

1. Explain why information systems are so important today for business and management.

Information systems are a foundation for conducting business today. In many industries, survival and even existence without extensive use of IT is inconceivable and IT plays a critical role in increasing productivity. Although information technology has become more of a commodity, when coupled with complementary changes in organization and management, it can provide the foundation for new products, services, and ways of conducting business that provide firms with a strategic advantage. Information technology has become the largest component of capital investment for firms in the United States and many industrialized societies.

2. Evaluate the role of information systems in today's competitive business environment.

Information systems have become essential for helping organizations deal with changes in global economies and the business enterprise. Information systems provide firms with communication and analytic tools for conducting trade and managing businesses on a global scale. Information systems are the foundation of new knowledge-based products and services in knowledge economies and help firms manage their knowledge assets. Information systems make it possible for businesses to adopt more flexible arrangements of employees and management that can coordinate with other organizations across great distances. Organizations are trying to become more competitive and efficient by transforming themselves into digital firms where nearly all core business processes and relationships with customers, suppliers, and employees are digitally enabled. The Internet is bringing about a convergence of technologies that is further widening the use of information systems in business and transforming industries and business models.

3. Assess the impact of the Internet and Internet technology on business and government.

The Internet provides global connectivity and a flexible platform for the seamless flow of information across the enterprise and between the firm and its customers and suppliers. It is the primary technology infrastructure for electronic commerce, electronic business, and the emerging digital firm. In electronic commerce (e-commerce), businesses can exchange electronic purchase and sale transactions with each other and with individual customers. Electronic business (e-business) uses Internet and other digital technology for organizational communication and coordination, collaboration with business partners, and the management of the firm, as well as for electronic commerce transactions. Digital firms use Internet technology intensively to manage their internal processes and relationships with customers, suppliers, and other external entities. E-government uses the Internet and intranets to improve delivery of government services, make internal operations more efficient, and empower citizens to network electronically with other citizens.

4. Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy.

An information system collects, stores, and disseminates information from an organization's environment and internal operations to support organizational functions and decision making, communication, coordination, control, analysis, and visualization. Information systems transform raw data into useful information through three basic activities: input, processing, and output. From a business perspective, an information system creates economic value for the firm as an organizational and management solution, based on information technology, to a challenge posed by the environment. The information system is part of a series of value-adding activities for acquiring, transforming, and distributing information to improve management decision making, enhance organizational performance, and, ultimately, increase firm profitability.

Information systems are rooted in organizations; they are an outcome of organizational structure, culture, politics, workflows, and business processes. They are instruments for organizational change and value creation, making it possible to recast these organizational elements into new business models and redraw organizational boundaries. Managers are problem solvers who are responsible for analyzing the many challenges confronting organizations and for developing strategies and action plans. Information systems are one of their tools, delivering the information required for solutions. Information systems both reflect management decisions and serve as instruments for changing the management process. Information systems cannot make managers and organizations more effective unless they are accompanied by complementary assets such as new business processes, organizational culture, or management behavior.

Information systems literacy requires an understanding of the organizational and management dimensions of information systems as well as the technical dimensions addressed by computer literacy. Information systems literacy draws on both technical and behavioral approaches to studying information systems. Both perspectives can be combined into a sociotechnical approach to systems.

5. Identify the major management challenges to building and using information systems.

There are five key management challenges in building and using information systems: (a) obtaining business value from information systems; (b) providing appropriate complementary assets to use information technology effectively; (c) understanding the system requirements of a global business environment; (d) creating an information technology infrastructure that is flexible enough to support changing organizational goals; and (e) designing systems that people can control, understand, and use in a socially and ethically responsible manner.

[Return to Top](#)

Chapter 2: Summary

[Back to Contents](#)

1. Evaluate the role played by the major types of systems in a business and their relationship to each other.

There are four major types of information systems in contemporary organizations. Operational-level systems are transaction processing systems (TPS), such as payroll or order processing, that track the flow of the daily routine transactions that are necessary to conduct business. Management-level systems (MIS and DSS) provide the management control level with reports and access to the organization's current performance and historical records. Most management information systems (MIS) reports condense information from TPS and are not highly analytical. Decision-support systems (DSS) support management decisions when these decisions are unique, rapidly changing, and not specified easily in advance. They have more advanced analytical models and data analysis capabilities than MIS and often draw on information from external as well as internal sources. Executive support systems (ESS) support the strategic level by providing data of greatest importance to senior management decision makers, often in the form of graphs and charts delivered via portals. They have limited analytical capabilities but can draw on sophisticated graphics software and many sources of internal and external information.

The various types of systems in the organization exchange data with one another. TPS are a major source of data for other systems, especially MIS and DSS. ESS primarily receive data from lower-level systems. Today's business environment calls for more integration among systems than in the past, but such integration is not easy to achieve.

2. Describe the information systems supporting the major business functions: sales and marketing, manufacturing and production, finance and accounting, and human resources.

At each level of the organization information systems support the major functional areas of the business. Sales and marketing systems help the firm identify customers for the firm's products or services, develop products and services to meet customers' needs, promote the products and services, sell the products and services, and provide ongoing customer support. Manufacturing and production systems deal with the planning, development, and production of products and services, and controlling the flow of production. Finance and accounting systems keep track of the firm's financial assets and fund flows. Human resources systems maintain employee records; track employee skills, job performance, and training; and support planning for employee compensation and career development.

3. Analyze the relationship between organizations, information systems, and business processes.

Business processes refer to the manner in which work activities are organized, coordinated, and focused to produce a specific business result. They also represent unique ways in which organizations coordinate work, information, and knowledge and the ways in which management chooses to coordinate work. Managers need to pay attention to business

processes because they determine how well the organization can execute, and thus are a potential source of strategic success or failure. Although each of the major business functions has its own set of business processes, many other business processes are cross-functional, such as order fulfillment. Information systems can help organizations achieve great efficiencies by automating parts of these processes or by helping organizations rethink and streamline them. Firms can become more flexible and efficient by coordinating and integrating their business processes to improve management of resources and customer service.

