12.7 percent. The share of African Americans in the workforce is expected to increase by only 1.8 percent during the same time period. Asians and other minorities would account for 8 percent of the labor-force in 2025. Latinos and Asians, therefore, will continue to be the two fastest-growing groups.

UNEMPLOYMENT

Historically, women have endured higher rates of unemployment than men; however, this trend appears to be changing. Through the first quarter of 2005, the seasonally adjusted unemployment rate for women ages twenty and over was 3.9 percent, while the average rate for men in the same age range was 4.1 percent. The unemployment rate for African American women was higher, averaging 9.1 percent for the first quarter of 2005, while African American men were unemployed at a rate of 10.9 percent. By 2007 the unemployment rate for women in the United States was 4.5 percent compared to a 4.7 percent unemployment rate for men of the same age range. Asian women had the lowest unemployment rate in 2007 at 3.4 percent.

OCCUPATIONS

The biggest percentage of women employed in the United States are working in technical, sales, and administrative support occupations. However, one of the most significant changes that took place in the twentieth century was the rise of women managers. In 1900, only 4.4 percent of managers were women. By 2000, 46 percent of all managers were women, a ten-fold increase. By 2002, 34 percent of working women were in a managerial or processional occupation. However, both women professionals and women managers are clustered in certain specialty areas. In 2002, nearly 50 percent of women workers were employed in three occupational groups—sales, services, and administrative support. As example, only 11 percent of engineers were women, but 98 percent of preschool and kindergarten teachers were women. Furthermore, only 19 percent of dentists were women, whereas 93 percent of registered nurses were women. Conversely, in 2006, studies show that more women than men are now attending medical and veterinary school as well as masters programs, and more women than men demonstrated sound understanding of investment. Only in underdeveloped countries is education not a priority for the female population; it can therefore be stated that a sign of social and economic growth of a nation is the educational bar it sets for its women.

WOMEN ENTREPRENEURS

Businesses owned by women are increasing in terms of quantity, diversity, and impact on the American economy and by 2006 women in ownership, management, and the rest of the labor-force had a greater impact on global GDP than the influence of China, India, or technology. In 2003, over 38 percent of self-employed persons were women and almost 6 percent of employed women were self-employed. Furthermore, women-owned businesses employ over 19 million people in the United States or one in every seven employed persons nationwide according to figures published by the Center for Women's Business Research. As of 2004 there were 10.6 million women-owned businesses

in the United States. Job growth provided by women-owned businesses has exceeded the national averages in almost every major industry. Between 1997 and 2004 the number of businesses owned by women increased by 24 percent compared to 12 percent for all firms. The global GDP is impacted more heavily among the industries that have experienced the most dramatic growth in women-owned businesses are construction, manufacturing, wholesale trade, transportation, and communications. This growth in businesses owned by women has exploded since the 1960s and continues to move on an upward trend as more and more women of working age continue to seek work as managers and business owners rather than laborers and members of the service industry.

Many of the businesses owned by women are home-based. By 2002, 66 percent of all home-based businesses were owned by women. These enterprises are changing the face of business because they enable many women to balance work and family commitments at home while fulfilling professional objectives.

WOMEN AND MINORITIES ON CORPORATE BOARDS

The combination of increased cultural and governmental pressure for corporations to add women to their boards has resulted in an increase of women seated on corporate boards. As of 2003, 89 percent of the corporate boards in the *Fortune* 500 had at least one female director. Nonetheless, women still only accounted for 13.6 percent of all corporate board members in 2003. Further, the same women often held several of these seats on different corporate boards. According to the U.S. Department of Labor, by 2007, 51 percent of management and professional jobs in the United States with the highest pay were occupied by women.

Although minorities have been entering the workforce in record numbers, reaching the top of the corporate ladder has been an uphill battle with much progress still ahead. A 2005 examination of the *Fortune* 1000 companies reveals that one in twelve organizations has at least one African American on their Board of Directors—a staggering leap from even a decade ago. Still, other minorities are underrepresented and a long road lies ahead for those who wish to see color, class, race, gender, religion, and sexual preference be hiring and firing determinants of the past.

LAWS AFFECTING EMPLOYMENT OF WOMEN AND MINORITIES

The Equal Pay Act of 1963 was enacted as an amendment to the Fair Labor Standards Act. The Equal Pay Act forbids employers from paying employees different wages or salaries based on sex. The act mandates that employers may not pay men and women different wages if their jobs require equal skills, effort, and responsibilities and occur in the same work environment. If men and women in the same jobs do receive different pay, their pay must be equalized by raising the lower pay rather than lowering the higher pay. The Equal Pay act specifies four instances in which differences in pay are permitted: (1) under a seniority system; (2) under a merit system; (3) under a system that measures earnings by quantity or quality of production; or (4) under a differential system based on any other factor besides sex.

The act is administered by the Equal Employment Opportunity Commission (EEOC). To ensure enforcement, employers are required to keep records documenting employee hours, pay rates, job descriptions, and other relevant information. If employers violate the act, they may be required to pay back wages and possible punitive damages.

Title VII of the Civil Rights Act of 1964. Title VII of the Civil Rights Act of 1964 prohibits discrimination in hiring, firing, promotion, assignment, and other treatment of persons in the workplace based on race, color, national origin, religion, or sex. Title VII applies to both public and private employers, employment agencies, and labor unions with fifteen or more employees or members. As with the Equal Pay Act, the EEOC administers enforcement of Title VII (Civil Rights Act of 1964).

In addressing claims, the courts have held that sex discrimination under Title VII refers to discrimination based on gender and not related to sexual orientation. In addition, while Title VII does not ban discrimination based on marital status, there are many state laws that forbid such discrimination.

Sexual Harassment. Subjecting women to sexual harassment in the work place is considered a form of sex discrimination under Title VII. Generally, there are two primary forms of sexual harassment: quid pro quo, and hostile environment. Under the quid pro quo-type of sexual harassment, a victim is either promised a reward (i.e., pay raise, promotion, etc.) in exchange for sexual favors, or threatened with punishment for not complying with sexual requests. These requests can be expressed or implied.

Under the hostile environment theory, the employer is charged with creating conditions, or allowing others in the work place to create conditions, that make the work environment extremely unpleasant or hostile for the victimized employee(s). The types of activities that may contribute to a hostile work environment include: displaying sexually suggestive pictures; using offensive or sexually suggestive language; discussing sexual activities; talking about a person's physical characteristics; inappropriate touching, etc.