4. Explain how enterprise applications promote business process integration and improve organizational performance.

Enterprise applications, such as enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems, are designed to support organization-wide process coordination and integration so that the organization can operate more efficiently. They span multiple functions and business processes and may be tied to the business processes of other organizations. Enterprise systems integrate the key internal business processes of a firm into a single software system so that information can flow throughout the organization, improving coordination, efficiency, and decision making. Supply chain management systems help the firm manage its relationship with suppliers to optimize the planning, sourcing, manufacturing, and delivery of products and services. Customer relationship management uses information systems to coordinate all of the business processes surrounding the firm's interactions with its customers to optimize firm revenue and customer satisfaction. Knowledge management systems enable firms to optimize the creation, sharing, distribution, of knowledge to improve business processes and management decisions.

5. Assess the challenges posed by information systems in the enterprise and management solutions.

The array of information systems available to businesses can help businesses achieve higher levels of productivity and financial worth. Management challenges include the tension between building systems that both serve specific interests in the firm but that also can be integrated to provide organization-wide information, the need for management and employee training to use systems properly, and the need to establish priorities on which systems most merit corporate attention and funding. Solutions include inventorying the firm's information systems to establish organization-wide information needs, employee and management training, and establishing a system for accounting for the costs of information systems and managing demand for them.

[Return to Top](#)

Chapter 3: Summary

[Back to Contents](#)

1. Identify and describe important features of organizations that managers need to know about in order to build and use information systems successfully.

Managers need to understand certain essential features of organizations to build and use information systems successfully. All modern organizations are hierarchical, specialized, and impartial. They use explicit routines to maximize efficiency. All organizations have their own cultures and politics arising from differences in interest groups. Organizations differ in goals, groups served, social roles, leadership styles, incentives, surrounding environments, and types of tasks performed. These differences create varying types of organizational structures, and they also help explain differences in organizations' use of information systems.

2. Evaluate the impact of information systems on organizations.

Information systems and the organizations in which they are used interact with and influence each other. The introduction of a new information system will affect organizational structure, goals, work design, values, competition between interest groups, decision making, and day-to-day behavior. At the same time, information systems must be designed to serve the needs of important organizational groups and will be shaped by the organization's structure, tasks, goals, culture, politics, and management. Information technology can reduce transaction and agency costs, and such changes have been accentuated in organizations using the Internet. The information systems department is the formal organizational unit that is responsible for the organization's information systems function. Organizational characteristics and managerial decisions determine the role this group will actually play.

3. Assess how information systems support the activities of managers in organizations.

Several different models of what managers actually do in organizations show how information systems can be used for managerial support. Early classical models of managerial activities stress the functions of planning, organizing, coordinating, deciding, and controlling. Contemporary research looking at the actual behavior of managers has found that managers' real activities are highly fragmented, variegated, and brief in duration, with managers moving rapidly and intensely from one issue to another. Managers spend considerable time pursuing personal agendas and goals, and contemporary managers shy away from making grand, sweeping policy decisions.

Decision making can also take place at the individual or group level. Individual models of decision making assume that human beings can rationally choose alternatives and consequences based on the priority of their objectives and goals. Organizational models of decision making illustrate that real decision making in organizations takes place in arenas where many psychological, political, and bureaucratic forces are at work.

Information technology provides new tools for managers to carry out both their traditional and newer roles, enabling them to monitor, plan, and forecast with more precision

and speed than ever before and to respond more rapidly to the changing business environment. Information systems have been most helpful to managers by providing support for their roles in disseminating information, providing liaisons between organizational levels, and allocating resources. However, some managerial roles cannot be supported by information systems, and information systems are less successful at supporting unstructured decisions.

4. Analyze how information systems support various business strategies for competitive advantage.

Businesses can use strategic information systems to gain an edge over competitors. Such systems change organizations' goals, business processes, products, services, or environmental relationships, driving them into new forms of behavior.

Information systems can be used to support strategy at the business, firm, and industry levels. At the business level of strategy, information systems can be used to help firms become the low-cost producers, differentiate products and services, or serve new markets. Information systems can also be used to lock in customers and suppliers using efficient customer response and supply chain management applications. Value chain analysis is useful at the business level to highlight specific activities in the business where information systems are most likely to have a strategic impact.

At the firm level, information systems can be used to achieve new efficiencies or to enhance services by tying together the operations of disparate business units so that they can function as a whole or promote the sharing of knowledge across business units.

At the industry level, systems can promote competitive advantage by facilitating cooperation with other firms in the industry, creating consortiums or communities for sharing information, exchanging transactions, or coordinating activities. The competitive forces model, information partnerships, business ecosystems, and network economics are useful concepts for identifying strategic opportunities for systems at the industry level.

5. Assess the challenges posed by strategic information systems and management solutions.

Information systems are closely intertwined with an organization's structure, culture, and business processes. New systems disrupt established patterns of work and power relationships, so there is often considerable resistance to them when they are introduced.

Implementing strategic systems often requires extensive organizational change and a transition from one sociotechnical level to another. Such changes are called strategic transitions and are often difficult and painful to achieve. Moreover, not all strategic systems are profitable, and they can be expensive to build. Many strategic information systems are easily copied by other firms so that strategic advantage is not always sustainable. The complex relationship between information systems, organizational performance, and decision making must be carefully managed. A strategic system analysis is helpful.

[Return to Top](#)

Chapter 4: Summary

[Back to Contents](#)

1. Analyze how Internet technology has changed value propositions and business models.

The Internet is rapidly becoming the infrastructure of choice for electronic commerce and electronic business because it provides a universal and easy-to-use set of technologies and technology standards that can be adopted by all organizations, no matter which computer system or information technology platform they use. Internet technology provides a much lower cost and easier to use alternative for coordination activities than proprietary networks. Companies can use Internet technology to radically reduce their transaction and agency costs.

The Internet radically reduces the cost of creating, sending, and storing information while making that information more widely available. Information is not limited to traditional physical methods of delivery. Customers can find out about products on their own on the Web and buy directly from product suppliers instead of using intermediaries such as retail stores. This unbundling of information from traditional value chain channels is having a disruptive effect on old business models, and it is creating new business models as well. Some of the traditional channels for exchanging product information have become unnecessary or uneconomical, and business models based on the coupling of information with products and services may no longer be necessary. By using the Internet and other networks for electronic commerce, organizations in some industries can exchange purchase and sale transactions directly with customers and suppliers, eliminating inefficient intermediaries.

The Internet shrinks information asymmetry and has transformed the relationship between information richness and reach. Using the Internet and Web multimedia capabilities, companies can quickly and inexpensively provide detailed product information and detailed information specific to each customer to very large numbers of people simultaneously. The Internet can help companies create and capture profit in new ways by adding extra value to existing products and services or by providing the foundation for new products and services. Many different business models for electronic commerce on the Internet have emerged, including virtual storefronts, information brokers, transaction brokers, Net marketplaces, content providers, online service providers, virtual communities, and portals.

2. Define electronic commerce and describe how it has changed consumer retailing and business-to-business transactions.

Electronic commerce is the process of buying and selling goods electronically with computerized business transactions using the Internet or other digital network technology. It includes marketing, customer support, delivery, and payment. The three major types of electronic commerce are business-to-consumer (B2C), business-to-business (B2B), and consumer-to-consumer (C2C). Another way of classifying electronic commerce transactions is in terms of the participants' physical connection to the Web. Conventional e-commerce transactions, which take place over wired networks, can be distinguished from mobile commerce, or m-commerce, which is the purchase of goods and services using handheld wireless devices.

The Internet provides a universally available set of technologies for electronic commerce that can be used to create new channels for marketing, sales, and customer support and to eliminate intermediaries in buy-and-sell transactions. Interactive capabilities on the Web can be used to build closer relationships with customers in marketing and customer support. Firms can use various Web personalization technologies to deliver Web pages with content geared to the specific interests of each user, including technologies to deliver personalized information and ads through m-commerce channels. Companies can also reduce costs and improve customer service by using Web sites, as well as e-mail and telephone access to customer service representatives, to provide helpful information.

B2B e-commerce generates efficiencies by enabling companies to locate suppliers, solicit bids, place orders, and track shipments in transit electronically. Businesses can use their own Web sites to sell to other businesses or use Net marketplaces or private industrial networks. Net marketplaces provide a single digital marketplace based on Internet technology for many buyers and sellers. Net marketplaces can be differentiated by whether they sell direct or indirect goods, support spot or longterm purchasing, or serve vertical or horizontal markets. Private industrial networks link a firm with its suppliers and other strategic business partners to develop highly efficient supply chains and to respond quickly to customer demands.

3. Compare the principal payment systems for electronic commerce.

The principal electronic payment systems for electronic commerce are digital credit card systems, digital wallets, accumulated balance digital payment systems, stored value payment systems, digital cash, peer-to-peer payment systems, digital checking, and electronic billing presentment and payment systems. Accumulated balance systems, stored value systems (including smart cards), and digital cash are useful for small micropayments.

4. Evaluate the role of Internet technology in facilitating management and coordination of internal and inter-organizational business processes.

Private, internal corporate networks called intranets can be created using Internet connectivity standards. Extranets are private intranets that are extended to selected organizations or individuals outside the firm. Intranets and extranets are forming the underpinnings of electronic business by providing a low-cost technology that can run on almost any computing platform. Organizations can use intranets to create collaboration environments for coordinating work and information sharing, and to make information flow between different functional areas of the firm. Intranets also provide a low-cost alternative for improving coordination of cross-functional business processes within the organization.

Extranets help coordinate business processes shared with customers, suppliers, and other external organizations. Collaborative commerce builds on extranets to enable multiple organizations to collaboratively design, develop, build, move, and manage products through their life cycles. A firm engaged in collaborative commerce with its suppliers and customers can achieve new efficiencies by reducing product design cycles, minimizing excess inventory,

forecasting demand, and keeping partners and customers informed.

5. Assess the challenges posed by electronic business and electronic commerce and management solutions.

Many new business models based on the Internet have not yet found proven ways to generate profits or reduce costs. Digitally enabling a firm for electronic commerce and electronic business requires far-reaching organizational change, including redesign of business processes; recasting relationships with customers, suppliers, and other business partners; and new roles for employees. Channel conflicts may erupt as the firm turns to the Internet as an alternative outlet for sales. Security, privacy, and legal issues pose additional electronic commerce challenges. Before embracing e-commerce and e-business, firms should understand exactly how Internet technology provides value to the business and relates to their overall business strategy. They should also anticipate making organizational changes, including changing business processes and developing a plan for managing channel conflict. Finally, they will need corporate policies and tools for promoting security and privacy within an e-business environment.

[Return to Top](#)

Chapter 5: Summary

[Back to Contents](#)

1. Analyze the relationship among ethical, social, and political issues that are raised by information systems.

Information technology has raised new possibilities for behavior for which laws and rules of acceptable conduct have not yet been developed. Information technology is introducing changes that create new ethical issues for societies to debate and resolve. Increasing computing power, storage, and networking capabilities—including the Internet—can expand the reach of individual and organizational actions and magnify their impact. The ease and anonymity with which information can be communicated, copied, and manipulated in online environments are challenging traditional rules of right and wrong behavior. Ethical, social, and political issues are closely related. Ethical issues confront individuals who must choose a course of action, often in a situation in which two or more ethical principles are in conflict (a dilemma). Social issues spring from ethical issues as societies develop expectations in individuals about the correct course of action. Political issues spring from social conflict and are mainly concerned with using laws that prescribe behavior to create situations in which individuals behave correctly.

2. Identify the main moral dimensions of an information society and specific principles for conduct that can be used to guide ethical decisions.

The moral dimensions of information systems center around information rights and obligations, property rights and obligations, accountability and control, system quality, and quality of life. Six ethical principles are available to judge conduct. These principles are derived independently from several cultural, religious, and intellectual traditions and include the Golden Rule, Immanuel Kant's Categorical Imperative, Descartes' rule of change, the Utilitarian Principle, the Risk Aversion Principle, and the ethical "no free lunch" rule. These principles should be used in conjunction with an ethical analysis to guide decision making. The ethical analysis involves identifying the facts, values, stakeholders, options, and consequences of actions. Once completed, you can consider which ethical principle to apply to a situation to arrive at a judgment.