Employers have a legal obligation to prevent either type of sexual harassment from occurring in the work

place. Businesses usually establish detailed policies to try to prevent sexual harassment situations from arising in the work place.

Pregnancy Discrimination Act. Title VII of the Civil Rights Act was amended in 1978 by the Pregnancy Discrimination Act, which bans discrimination against women in employment because of pregnancy, childbirth, and related medical conditions. This act provides that women covered by the law "shall be treated the same for all employment-related purposes, including receipt of benefits under fringe benefit programs."

Executive Order 11246. President Lyndon B. Johnson issued Executive Order 11246 in 1965. This order mandates that companies who do business ($10,000 or more annually) with the federal government must take affirmative actions to increase the representation of women and minorities in their employment ranks. If a company in question does more than $50,000 of annual business with the federal government, its affirmative action plan must be in writing.

Family and Medical Leave Act of 1993. Enforced by the U.S. Department of Labor, the Family and Medical Leave Act applies to private employers with fifty or more employees and to all governmental employers, and requires employers to provide up to twelve weeks of unpaid leave to employees who have undergone childbirth; adoption; personal illness or injury; or illness or injury of a child, parent or spouse. During the leave period, the employee's health benefits must remain intact. Once the employee returns from the unpaid leave, the employee is entitled to return to the same or a comparable position.

CONCERNS OF WOMEN AND MINORITY WORKERS

Despite the progress women made during the twentieth century, differences remain in the average pay of men and women. Although between 1979 and 2003 the earnings gap between women and men narrowed significantly, according to the Bureau of Labor Statistics, women still earned 79 cents to every dollar earned by men in 2003.

Maternity, Pregnancy, Childbirth, and Childcare. According to the U.S. Department of Labor, 99 out of every 100 women will work for pay in the United States at some point in their lives. Further, the number of families in which a woman is the head of the household and no male spouse is present is continuing to rise. In 2003, women were the primary breadwinners in over 22 percent of all families in the United States, and 72 percent of these female heads of households were employed. Furthermore, the proportion of married-couple families in which only the wife worked rose

to 6.8 percent in 2003. With so many women in the workforce—both single mothers and married women—many of these women were concerned with balancing work with pregnancy and childcare issues.

Despite the increasing need for childcare as more mothers work outside the home, very few companies have policies for dealing with working parents who need outside childcare. Although some women quit their jobs or delay advancement at work to pursue motherhood, other women may postpone parenthood in pursuit of the executive suite. A 2001 nationwide survey of high-earning career women found that 67 percent of them were mothers at ages forty to fifty-five. Another survey of 187 of *Fortune* Magazine's Most Powerful Women in Business found that 72 percent were mothers. In fact, as of 2003 nearly three-quarters of all mothers were in the laborforce, including more than 60 percent of women with children under the age of three. Therefore, working women continue to balance work and family more and more successfully as the paradigm shifts. Historically, women have been forced to take lower-paying jobs, and it is often the case that the structures, habits, values, and atmospheres of work become organized around the availability of women whose top priority is their children.

In addition to the challenge of finding childcare, some working women are forced to face the issue of pregnancy discrimination. Despite the fact that the courts have banned pregnancy discrimination as a form of sex discrimination under Title VII of the Civil Rights Act, working women are still dealing with the problem. In 2004 4,512 women who claimed that they were discriminated against as a result of pregnancy filed charges with the EEOC. Of the claims that were found given merit, employers were forced to pay over $11 million in damages (not including litigation).

Alternative Work Schedules. The increasing number of women in the work place has generated a demand for alternative work schedules. Because women operate as the field managers of their households and also maintain a profession, sometimes they require greater flexibility in their work schedules than their male counterparts who work a "nine to five" without having to juggle other activities. Alternative work schedules offer the dual benefit of providing heads of household with flexible schedules to meet familial obligations while enabling employers to benefit from the work these types of employees offer. Generally, alternative work schedules can take several forms: (1) flexible work schedules, (2) compressed work schedules, and (3) job-sharing. Each of these types of work arrangements represents a departure from the traditional fixed schedule of eight hours per day, five days per week, beginning and ending at the same time each day.

Flexible work schedules allow an employee to determine his or her own schedule within specified parameters. Employers may allow employees to vary their start and stop time daily or to adhere to a predetermined fixed start and stop time. Under a system of compressed work schedules, full-time employees may still work 40-hour weeks; however, they may work four 10-hour days and take one day a week off. Another arrangement may exist when an employee works four 9-hour days and one 4-hour day or any other variation that is agreed upon between the employer and employee.

Job sharing is where two employees share the same job; these two employees may alternate days, or one may work mornings and the other works afternoons. Employers are under no obligation to offer alternative work schedules; however, many employers are recognizing that it is in their interest to offer some such arrangement in order to avoid alienating a valuable segment of the workforce. Alternative work schedules allow employers to attract employees who can make significant contributions to the company while fulfilling their family or other kinds of commitments at the same time.

In 2003, 25 percent of all female salary workers worked fewer than 35 hours per week. In contrast, only 11 percent of employed men worked part time.

Sexual Harassment at Work. Despite legislative and judicial efforts to minimize incidences of sexual harassment at work, it is still a significant problem for women in the work place. In 2004 a total of 13,136 claims of sexual harassment were filed with EEOC and with the state and local Fair Employment Practices agencies around the country that have a work-sharing agreement with the Commission. Of these complaints, women filed 84.9 percent of them. The damages awarded based on many of these claims (not including awards from litigation), totaled approximately $37.1 million.

Employers have clear incentives to prevent sexual harassment from occurring in the work place; the courts have determined that sexual harassment is a form of sex discrimination under Title VII of the Civil Rights Act of 1964. Employers found guilty of sexual harassment or allowing it to occur can be forced to pay substantial damages. Beyond the legal and monetary penalties, companies can suffer because sexual harassment can lead to lower productivity, absenteeism, employee turnover, poor morale, and devastating publicity for the company.

WOMEN AND MINORITIES IN MANAGEMENT

The growing number of women in the labor-force over time has meant more women in management positions—in 2007, 39 percent of employed women worked as managers, professionals, or in related fields where expertise and higher education are required. As of 2007, more women than men are financial and human resource managers, as well as budget analysts, auditors, accountants.