3. Evaluate the impact of contemporary information systems and the Internet on the protection of individual privacy and intellectual property.

Contemporary information systems technology, including Internet technology, challenges traditional regimens for protecting individual privacy and intellectual property. Data storage and data analysis technology enables companies to easily gather personal data about individuals from many different sources and analyze these data to create detailed electronic profiles about individuals and their behaviors. Data flowing over the Internet can be monitored at many points. The activities of Web site visitors can be closely tracked using cookies and other Web monitoring tools. Not all Web sites have strong privacy protection policies, and they do not always allow for informed consent regarding the use of personal information. The online industry prefers self-regulation to the U.S. government tightening privacy protection legislation.

Traditional copyright laws are insufficient to protect against software piracy

because digital material can be copied so easily. Internet technology also makes other intellectual property even more difficult to protect because digital material can be copied easily and transmitted to many different locations simultaneously over the Net. Web pages can be constructed easily using pieces of content from other Web sites without permission.

4. Assess how information systems have affected everyday life.

Although computer systems have been sources of efficiency and wealth, they have some negative impacts. Errors in large computer systems are impossible to eradicate totally. Computer errors can cause serious harm to individuals and organizations, and existing laws and social practices are often unable to establish liability and accountability for these problems. Less serious errors are often attributable to poor data quality, which can cause disruptions and losses for businesses. Jobs can be lost when computers replace workers or tasks become unnecessary in reengineered business processes. The ability to own and use a computer may be exacerbating socioeconomic disparities among different racial groups and social classes. Widespread use of computers increases opportunities for computer crime and computer abuse. Computers can also create health problems such as repetitive stress injury, computer vision syndrome, and technostress.

5. Identify the principal management challenges posed by the ethical and social impact of information systems and management solutions.

The main management challenges posed by the ethical and social impact of information systems are the need to understand the moral risks of new technology and the difficulty of establishing corporate ethics policies that address information systems issues. For each of the five moral dimensions of information systems, corporations should develop a corporate ethics policy statement to guide individuals and to encourage appropriate decision making. The policy areas are as follows:

- ✦ *Individual information rights.* Spell out corporate privacy and due process policies.
- ✦ *Property rights.* Clarify how the corporation will treat property rights of software owners.
- ✦ *System quality.* Identify methodologies and quality standards to be achieved.
- ✦ *Quality of life.* Identify corporate policies on family, computer crime, decision making, vulnerability, job loss, and health risks.
- ✦ *Accountability and control.* Clarify who is responsible and accountable for corporate information.

[Return to Top](#)

Chapter 6: Summary

[Back to Contents](#)

1. Define IT infrastructure and describe the components and levels of IT infrastructure.

IT infrastructure is the shared technology resources that provide the platform for the firm's specific information system applications. IT infrastructure includes hardware, software, and services that are shared across the entire firm. Major IT infrastructure components include computer hardware platforms, operating system platforms, enterprise software platforms, networking and telecommunications platforms, database management software, Internet platforms, and consulting services and systems integrators. There are three different levels of IT infrastructure: public, enterprise, and business unit.

You can better understand the business value of IT infrastructure investments by viewing IT infrastructure as a platform of services as well as a set of technologies.

2. Identify and describe the stages of IT infrastructure evolution.

There are five stages of IT infrastructure evolution. IT infrastructure in the earliest stage consisted of specialized "electronic accounting machines" that were primitive computers used for accounting tasks. IT infrastructure in the mainframe era (1959 to present) consists of a mainframe performing centralized processing that could be networked to thousands of terminals and eventually some decentralized and departmental computing using networked minicomputers. The personal computer era (1981 to present) in IT infrastructure has been dominated by the widespread use of standalone desktop computers with office productivity tools. The predominant infrastructure in the client/server era (1983 to present) consists of desktop or laptop clients networked to more powerful server computers that handle most of the data management and processing. The enterprise Internet computing era (1992 to present) is defined by large numbers of PCs linked into local area networks and growing use of standards and software to link disparate networks and devices into an enterprise-wide network so that information can flow freely across the organization.

3. Identify and describe the technology drivers of IT infrastructure evolution.

A series of technology developments has driven the continuing transformation of IT infrastructure. Moore's Law deals with the exponential increase in processing power and decline in the cost of computer technology, stating that every 18 months the power of microprocessors doubles and the price of computing falls in half. The Law of Mass Digital Storage deals with the exponential decrease in the cost of storing data, stating that the number of kilobytes of data that can be stored on magnetic media for \$1 roughly doubles every 15 months. Metcalfe's Law helps explain the mushrooming use of computers by showing that a network's value to participants grows exponentially as the network takes on more members. Also driving exploding computer use is the rapid decline in costs of communication and growing agreement in the technology industry to use computing and communications standards.

4. Assess contemporary computer hardware platform trends.

Contemporary hardware and software platform trends address the overwhelming need to

reduce IT infrastructure costs, to integrate information across platforms, and to provide a higher level of flexibility and service to the firm and its customers. The integration of computing and telecommunications platforms, grid computing, edge computing, and on-demand computing demonstrate that, increasingly, computing is taking place over a network. Grid computing involves connecting geographically remote computers into a single network to create a computational grid that combines the computing power of all the computers on the network to attack large computing problems. Edge computing balances the processing load for Web-based applications by distributing parts of the Web content, logic, and processing among multiple servers. On-demand computing also depends on networks for firms to purchase additional processing power from large computer service firms and to have that power delivered when they need it over a network. In autonomic computing, computer systems have capabilities for automatically configuring and repairing themselves.

5. Assess contemporary software platform trends.

Contemporary software platform trends include the growing use of Linux, open-source software, and Java, software for enterprise integration, and software outsourcing. Open-source software is produced and maintained by a global community of programmers and is downloadable for free. Linux is a powerful, resilient open-source operating system that can run on multiple hardware platforms and is used widely to run Web servers. Java is an operating-system-and hardware-independent programming language that is the leading interactive programming environment for the Web.

Software for enterprise integration includes enterprise applications and middleware such as enterprise application integration (EAI) software and Web services. Unlike EAI software, Web services are loosely coupled software components based on open Web standards that are not product-specific and can work with any application software and operating system. They can be used as components of Web-based applications linking the systems of two different organizations or to link disparate systems of a single company. Companies are purchasing their new software applications from outside sources, including application software packages, outsourcing custom application development to an external vendor (that may be offshore), or renting software services from an application service provider.

6. Evaluate the challenges of managing IT infrastructure and management solutions.

Major infrastructure challenges include making wise infrastructure investments, choosing and coordinating infrastructure components, dealing with infrastructure change, and agreeing on infrastructure management and governance. Solution guidelines include using a competitive forces model to determine how much to spend on IT infrastructure and where to make strategic infrastructure investments, starting out new infrastructure initiatives with small experimental pilot projects, and establishing the total cost of ownership (TCO) of information technology assets. The total cost of owning technology resources includes not only the original cost of computer hardware and software but also costs for hardware and software upgrades, maintenance, technical support, and training.

[Return to Top](#)

Chapter 7: Summary

[Back to Contents](#)

1. Describe basic file organization concepts and the problems of managing data resources in a traditional file environment.

A computer system organizes data in a hierarchy that starts with bits and bytes and progresses to fields, records, files, and databases. Traditional file management techniques make it difficult for organizations to keep track of all of the pieces of data they use in a systematic way and to organize these data so that they can be easily accessed. Different functional areas and groups were allowed to develop their own files independently. Over time, this traditional file management environment creates problems such as data redundancy and inconsistency, program-data dependence, inflexibility, poor security, and lack of data sharing and availability.

2. Describe how a database management system organizes information and compare the principal database models.

A database management system (DBMS) consists of software that permits centralization of data and data management so that businesses have a single consistent source for all their data needs. A single database services multiple applications. A DBMS includes a data definition language, a data manipulation language, and a data dictionary capability. The most important feature of the DBMS is its ability to separate the logical and physical views of data. The user works with a logical view of data. The DBMS retrieves information so that the user does not have to be concerned with its physical location.

The principal types of databases today are relational DBMS and object-oriented DBMS. Relational systems are very flexible for supporting ad hoc requests for information and for combining information from different sources. They support many-to-many relationships among entities. Relational DBMS are efficient for storing alphanumeric data that can be organized into structured fields and records, which are represented by attributes and tuples in two-dimensional tabular models. This flexibility was not possible with the older hierarchical and network database models. Object-oriented DBMS can store graphics and other types of data in addition to conventional text data to support multimedia applications. Organizations should use the DBMS that is best suited for their data model.

3. Apply important database design principles.

Designing a database requires both a logical design and a physical design. The logical design models the database from a business perspective. The organization's data model should reflect its key business processes and decision-making requirements. The process of creating small, stable, flexible, and adaptive data structures from complex groups of data when designing a relational database is termed normalization. Database design also considers whether a complete database or portions of the database can be distributed to more than one location to increase responsiveness and reduce vulnerability and costs. There are two major types of distributed databases: replicated databases and partitioned databases.

4. Evaluate new database trends.

Powerful tools are available to analyze the information in databases and to take advantage of the information resources on the World Wide Web. Multidimensional data analysis, also known as online analytical processing (OLAP), can represent relationships among data as a multidimensional structure, which can be visualized as cubes of data and cubes within cubes of data, enabling more sophisticated data analysis. Data can be more conveniently analyzed across the enterprise by using a data warehouse, in which current and historical data are extracted from many different operational systems and consolidated for management decision making. Data mining analyzes large pools of data, including the contents of data warehouses, to find patterns and rules that can be used to predict future behavior and guide decision making. Hypermedia databases enable data to be stored in nodes linked together in any pattern the user establishes and are used for storing information at Web sites. Conventional databases can be linked to the Web to facilitate user access to an organization's internal data.

5. Identify the challenges posed by data resource management and management solutions.

Developing a database environment requires much more than selecting database technology. It requires a formal information policy governing the maintenance, distribution, and use of information in the organization. The organization must also develop a data administration function and a data-planning methodology. Data planning may need to be performed to make sure that the organization's data model delivers information efficiently for its business processes and enhances organizational performance. There is political resistance in organizations to many key database concepts, especially the sharing of information that has been controlled exclusively by one organizational group. Creating a database environment is a long-term endeavor requiring large up-front investments and organizational change.

[Return to Top](#)

Chapter 8: Summary

[Back to Contents](#)

1. Describe the features of a contemporary corporate network infrastructure and key networking technologies.

A contemporary corporate network infrastructure relies on both public and private infrastructures to support the movement of information across diverse technological platforms. It includes the traditional telephone system, mobile cellular communication, wireless local area networks, videoconferencing systems, a corporate Web site, intranets, extranets, and an array of local and wide area networks, including the Internet. This collection of networks evolved from two fundamentally different types of networks: telephone networks and computer networks.

A simple network consists of two or more connected computers. Basic network components include computers, network interfaces, a connection medium, network operating system software, and either a hub or a switch.

Contemporary networks have been shaped by the rise of client/server computing, the use of packet switching, and the adoption of TCP/IP as a universal communications standard for linking disparate networks and computers. Client/server networks have distributed much of the organization's computing power to the desktop and factory floor. Packet switching makes more efficient use of network communications capacity by breaking messages into small packets that are sent independently along different paths in a network and then reassembled at their destination. Protocols provide a common set of rules that enable communication among diverse components in a telecommunications network. TCP/IP is a suite of protocols that has become the dominant model of achieving connectivity among different networks and computers. It is the connectivity model used in the Internet.

2. Evaluate alternative transmission media, types of networks, and network services.

The principal physical transmission media are twisted copper telephone wire; coaxial copper cable; fiber-optic cable; and wireless transmission using microwave, satellite, low-frequency radio waves, or infrared waves. The choice of transmission medium depends on the distance and volume of communication required by the organization and its financial resources. Twisted wire enables companies to use existing wiring for telephone systems for digital communication, although it is relatively slow. Fiber-optic and coaxial cable are used for high-volume transmission but are expensive to install. Microwave and satellite are used for wireless communication over long distances. The transmission capacity of a medium, known as the bandwidth, is determined by the range of frequencies it can accommodate.