In the executive suite, women made up 8.7 percent of corporate officers in 1995 and 15.7 percent of corporate officers *Fortune* 500 in 2002—a radical increase over only seven years. In 2005, women made up 16.4 percent of corporate officers, proving that the numbers are on the upward swing. Women are CEOs, chairpersons, and presidents of some of the most powerful and important corporations today, including Xerox, eBay, Ogilvy & Mather, PepsiCo, Kraft Foods, TJX, Rite Aid, and Reynolds American.

In a similar fashion, many minorities have topped out at entry or mid-level management positions. In 2003, African Americans held less than 1 percent of the senior-level corporate positions in America's 1000 largest companies despite equal opportunity and affirmative action programs.

The Glass Ceiling. While the numbers of women rising to the management level now surpass the number of men, many women who do rise above middle management may find it difficult to secure a position at the top of the organizational structure. Many observers describe this as a "glass ceiling" acting as a barrier between women and the top-level positions they are striving for.

For years minorities have faced these same invisible, subtle, yet very real institutional barriers to promotions into higher level executive positions. The belief that minority groups reach organizational plateaus consisting of artificial barriers that derail them from senior management opportunities has been alternately termed "the brick wall." These barriers found in the structure of many organizations have often stymied the advancement of some minority employee groups.

Many women may confront "glass elevators" rather than "glass ceilings" as a function of being in an industry or work environment that does not foster the upward movement of women. While the existence of such barriers has been acknowledged for decades, successfully combating them is a process, and it will take a long term commitment from men and women alike. Eradicating gender barriers makes excellent business sense. Treating women unfairly in the workplace or not allowing them to advance based on their merits may lead to disillusionment and higher turnover among very capable women—and cheat companies out of some of its best human resources. Also, if irrelevant factors are used to exclude women from the top management positions, all employees may begin to assume that similar extraneous factors would affect their future progress in an organization.

Now that there are more women in management positions than men, the odds increase that women will have more opportunities at all levels of business. Nonetheless, U.S. corporations and those who act as the stewards of the status quo in American spheres of commerce still have a tremendous distance to travel before women can say that they enjoy equal opportunity in the workplace.

SEE ALSO *Diversity; Entrepreneurship; Mentoring; Sensitivity Training*

BIBLIOGRAPHY
Arfken, D.E., S.L. Bellar, and M.M. Helms. "The Ultimate Glass Ceiling Revisited: The Presence of Women on Corporate Boards." *Journal of Business Ethics* 50, no. 2 (2004): 177–186.

"Breaking Through the Glass Ceiling: Women in Management." Available from: http://www.ilo.org/public/english/dialogue/sector/techmeet/tmwm97/tmwm-com.htm.

"Capturing the Impact: Women-Owned Businesses in the United States." Available from: http://www.nfwbo.org.

"Catalyst Census of Women Board of Directors of Canada." Available from: http://www.catalystwomen.org/bookstore/files/fact/WBD03factsheetfinal.pdf.

"Changes in Women's Labor Force Participation in the 20th Century." Available from: http://www.bls.gov/pub/ted/2000/feb/wk3/art03.htm.

"Counting Minorities." Available from: http://www.bls.gov/opub/rtaw/chapter1.htm.

Dreher, G. F. "Breaking the Glass Ceiling: The Effects of Sex Ratios and Work-Life Programs on Female Leadership at the Top." *Human Relations* 56, no. 5 (2003): 541–562.

"Employment Characteristics of Families Summary." Available from: http://www.bls.gov/news.release/famee.nr0.htm.

"Facts on Working Women." Available from: http://permanent.access.gpo.gov/lps5585/millennium52000.htm.

Fullerton, H.N., Jr., and M. Toosi. "Labor Force Participation: 75 Years of Change, 1950–98 and 1998–2025." *Monthly Labor Review* 122, no. 12 (2001): 3–12.

Gettings, John, David Johnson, Borgna Brunner and Chris Frantz. "Wonder Women." Available from: http://www.infoplease.com/spot/womenceo1.html.

Goodman, J.S., D.L. Fields, and T.C. Blum "Cracks in the Glass Ceiling: In What Kinds of Organizations Do Women Make It to the Top?" *Group & Organization Management* 28, no. 4 (2003): 475–502.

Hewlett, S.A. *Creating a Life: Professional Women and the Quest for Children.* New York, NY: Miramax Books, 2002.

"Highlights of Women's Earnings in 2003." Available from: http://www.bls.gov/cps/cpswom2003.pdf.

Hultin, M. "Some Take the Glass Escalator, Some Hit the Glass Ceiling: Career Consequence of Occupational Sex Segregation." *Work and Occupations* 30, no. 1 (2003): 30–62.

Ivey, Susan. "Fortune 500 Women CEOs." Available from: http://money.cnn.com/galleries/2008/fortune/0804/gallery.500_women_ceos.fortune/10.html.

Jalilvand, M. "Married Women, Work, and Values." *Monthly Labor Review* 123, no. 8 (2000): 26–31.

Mitra, A. "Breaking the Glass Ceiling: African American Women in Management Positions." *Equal Opportunities International* 22, no. 2 (2003): 67–80.

Nutley, S., and J. Mudd. "Has the Glass Cliff Replaced the Glass Ceiling for Women Employed in the Public Sector?" *Public Money & Management* 25, no. 1 (2005): 3–4.

"Pregnancy." Available from: http://www.eeoc.gov/types/pregnancy.html.

"Self-Employed Women: 1976–2003." Available from: http://www.bls.gov/opub/ted/2004/apr/wk4/art04.htm.

"Sexual Harassment." Available from: http://www.eeoc.gov/types/sexual_harassment.html.

Tatum, B.D. *Why Are All the Black Kids Sitting Together in the Cafeteria?* New York, NY: Basic Books, 2003.

Tischler, L. "Where Are the Women? So What Happened?" *Fast Company* 79 (2004): 52–61.

"U.S. Department of Labor, Women's Bureau Quick Stats 2007." Available from: http://www.dol.gov/wb/stats/main.htm.

"Women in the Labor Force: A Databook." Available from: http://www.bls.gov/cps/wlf-databook.htm.

"Women at Work: A Visual Essay." Available from: http://www.bls.gov/opub/mlr/2003/10/ressum3.pdf.

"Women in the Workforce: The Importance of Sex." *Economist.* Available from: http://www.economist.com/opinion/displaystory.cfm?story_id=6800723.

Wooten, Lynn Perry. "African Americans Are Underrepresented on Corporate Boards." Available from: http://www.bus.umich.edu/NewsRoom/ArticleDisplay.asp?news_id=4825.