There are different types of networks and network services available to organizations. Network selection and design should be based on the organization's information requirements and the distance required for transmission. Local area networks (LANs) connect PCs and other digital devices together within a 500-meter radius and are used today for many corporate computing tasks. Network components may be connected together using a star, bus, or ring topology. Wide area networks (WANs) span broad geographical distances, ranging as far as entire continents or across the globe, and are private networks that are independently managed. Metropolitan area networks (MANs) span a single urban area, whereas campus area

networks (CANs) span a campus of buildings or a military base.

A number of network services are available to organizations requiring high-bandwidth transmission. Frame relay is a shared network service with transmission speeds ranging from 56 Kbps to more than 40 Mbps; it relies on digital circuits that require less error checking than packet switching. Asynchronous Transfer Mode (ATM) provides transmission speeds of 1.5 Mbps to more than 9 Gbps, parceling data into fixed 53-byte cells. ATM can pass data between computers from different vendors and is popular for transmitting data, video, and audio over the same network. Integrated Services Digital Network (ISDN) is an international standard for dial-up network access that uses existing local telephone lines to integrate voice, data, image, and video services. Basic rate ISDN can transmit data at a rate of 128 Kbps.

Digital Subscriber Line (DSL) technologies, cable modems, and T lines are often used for high-capacity Internet connections. Like ISDN, DSL technologies also operate over existing copper telephone lines to carry voice, data, and video, but they have higher transmission capacities than ISDN. Asymmetric Digital Subscriber Line (ADSL) supports a transmission rate of 1.5 to 9 Mbps when receiving data and up to 640 Kbps when sending data. Symmetric Digital Subscriber Line (SDSL) supports the same transmission rate for sending and receiving data of up to 3 Mbps.

Cable modems, which operate over cable TV lines, can provide high-speed access to the Web or corporate intranets at speeds of up to 4 Mbps. T lines are high-speed data lines leased from communications providers. A T-1 line supports a data transmission rate of 1.544 Mbps.

3. Assess the role of the Internet and the World Wide Web in a firm's information technology infrastructure.

The Internet is a worldwide network of networks that uses the client/server model of computing and the TCP/IP network reference model. Every computer on the Internet is assigned a unique numeric IP address. The Domain Name System (DNS) converts IP addresses to domain names so that users only need to specify a domain name to access a computer on the Internet instead of typing in the numeric IP address. No one owns the Internet and it has no formal management organization. However, worldwide Internet policies are established by organizations and government bodies such as the Internet Architecture Board and the World Wide Web Consortium. The Internet must also conform to the laws of the sovereign nation-states in which it operates, as well as the technical infrastructures that exist within the nation-state.

The Internet's global reach and connectivity, scalability, distributed design, universal standards, richness, and interactivity have made it the primary infrastructure for electronic business and electronic commerce. Major Internet services include e-mail, Usenet, LISTSERV, chatting, instant messaging, Telnet, FTP, and the World Wide Web.

The World Wide Web provides a universal set of standards for storing, retrieving, and displaying information in a client/server environment, enabling users to link to information resources housed on many different computer systems around the world. Web pages are based on Hypertext Markup Language (HTML) and can display text, graphics, video, and audio. Web site directories, search engines, and push technology can help users locate the information they need on the Web. Web technology and Internet networking standards provide the connectivity

and interfaces for internal private intranets and private extranets that can be accessed by many different kinds of computers inside and outside the organization.

4. Identify and describe the most important tools for communication and e-business.

The principal applications for communication are e-mail, chatting, instant messaging, Usenet newsgroups, and LISTSERV services. These tools reduce time and cost when firms must manage organizational activities and communicate with many employees. Groupware, teamware, and electronic conferencing software provide tools to support communication and collaboration when people work together in groups or work teams, often in different locations. Firms are also starting to realize economies by using Internet telephony, which enables Internet technology to be used for telephone voice transmission. Internet technology can also reduce communication costs by enabling companies to create virtual private networks (VPNs) as low-cost alternatives to private WANs.

5. Identify and describe the challenges posed by networking and the Internet and management solutions.

Challenges posed by networking and the Internet include loss of management control over information systems; the need for organizational change; and the difficulty of ensuring infrastructure scalability and reliability. Solutions include developing a strategic networking plan and carefully managing the business and organizational changes associated with intensive networking and the Internet.

[Return to Top](#)

Chapter 9: Summary

[Back to Contents](#)

1. Identify the principal wireless transmission media and devices, cellular network standards and generations, and standards for Mobile Web access.

Devices for wireless transmission include pagers, e-mail handhelds, personal digital assistants (PDAs), cellular telephones, and smart phones. Personal computers are also starting to be used in wireless transmission.

Microwave systems, both terrestrial and celestial, transmit high-frequency radio signals through the atmosphere and are widely used for high-volume, long-distance, point-to-point communication. Communication satellites serve as relay stations for microwave signals transmitted from terrestrial stations.

Major cellular standards include Code Division Multiple Access (CDMA), which is used primarily in the United States, and Global System for Mobile Communication (GSM), which is the standard in Europe and much of the rest of the world.

Cellular networks have evolved from slow-speed (1G) analog networks to high-speed high-bandwidth digital packet-switched third-generation (3G) networks with speeds ranging from 144 Kbps to over 2 Mbps for data transmission. Second-generation (2G) cellular networks are digital networks used primarily for voice transmission, but they can also transmit data at rates ranging from 9.6 to 14.4 Kbps. 2.5G networks are packet-switched, use many existing infrastructure elements, and have data transmission rates ranging from 50 to 144 Kbps.

Alternative standards governing the way wireless mobile devices access the Internet and the World Wide Web include Wireless Application Protocol (WAP) and I-mode.

2. Describe the major standards for wireless networks and for wireless Internet access.

The Institute of Electrical and Electronics Engineers (IEEE) has established a hierarchy of complementary standards for wireless computer networks. These include Bluetooth (802.15) for small personal area networks (PANs), Wi-Fi (802.11) for local area networks (LANs), and WiMax (802.16) for metropolitan area networks (MANs).