"Working the Twenty-First Century." Available from: http://www.bls.gov/opub/working/home.htm.

WORLD-CLASS MANUFACTURER

The term "world-class manufacturer" is popularly used to denote a standard of excellence: the best of the best manufacturers at the international level. The term came into prominence following the 1986 publication of *World Class Manufacturing: The Lessons of Simplicity Applied* by Richard J. Schonberger, which was his follow-up to *Japanese Management Techniques: Nine Hidden Lessons in Simplicity.*

World marketplace events during the 1970s and 1980s caused competition to grow to such an intense level that many firms were forced to re-examine their concept of manufacturing strategy, especially in terms of the tradeoffs among the four competitive priorities: cost, quality, delivery/service, and flexibility. Managers began to realize that they no longer had to make these tradeoffs but could instead compete on several competencies.

Some of those excited by the concept describe it as capturing the breadth and the essence of the fundamental changes taking place in larger industrial enterprises, with an overall goal and underlying mindset of continual and rapid improvement. Others describe it as the culmination of the relentless pursuit of competitive excellence. Richard Schonberger states that the emphasis on world-class manufacturing may someday be chronicled as the third major event in the history of manufacturing management,

following the use of standard methods and times espoused by Frederick Taylor and Frank Gilbreth, and the findings of the Hawthorne experiments at Western Electric. These findings suggested that motivation, to a significant degree, comes from recognition. For simplicity's sake, we will describe a world-class manufacturer as a company that is able to compete effectively in a global market.

Clearly, there are some demands placed on individuals and organizations that desire world-class status. Peter Stonebreaker and Keong Leong presented a hierarchy of steps—appearing as five levels—that lead to world-class operations. This series of steps will be used to describe the characteristics of world-class manufacturers.

LEVEL ONE: BUSINESS AND OPERATIONS STRATEGY

All world-class manufacturers have an explicit, formal manufacturing mission. Within this mission is the operating goal to become world class. They use competitive information to establish organizational goals and objectives, which they communicate to all members of the enterprise. They regularly assess the appropriateness of these objectives to attaining and maintaining world-class status.

World-class manufacturing requires an overall willingness to establish closer connections with everyone, from suppliers to workers. It requires an unwavering commitment to self-analysis and improvement. It requires an aggressive approach to technology that can turn visionary strategies into reality. All of these must be reflected in the firm's business and operations strategy if world-class status is to be attained. It's important to balance real-world approaches with highly innovative notions—i.e., the visionary tactics that will likely put a firm at the head of its class can only do so if executed in a balanced, well-thought-out manner that takes time, planning, and research into serious consideration.

LEVEL TWO: ORGANIZATION DESIGN, HUMAN RESOURCES, TECHNOLOGY, AND PERFORMANCE MEASUREMENT

The following sections discuss how organization design, human resources, technology, and performance measurement factor into an organization's effort to become a world-class manufacturer.

Organization Design. World-class manufacturers integrate all elements of the manufacturing system in such a way that the needs and wants of its customers are satisfied in an effective, timely manner. This requires the commitment and the expenditure of efforts and resources by all elements within the system to ensure their proper inte-

gration. This commitment extends to outside elements as well, as the world-class manufacturer encourages and motivates its suppliers and vendors to become co-equals with the other elements of the manufacturing system.

World-class manufacturers work to eliminate organizational barriers to communication and to organize the firm in such a way that the core values needed to reach world-class status take precedence. Taking a multicultural outlook is at the top of the priority list when reaching and maintaining world class status is the objective. The globalized marketplace will tolerate nothing less than superior knowledge, understanding, and experience with a healthy cross section of every thinkable demographic. This means bringing world-class experience into the organization by way of executives and officers as well as subordinates who know the ins and outs of a multinational setting. The core values of the company will be important to every member as long as each feels he or she is also important; racial, gender, and religious tolerance lend a hand in globalizing any organization.

Most companies that have succeeded in implementing many other world-class tools—such as just-in-time production (JIT), total quality management (TQM), manufacturing resource planning (MRP II), and total productive maintenance (TPM)—already had the core values well in place. Companies that are already world class are able to quickly absorb other world-class manufacturing concepts as they are developed and publicized.

Human Resources. World-class manufacturers recognize that employee involvement and empowerment are critical to achieving continuous improvement in all elements of the manufacturing system. The continuity of organizational development and renewal comes primarily through the involvement of the employee. World-class companies invest comparatively more in their relationships with their workers, providing significantly more training than their competitors. An *Industry Week* survey found that firms approaching world-class status were three to five times more likely to report "highly effective" human-resources programs than other firms. Some analysts note that combining lean manufacturing principles with employee participation can help firms become world-class manufacturers.

Technology. A great deal of emphasis is placed on technology, equipment, and processes by those trying to attain world-class status. World-class manufacturers view technology as a strategic tool for achieving and maintaining their world-class status. A high priority is placed on the discovery, development, and timely implementation of the most relevant technology available and the identification and support of those who can communicate and implement this technology. The most highly competitive firms have made significantly more progress than others in

implementing TQM, reengineering, simultaneous engineering, group technology, computer-assisted manufacturing (CAM), material resources planning (MRP), and the use of local area networks (LANs).

Performance Measurement. World-class manufacturers recognize the importance of measurement in defining the goals and performance expectations for their organization. They routinely adopt or develop the appropriate performance measurements needed to interpret and quantitatively describe the criteria used to measure the effectiveness of their manufacturing system and its interrelated components.

Use of the proper measurements allows world-class manufacturers to assess their performance against themselves (internal benchmarking), their competitors (competitive benchmarking), and against other world-class manufacturing firms that are not competitors (generic and functional benchmarking). World-class status is achieved through a relentless commitment to continuous improvement, which cannot be achieved without measurement.

LEVEL THREE: INFORMATION SYSTEMS, MANAGEMENT DIRECTION, AND OPERATIONS CAPABILITIES

The following sections discuss how information systems, management direction, and operations capabilities factor into an organization's effort to become a world-class manufacturer.

Information Systems. World-class manufacturers require world-class information systems for collecting, processing, and disseminating data and for providing the feedback mechanism that is necessary for meeting their objectives. Information systems are fully integrated into the business processes of firms that adhere to continuous improvement and TQM strategies. Capturing and analyzing customer feedback and designing, manufacturing, and delivering world-class quality products and services are all rooted in superior information systems. Richard Schonberger states that functions within a world-class firm all have a common language and signaling system. World-class firms embrace computerized maintenance management and computer-integrated manufacturing. Additionally, organizational commitment to continuous improvement is supported by the strategic use of information systems.

Management Direction. Management is responsible for directing the manufacturing organization's journey to world-class status and for creating an organizational culture committed to all that is necessary for achieving continuous improvement. Corporate culture and values are the foundation for superior manufacturing, which in turn reflects the caliber of corporate management. This implies that personal commitment, involvement, and a sense of direction by management are critical to the success of world-class firms.

The manufacturing excellence needed for world-class status is nurtured by direction from superior management, which must penetrate the manufacturing function, viewing and managing it as an integral, indivisible part of the firm. It cannot tolerate mediocrity or even average manufacturing performance. The only real way to do this effectively in many cases is to establish a flatter organization where autonomy and a higher sense of accountability and ownership are engendered by the actions of the firm's executives. In this way, the products and services of the firm become inherently more important to workers and the result is world-class turnout.

Management must seek to describe and understand the interdependency of the multiple elements of their manufacturing system, to discover new relationships, to explore the consequences of alternative decisions, and communicate unambiguously within the organization and with the firm's customers and suppliers. Stimulating and accommodating continuous change forces management to experiment and assess outcomes. They must be able to translate knowledge acquired in this way into some sort of direction, framework, or model that leads to improved operational decision making, while incorporating a learning process into their fundamental operating philosophy. The objective of world-class status tests management's ability to learn, adapt, and innovate faster in the face of an intensely competitive global market.

Operations Capabilities. World-class manufacturers are concerned with whether their operations systems have the ability to meet design specifications, rather than with evaluating the quality and quantity of products after the fact. In order to attain world-class status, the manufacturing firm has to be given the proper resources. With these resources, the firm must have the capability to produce the right quantity, the right quality, at the right time (often just in time), and at the right price. The proper technology must be on hand or readily attainable. In addition, the firm must have the necessary managerial capabilities to compete successfully on the global scale. For many firms, the necessary operational capability involves the ability to provide customers with a large degree of flexibility in product or volume, or exceptional response time to orders, changes in orders, trade prices of product, or new product development.

Beyond the firm itself, operations capability implies a superior interactive relationship with all vendors and suppliers. World-class firms have extensively implemented

JIT, are heavily involved with programs that contractually commit suppliers to annual cost cuts, and are making efforts to involve the supplier early in the new product development process.

LEVEL FOUR: QUALITY

World-class manufacturers place an emphasis on quality. Firms in this category are usually in an advanced state of TQM implementation, continually seeking to enhance their business. All quality costs (prevention costs, appraisal costs, and cost of defects—both internal and external) are evaluated and held to the lowest reasonable sum. "Zero defects" is the goal of the world-class manufacturer. In order to achieve zero defects, the world-class firm is educated in and has fully implemented statistical quality control (SQC), sometimes called statistical process control (SPC) or quality at the source. Hence, quality is maintained and elevated through quality planning, quality control, and quality improvement. In conjunction with this effort to improve processes and products, world-class firms utilize an activity called benchmarking. This involves comparing the firm's performance, either overall or in a functional area, with that of other world-class organizations. The use of TQM techniques, according to some analysts, is the most striking differentiator between world-class and non-world-class firms. Quality has also been found to be the most important competitive differentiator in the eyes of the customer.

LEVEL FIVE: CUSTOMER SERVICE

World-class manufacturers instill within their organization and constantly reinforce the idea that all who are a part of the organization must know their customers and must seek to satisfy the wants and needs of not only the customers, but also all other stakeholders. The goal of satisfaction is pursued in regards to the product, order processing, delivery, quick response to changes, and service after the sale. After all, the goal of continuous improvement is to add value to products and services so that customers are consistently satisfied and loyal, ensuring long-term profitability.

LEVEL SIX: WORLD-CLASS MANUFACTURING

While world-class manufacturing may be difficult for manufacturers to define, many say they know it when they see it.

Whatever it is, it must be from the customer's vantage point. An *Industry Week* survey found that, among factories approaching world-class status, a higher percentage were likely to belong to public companies; have corporate parents with revenues greater than $1 billion; participate in an automotive industry value chain; and employ 250 or more people at the location. These firms reported large cost reductions over the previous three years, as well as increased revenues, higher capacity utilization, higher sales per employee, and returns on invested capital (ROIC) that exceeded that of other manufacturers. Daniel F. Baldwin states that truly world-class firms are always examining their business processes and continuously seeking solutions to improve in key areas, such as lead-time reduction, cost cutting, exceeding customer expectations, streamlining processes, shortening time to market for new products, and managing the global operation.

World-class manufacturers are those that possess the knowledge and technology to provide products and services of continually improving quality. It is what separates practitioners of the new global paradigm from industrialist dinosaurs.

SEE ALSO *Benchmarking; Customer Relationship Management; Human Resource Management; Management Awards; Quality and Total Quality Management*

BIBLIOGRAPHY

Baldwin, Daniel F. "Q&A: World-Class Manufacturing." *Surface Mount Technology* 18, no. 1 (2004): 23.

Kates, Amy and Jay R. Galbraith. "Designing Your Organization: Using the STAR Model to Solve 5 Critical Design Challenges." California: Jossey-Bass, 2007.

Schonberger, Richard J. *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity.* New York: The Free Press, 1982.

———. "The Right Stuff, Revisited." *MSI* 21, no. 9 (2003): 26–30.

———. *World Class Manufacturing: The Lessons of Simplicity Applied.* New York: The Free Press, 1986.

Stonebreaker, Peter W., and G. Keong Leong. *Operations Strategy: Focusing Competitive Excellence.* Boston: Allyn and Bacon, 1994.

Taninecz, George. "Long-Term Commitments: Practices and Performances Validate World-Class Plants." *Industry Week* 253, no. 2 (2004): 51–53.

Z

ZERO-BASED BUDGETING

The budgeting process is an essential component of management control systems and has been an effective system by which management can successfully plan, coordinate, and control. The process involves the creation and implementation of the broad objectives of an organization, the detailed objectives, and a short-term and long-term financial plan. The basic process of zero-based budgeting is to justify budget requests every budgeting cycle, regardless of prior period budgets. This can be contrasted with traditional incremental budgeting, in which budgets are set by justifying only increases over the previous period's budget without referencing the previous level of expenditure. The philosophy and procedures used to justify and implement zero-based budgeting in industry and government settings are quite similar, only slightly differing with the mechanics to fit the specific needs of each organization.