Bluetooth can link up to eight devices within a 10 meter area using low-power, radio-based communication and can transmit up to 722 Kbps in the 2.4-GHz band. Wireless phones, keyboards, computers, printers, and PDAs using Bluetooth can communicate with each other and even operate each other without direct user intervention.

The most popular of the 802.11 standards is currently 802.11b, which can transmit up to 11 Mbps in the unlicensed 2.4-GHz band and has an effective distance of 30 to 50 meters, although this range can be extended outdoors by using tower-mounted antennas. The 802.11b standard has been the most widely used standard for creating wireless LANs and providing broadband wireless Internet access. However, 802.11b is vulnerable to penetration

by outsiders and interference from other wireless devices in the same frequency spectrum.

WiMax has a wireless access range of up to 31 miles and a data transfer rate of up to 75 Mbps, making it suitable for providing broadband Internet access in areas lacking DSL and cable lines. The 802.16 specification also has robust security and quality of service features to support voice and video.

Major cellular carriers are also upgrading their networks to provide wireless broadband access to the Internet at an average speed of 300 to 500 Kbps. Verizon's service, called BroadBand Access, uses a technology called EV-DO to provide Internet access over a cellular network.

3. Evaluate the role of m-commerce in business and describe the most important m-commerce applications.

M-commerce uses the Internet for purchasing goods and services as well as for transmitting messages using wireless mobile devices. It is especially well-suited for location-based applications, such as finding local hotels and restaurants, monitoring local traffic and weather, and providing personalized location-based marketing. Mobile phones and handhelds are being used for mobile bill payment, banking, securities trading, transportation schedule updates, and digital music and game downloads.

Wireless portals (mobile portals) feature content and services optimized for mobile devices to steer users to the information they are most likely to need. Voice portals accept voice commands for accessing Web content, e-mail, and other electronic applications from a cell phone or standard telephone.

M-commerce requires special digital payment systems that can handle micropayments, because most m-commerce purchases today are for very small amounts. Mobile wallets (m-wallets) expedite purchases by storing online shoppers' personal information and credit card numbers.

M-commerce represents a tiny fraction of all online purchases because wireless mobile devices can't display merchandise very well. Mobile phones have tiny keyboards, small screens, and slow data transfer speeds (9.6 to 14.4 Kbps). M-commerce will benefit from interoperable payment systems for wireless devices and faster wireless networks to support more data-rich communication.

4. Assess the business value of wireless technology and describe important wireless applications in business.

Wireless technology increases productivity and worker output by providing anytime, anywhere communication and access to information, including the information resources of the Internet. Wireless communication helps businesses stay more easily in touch with customers, suppliers, and employees and provides more flexible arrangements for organizing work.

Mobile applications are having a significant impact on customer relationship management (CRM), supply chain management (SCM), and health care. Mobile CRM

applications provide additional support for sales and service activities at the point of customer interaction.

Mobile wireless technology facilitates supply chain management by capturing data on the movement of goods as these events take place and by providing detailed, immediate information as goods move among supply chain partners. Radio frequency identification (RFID) systems provide a powerful technology for this purpose. These systems use tiny tags that have embedded microchips that contain data about an item and its location. The tags transmit radio signals over a short distance to special RFID readers. The RFID readers then pass the data over a network to a computer for processing.

Mobile technology is improving health care by delivering essential information to physicians and nurses who constantly move from place to place and capturing patient information for electronic record systems at the point of creation.

Wireless sensor networks (WSNs) are networks of interconnected wireless devices with some processing and radio-transmitting capability that are embedded into the physical environment to provide measurements of many points over large spaces. Wireless sensor networks are valuable for monitoring environmental changes, traffic patterns, security incidents, or supply chain events.

5. Identify and describe the challenges posed by wireless technology and management solutions.

The principal challenges posed by wireless technology are maintaining security and privacy and integrating this technology into the firm's IT infrastructure.

Solutions include identifying the areas in which wireless can provide the greatest value, creating an appropriate framework for managing wireless technology, and using a pilot program before full-scale rollout of wireless systems. Key management decisions deal with establishing the business value of wireless technology, selecting appropriate wireless technologies and standards, and identifying the necessary changes in business processes to make wireless technology work.

[Return to Top](#)

Chapter 10: Summary

[Back to Contents](#)

1. Explain why information systems need special protection from destruction, error, and abuse.

With data concentrated into electronic form and many procedures invisible through automation, computerized information systems are vulnerable to destruction, misuse, error, fraud, and hardware or software failures. Corporate systems using the Internet are especially vulnerable because the Internet is designed to be an open system and makes internal corporate systems more vulnerable to actions from outsiders. Hackers can unleash denial of service (DoS) attacks or penetrate corporate networks to cause serious system disruptions. Wi-Fi networks can easily be penetrated by intruders using sniffer programs to obtain an address to access the resources of the network. Computer viruses and worms can spread rampantly from system to system, clogging computer memory or destroying programs and data. Software presents problems because software bugs may be impossible to eliminate and because software vulnerabilities can be exploited by hackers and malicious software. End users can introduce errors.

2. Assess the business value of security and control.

Security and control are important but often neglected areas for information systems investment. Firms relying on computer systems for their core business functions can lose sales and productivity. Information assets such as confidential employee records, trade secrets, or business plans lose much of their value if they are revealed to outsiders or if they expose the firm to legal liability. New laws such as HIPAA, the Sarbanes-Oxley Act, and the Gramm-Leach-Bliley Act require companies to practice stringent electronic records management and adhere to strict standards for security, privacy, and control. Legal actions requiring electronic evidence and computer forensics also require firms to pay more attention to security and electronic records management.

3. Evaluate elements of an organizational and managerial framework for security and control.

Firms need to establish an appropriate organizational and managerial framework for security and control to use technologies effectively to protect their information resources. They must establish a well-designed set of general and application controls. General controls handle the overall design, security, and use of computers, programs, and files for the organization's information technology infrastructure. Application controls are those unique to specific computerized applications. They focus on the completeness and accuracy of input, updating and maintenance, and the validity of the information in the system. Application controls consist of (1) input controls, (2) processing controls, and (3) output controls.