HISTORY OF ZERO-BASED BUDGETING

Government budgeting was established in Great Britain in the late seventeenth century. The enactment of the 1689 Bill of Rights gave taxing authority to Parliament as opposed to the King. Parliament gradually established spending programs, and by the 1820s parliament published detailed annual financial statements showing revenues and expenditures and a projected surplus or deficit. The usage of budgets by the U.S. government did not begin until the nineteenth century, when a law was passed for the Secretary of the Treasury to submit an annual financial report to Congress. This action was not taken by the Treasury department, and instead, federal government agencies developed their own reports and submitted them to the Treasury.

Several attempts were made in the early twentieth century to implement federal budgeting and financial management, but each failed, even though forty-four individual states had already passed laws concerning budgets. Congress passed the Budgeting and Accounting Act in 1921 along with the creation of a centralized Bureau of the Budget. Although created in 1921, it was not until the mid-1940s that the federal budget included identification of the major goals and program objectives, a systematic analysis of supplies and needs for both military and civilian purposes, and a long-range plan of projects. In the 1960s, the Planning-Programming-Budgeting System (PPBS) was adopted by President Lyndon B. Johnson to be implemented throughout the federal government.

The PPBS was short-lived, however. In the 1970s every federal department except for the Defense Department abandoned the system. The concept of zero-based budgeting gained notoriety in 1977 when President Jimmy Carter announced he was introducing zero-based budgeting into the federal budgeting process. The term, "zero-based budgeting," and the techniques for carrying out these budgeting processes had been previously introduced in an article written by Peter A. Pyhrr in the Harvard Business Review in 1970, but when President Carter adopted this method at the federal level, zero-based budgeting began to spread more rapidly.

President Carter, while still governor of Georgia in 1973, contracted with Pyhrr to implement the system for the entire executive budget recommendations for the state

of Georgia. However, when the system was applied to governmental budgeting, it failed due to the great amount of effort and time required for development and implementation. With further refinement, however, zero-based budgeting was largely hailed as a success when introduced to Congress in 1977.

A number of state legislatures began mandating zero-based budgeting around the same time, though many were slow or reluctant to follow the federal government's lead and some returned to traditional practices at a later time. Oklahoma passed a zero-based budgeting law in 2003, making it one of the only states to use this practice widely. Ohio followed in 2006, but other states are not rushing to follow this new lead. The National Conference of State Legislatures Web site indicates that as of February 2008, only a few states use a combination of methods that includes zero-based budgeting. The site notes that 25 states use traditional incremental budgeting, and ten states use program-based budgeting.

Early business budgets focused on controlling costs and put little emphasis on measuring effectiveness. In the early twentieth century, the use of budgets increased due to the necessity for industries to implement more careful factory planning. A systematic plan of budgeting arose from two areas: industrial engineering and cost accounting. Industrial engineers, to arrive at production standards that could then be used to estimate future operations and performance standards, used scientific methods. Cost accountants used budgeting to establish standard costs and to estimate future expected costs in a budgetary form. Also at this time, texts on budgeting and managerial accounting began to emerge.

As zero-based budgeting gained traction in the 1970s among public budgeting constituents, it also gained popularity among private enterprises, and during this time a number of organizations modified and implemented the system. An example of an organization successfully implementing this system is the Florida Power and Light Company. In 1977 zero-based budgeting became required for all Florida Power and Light general office staff departments. Ben Dady, the company's director of management control, favored the system because when managers develop the zero-based budget, they begin with nothing in terms of budgeted dollars, and have to justify or prove why they need to spend money on each activity or project. New and old problems are treated equally. Every managerial activity is properly identified and then evaluated by analyzing more efficient ways and alternative levels of performing the same activity. These alternatives are then ranked and relative priorities are established.

The publicity in the 1970s surrounding zero-based budgeting gave the impression that the system was a relatively new technique, although the system was not new at all. Zero-based budgeting is quite similar to the Planning-Programming-Budgeting system, implemented in the 1960s. Both systems involve evaluating the inputs and outputs for specific activities, as opposed to the traditional line-item format.

IMPLEMENTATION OF ZERO-BASED BUDGETING

The zero-based budgeting system puts the burden of proof on the manager, and demands that each manager justify the entire budget in detail and prove why he or she should spend the organization's money in the manner proposed. A "decision package" must be developed by each manager for every project or activity, which includes an analysis of cost, purpose, alternative courses of action, measures of performance, consequences of not performing the activity, and the benefits.

This approach is different from traditional budgeting techniques due to the analysis of alternatives. Managers must identify alternative methods of performing each activity first, such as evaluating the costs and benefits of making a project or outsourcing it, or centralizing versus decentralizing operations. In addition, managers must identify different levels for performing each alternative method of the proposed activity. This means establishing a minimum level of spending (often 75 percent of the current operating level) and then developing separate decision packages that include the costs and benefits of additional levels of spending for that particular activity. The different levels allow managers to consider and evaluate a level of spending lower than the current operating level, giving decision makers the choice of eliminating an activity or the ability to choose from a selection of levels of effort including tradeoffs and shifts in expenditure levels among organizational units.

The decision packages must be ranked in order of importance once they have been created. This allows each manager to identify priorities, combine decision packages for old and new projects into one ranking, and allows top management to evaluate and compare the needs of individual units or divisions to make funding allocations. In this respect, zero-based budgeting is quite different than traditional rolling budgets.

Rolling budgets often appeal to people who prepare budgets because they make budget development much easier. Managers can add an inflation factor to the previous year's budget and then include any adjustments for major changes. Rolling budgets also give management a concrete number to help make comparisons from year to year. However, traditional rolling budgets have a tendency to create conflict; they can create an incentive to spend money carelessly in order to justify the next year's budget. They can also create inefficient operations due to

the fact that individual departments or units do not have to justify expenditures based on operations, but only on the prior year's expenditures.

Zero-based budgeting addresses such problems that can occur with traditional rolling budgets. In zero-based budgeting, each dollar spent by management must be justified with a detailed account of what will be purchased, how many labor hours are needed, what problems will be faced, and so forth. This allows management an opportunity to review operations in depth and make recommendations for changes if necessary. The zero-based budgeting process helps managers identify redundancies and duplications among different departments, concentrating on the dollars needed for proposed programs as opposed to percentage increases or decreases from the previous year. Specific priorities of departments and divisions are identified more easily in zero-based budgeting. The process also allows for the comparability of different departments as to the respective priorities funded. Zero-based budgeting enables a performance audit to determine whether each project or activity has been performed as efficiently as planned.

ZERO-BASED BUDGETING DRAWBACKS AND SOLUTIONS

One drawback to zero-based budgeting is cost in terms of managerial time; it takes a considerable amount of time to go through the process of reviewing operations in enough detail to justify costs each budget cycle without relying on past expenditures. As the author of *Management* (2008) points out, "In a large and complex enterprise, it is difficult to subject all expenditure areas to [zero-based budgeting] every year. Yet it should always be done for major expenditure areas. For less important areas, zero-based budgeting might be done every three years or so, rather than yearly."

Another solution to this problem is to create a rolling budget every year and perform a zero-based budget every three to five years, or when a major change occurs within the operation. This allows an organization to benefit from the advantages of zero-based budgeting without an excessive amount of work. Likewise, traditional rolling budgets should never strictly rely on a prior-year budget plus a percentage; consideration should always be given to past numbers. In some cases, a zero-based budget may rely on some prior numbers where it is overwhelming to create a budget from scratch. Ultimately, the process gives top management the opportunity to judge the performance of managers in terms of allocating resources efficiently and effectively, and gives managers more responsibility in developing their budgets.

An organization should not feel that all budgets must be developed in entirely the same manner. Some departments can utilize an in-depth study of a zero-based budget while others can use a rolling budget. This is a way to spread the extensive work over a number of years instead of concentrating on one certain year. Many organizations have implemented the system in some form or another and found that it did not work. If properly implemented, however, the process could have a considerable improvement over traditional rolling budgets. The number and nature of decision packages varies from organization to organization; it is not uncommon for large organizations to identify several thousand packages. Furthermore, it is often hard or even impossible for top executives to have the necessary knowledge or time to develop and rank priorities for thousands of packages.

To alleviate this problem, managers, after ranking their own packages, can have their top executives rank the packages of all the managers that report to them. This approach is used by one of zero-based budgeting's pioneers, Texas Instruments. Another solution is for each level of management to rank a certain percentage of packages within its own area of responsibility. In this solution, the first level of management may rank 40 percent of the proposed packages; the next level may rank the next 40 percent of packages, while top management may concentrate on the remainder of the budget.

BEHAVIORAL IMPACTS OF ZERO-BASED BUDGETING

The impact of budgeting on organizations was probably first studied by Argyris in the 1950s. These studies show some of the behavioral effects resulting from the way budgets are used in organizations. The results of his research showed that the particular process used could cause dysfunctional behavior in subordinates, regardless of the degree of technical refinement of the budgetary system. In the 1970s, Hopwood's studies inquired into the effects of budgets on human behavior. These studies showed that the use by a superior of a budget-constrained style of evaluation gave rise to significant levels of job-related tension, had adverse effects on peer and subordinate-superior relationships, and was implicated in manipulative behavior on subordinates.

On the other hand, others have noted that zero-based budgeting can have a favorable impact on organizations by averting bureaucratic fossilization and preventing the growth of unproductive departments or activities. As Michael LaFaive noted in 2003 in testimony before the House Appropriations Subcommittee on General Government, "Zero-based budgeting can be useful for shaking up a process that may have grown stale and counterproductive over time."

Zero-based budgeting may require an extensive amount of time, money, and paper work; but it does provide a systematic method of addressing an organization's financial concerns, in turn enabling an organization to better allocate

its resources. A combination of zero-based budgets with rolling budgets or some other form of budgeting that spreads the work of justifying new budgets each cycle is one way to incorporate zero-based budgeting without undo stress at the same time for all managers with budgetary responsibility.

BIBLIOGRAPHY

Bowhill, Bruce. *Business Planning and Control: Integrating Accounting, Strategy, and People.* Hoboken, NJ: John Wiley & Sons, 2008.

Dropkin, Murray, Jim Halpin, and Bill La Touche. *The Budget-Building Book for Nonprofits.* San Francisco: Jossey-Bass, 2007.

Drucker, Peter. *Management.* Rev. ed. New York: HarperCollins, 2008.

Hilton, Ronald W. *Managerial Accounting Mgmt 201: Creating Value in a Dynamic Business Environment.* Boston: McGraw-Hill, 2007.

LaFaive, Michael. "The Pros and Cons of Zero-based Budgeting: Testimony Before the House Appropriations Subcommittee on General Government." 4 November 2003. Available from: http://www.mackinac.org/article.aspx?ID=5928.

Lee, Robert D., Ronald W. Johnson, and Philip G. Joyce. *Public Budgeting Systems.* 8th ed. Boston: Jones and Barlett, 2007.

"Predominant Budget Approach" National Conference of State Legislatures. Available from: http://www.ncsl.org/programs/fiscal/lbptabls/lbpc3t1.htm.

Warren, Carl S., James M. Reeve, and Jonathan Duchac. *Accounting.* 23rd ed. Mason, OH: South-Western College Publications, 2008.

ZERO SUM GAME

A zero-sum game is a term used in connection with game theory and management games. Game theory is a mathematical theory that applies to certain situations in which there are conflicts of interest between two or more individuals or groups. Management games are training or educational activities utilizing game theory models consisting of work situations. A zero-sum game is one type of management game in which all the payoffs for all players total zero; what one player or group gains, the other loses.

GAME THEORY

To better understand the term zero-sum game, it is beneficial to analyze game theory, as well as management games. Game theory is a significant branch of operations research and is closely related to decision theory and operational gaming. It attempts to answer the question: In a situation of conflict, what choice should the player make?

Game theory deals with abstract models of conflict situations or games of strategy. A game occurs when an individual or teams of people are in competition either against one another or against situations, or both.

The Game Theory Model. A game can be represented by the following model:

1. There are *n* players (*n* being a certain number), each of whom is required to make one choice from a specified set of possible choices.

2. When every player has made a choice, the particular combination of choices they have made determines an outcome that, in some way, affects or interests all players.

3. Each player knows what outcome results from each possible combination of choices.

4. Each player has an order of preference for the possible outcomes (often each player assigns to each outcome a numerical value, called a payoff, which can be thought of as representing the number of points, or dollars, etc., that he gains or loses from the outcome).

5. Each player knows the preferences of the other players (she knows what their payoffs are) and all players are assumed to act so as to gain the most they can from the game.

6. But each player makes his choice without knowing what choice the other players are making.

In the game, the competing players are identified as *persons* whether they are individuals, teams, or any other group representing a single set of interests. A *play* of a game is an exercise of the conflict model according to the rules; it consists of one or more *moves* by each player and may involve moves left to chance. The outcome of the game is represented by the payoff, a gain or loss of some utility to each of the players as a result of the positions reached at the end of the game. The *solution* of a game is comprised of the identification from among all the possible alternative courses of action, which ensures the player's expected payoff at a quantity called the *value* of the game.

In a business scenario, for example, the competition between two companies may be structured in game-theory terms. The persons are the companies; the play can be a determined period of time; and the rules are the discipline of the marketplace. Within the rules, management may make a variety of decisions upon which actions may be taken. These are known as the moves.

The firm's master plan is the strategy. In this example, the strategies of the companies would describe the companies' general decisions on such topics as advertising, mergers, and new product lines. The results of the interactions among the strategic choices made by the two firms are manifested by the payoff, which could be chosen to be annual gross sales, net profits, and so on. Only when a situation such as this is structured and quantified is it meaningful to address a solution and value for the game.

The theory is used to calculate the optimum strategy that maximizes the winnings or minimizes the losses of one or more of the players.

Example of a Game-Theory Game. Finite games, those in which each player has available a finite number of strategies, may be categorized according to the number of persons, relationships among payoffs, and whether cooperation among the players is allowed. The simplest form is the two-person zero-sum game; zero-sum denoting that the sum of the payoffs to the two players is zero.

A payoff matrix can be arranged to identify the payoffs for each player. The matrix is expressed in terms of the payoff to A, whereas B's payoffs are the negative of A's, thus satisfying the condition that their sum be zero. Positive entries indicate payments by B to A; negative ones, payments by A to B.

The solution can take two forms; the pure strategy case, in which a single strategy will be indicated as optimal; or a mixed strategy case, in which two or more strategies appear along with the relative frequencies with which they must be employed. An example of a two-person zero-sum game given by Derek French and Heather Saward, showing a pure strategy solution, is presented in Exhibit 1.

A's problem is to choose one of his four strategies; while B's is to choose one of his three. For example, the choices of A2 and B2 result in the payment by B to A of three units, while A4 and B3 lead to the payment by A to B of two units. First, consider A's analysis of his problem: A1 is a weak strategy because it nets A less than does the equally available strategy A2, regardless of B's choice. By choosing A4 in an effort to realize the payoff of ten units at A4 and B1 could result in the loss of two units if B selects B3; similar dilemmas exist for the other choices.

Suppose that A takes a conservative point of view and examines the least his choice could produce; a gain of two for A2, a gain of five for A3, and a loss of two for A4. Of these options, A3 and its consequence appear to be the best choice; the five-unit gain represents an assured security level to A since he cannot be driven below this point

by any action taken by B. In essence, A has examined the minimum gain that each row strategy could produce and, striving to maximize his gain, has selected the greatest of these.

This is referred to as A's maximum strategy (R3 in Exhibit 1). At this point, B analyzes the greatest loss he might sustain as a result of his strategy choice; ten units for B1, five units for B2, and eight units for B3. Of these choices, B2 causes the smallest loss on B and establishes his security level by guaranteeing that no action of A's can cause his loss to be above five.

Summarizing, B has identified the maximum loss that each column strategy could produce and, wanting to minimize his loss has selected the least of these; known as B's minimax strategy. The most important feature of this result is the independently arrived-at agreement on the part of the players as to their security levels. This example also possesses a saddle-point, an element that is concurrently the greatest of the row minima and the least of the column maxima. The significance lies in the fact that if either player deviates from this choice; it will result in either decreased gain or increased loss.

The solution is that A always employs A3, B always employs B2, and the value of the game is five. This, of course, is not a fair game since A always wins five units at each play. It can be made fair, however, by requiring A to pay five units to B each time to induce B to play, or by reducing each element of the game matrix by five.

APPLICATIONS

Game theorists have posited a number of real-world applications for their abstract models. The most notorious use of game theory was utilized by the armed services in the Vietnam War for strategic purposes; however, the theory is noted today for its potential contribution to industrial affairs. Game theory is used to analyze economic policies and international agreements (e.g., whether economic sanctions act as practical incentives or build additional resentment). It is applied in management games, in which managers are grouped into teams representing a manager or the management of one of several competing organizations. The manager must take a sequence of decisions relating to a simulation of a real-life management problem, and is then presented with the results of each decision after it is made.

Since the rise of "reality" television game shows such as *Survivor* (2000–present) and *The Apprentice* (2004–present), and the sudden popularity of televised poker in the mid-2000s, the viewing public has had the opportunity to witness game strategies being used in a real-life context. While these programs are ultimately zero-sum games—in the end, one person wins everything—successful participants have employed various strategies to cooperate with and exploit each other, all in an effort to win.

Exhibit 1

Matrix of a Two-Person Zero-Sum Game

		B₁	B₂	B₃
	A₁	0	-1	7
A's Strategies	A₂	2	3	8
	A₃	9	5	6
	A₄	10	4	-2
		10	5	8

B's Strategies

In all game-theory games, the result of an individual decision is the response, or the next move, of the other competitors. The games are used for several training purposes. They provide experience and they bring rapid feedback on the results of a decision. They also can show cause-and-effect relationships that may be blurred during longer time periods in real-life situations. The end result is to attain more personal involvement, greater attention, and greater retention of new concepts and ideas that have been acquired.

BIBLIOGRAPHY

Binmore, Ken. *Game Theory: A Very Short Introduction.* Oxford: Oxford University Press, 2007.

Finch, Frank, ed. *The Facts on File Encyclopedia of Management Techniques.* New York, NY: Facts on File, 1985.

French, Derek, and Heather Saward. *Dictionary of Management.* Aldershot, Hants, England: Gower, 1983.

"Game Theory." *Asia Africa Intelligence Wire,* 29 August 2004.

Goodkey, Kennedy. "Is the Key to Survivor in 'Non-Cooperative Games'?" *Reality News Online*, 24 December 2002. Available from: http://www.realitynewsonline.com/cgi-bin/ae.pl?mode= 4&article=article2575.art&page=1.

Harford, Tim. "All Is Fair in Love, War and Poker." *BBC News*, 17 August 2006. Available from: http://news.bbc.co.uk/2/hi/ business/5260120.stm.

McMillan, John. *Games, Strategies and Managers.* New York, NY: Oxford University Press, 1996.

Poundstone, William. *Prisoners' Dilemma.* New York, NY: Anchor Books, Doubleday, 1993.

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