To determine which controls are required, designers and users of systems must identify the most important assets requiring protection and the extent to which these assets are vulnerable. A risk assessment evaluates information assets, identifies control points and control weaknesses, and determines the most cost-effective set of controls.

Firms must also develop a coherent corporate security policy and plans for continuing

business operations in the event of disaster or disruption. The security policy includes policies for acceptable use and authorization. A disaster recovery plan provides procedures and facilities for restoring computing and communication services after they have been disrupted, whereas a business continuity plan focuses on how the company can restore business operations.

Comprehensive and systematic MIS auditing can help organizations determine the effectiveness of security and controls for their information systems.

4. Evaluate the most important tools and technologies for safeguarding information resources.

Companies require special measures to support electronic commerce and digital business processes. They can use fault-tolerant computer systems or create high-availability computing environments to make sure that their information systems are always available and performing without interruptions. Firewalls are placed between an organization's private network and external networks such as the Internet to prevent unauthorized users from accessing the private network. Intrusion detection systems monitor private networks for suspicious network traffic and attempts to access corporate systems. Passwords, tokens, and biometric authentication can be used for authenticating system users. Antivirus software can check computer systems for infection by viruses and worms and often eliminate the malicious software. Encryption, the coding and scrambling of messages, is a widely used technology for securing electronic transmissions over the Internet and over Wi-Fi networks. Digital certificates combined with public key encryption provide further protection of electronic transactions by authenticating a user's identity.

The quality and reliability of software can be improved by thorough testing procedures and by allocating resources to put more emphasis on secure software design.

5. Identify the challenges posed by information systems security and control and management solutions.

Establishing a good framework for security and control requires skillful balancing of risks, rewards, and the firm's operational capabilities. Designing systems that are neither overcontrolled nor undercontrolled and implementing an effective security policy are major management challenges. Solutions include making security and control a higher management priority and instilling security awareness throughout the firm. Key management decisions include determining an appropriate level of control for the organization and establishing standards for system accuracy and reliability.

[Return to Top](#)

Chapter 11: Summary

[Back to Contents](#)

1. Assess how enterprise systems provide value for businesses and describe how they work.

Enterprise systems integrate the key business processes of a firm into a single software system so that information can flow seamlessly throughout the organization, improving coordination, efficiency, and decision making. Enterprise software is based on a suite of integrated software modules and a common central database. The database collects data from and feeds the data into numerous applications that can support nearly all of an organization's internal business activities. When new information is entered by one process, the information is made available immediately to other business processes. Organizations implementing enterprise software would have to adopt the business processes embedded in the software and, if necessary, change their business processes to conform to those in the software.

Enterprise systems support organizational centralization by enforcing uniform data standards and business processes throughout the company and a single unified technology platform. The firmwide data generated by enterprise systems can help managers monitor organizational performance. By integrating business processes in sales, production, finance, and logistics, the entire organization can more efficiently respond to customer requests for products or information, forecast new products, and build and deliver them as demand appears.

2. Assess how supply chain management systems provide value for businesses and explain how they work.

Supply chain management systems automate the flow of information between members of the supply chain so they can use it to make better decisions about when and how much to purchase, produce, or ship. More accurate information from supply chain management systems reduces uncertainty and the impact of the bullwhip effect. The correct movement of information makes it possible to time orders, shipments, and production properly to minimize inventory levels and expedite deliveries to customers.

Supply chain management software includes software for supply chain planning and for supply chain execution. Supply chain planning systems enable the firm to generate demand forecasts for a product and to develop sourcing, manufacturing, and distribution plans. Supply chain execution systems manage the flow of products through the final stages of production, distribution, and delivery. Supply chain management systems provide data such as fill rates, inventory turns, or source/make cycle time for evaluating the performance of supply chain processes. Firms can use intranets to improve coordination among their internal supply chain processes, and they can use extranets to coordinate supply chain processes shared with their business partners. Internet technology facilitates the management of global supply chains by providing the connectivity for organizations in different countries to share supply chain information. Improved communication among supply chain members also facilitates efficient customer response and movement toward a demand-driven model.

3. Assess how customer relationship management systems provide value for businesses and describe how they work.

Customer relationship management (CRM) systems integrate and automate many customer-facing processes in sales, marketing, and customer service, providing an enterprise-wide view of customers. These systems track all of the ways in which a company interacts with its customers and analyze these interactions to maximize customer lifetime value for the firm. CRM systems capture and integrate customer data from all over the organization, analyzing the data and distributing the results to customer-related systems and customer touch points across the enterprise. Companies can use this customer knowledge when they interact with customers to provide them with better service or to sell new products and services. These systems can also identify profitable or nonprofitable customers or opportunities to reduce the churn rate. The major customer relationship management software packages integrate customer-related processes in sales, marketing, and customer service and provide capabilities for both operational CRM and analytical CRM. They often include modules for managing relationships with selling partners (partner relationship management) and for employee relationship management.

If properly implemented, CRM systems help firms increase customer satisfaction, reduce direct marketing costs, and lower costs for customer acquisition and retention. Information from CRM systems can increase sales revenue by identifying the most profitable customers and segments for focused marketing, cross-selling, and up-selling. Customer churn can be reduced as sales, service, and marketing better respond to customer needs.

4. Explain how enterprise applications can be used in platforms for new cross-functional services.

Enterprise applications can serve as building blocks for new cross-functional services for customers, suppliers, or business partners based on enterprise-wide business processes by using service platforms and enterprise portals. Service platforms integrate data and processes from the various enterprise applications (customer relationship management, supply chain management, and enterprise systems), as well as from disparate legacy applications to create new composite processes. The new composite process is modeled using business process management tools, and application integration software ties various systems together. The new services are delivered through enterprise portals, which can integrate disparate applications so that information appears to be coming from a single source.

5. Identify the challenges posed by enterprise applications and management solutions.

Enterprise applications are very difficult to implement successfully. They require extensive organizational change, large new software investments, and careful assessment of how these systems will enhance organizational performance. Management vision and foresight are required to take a firm- and industry-wide view of problems and to find solutions that realize strategic value from the investment. Enterprise applications create new interconnections among myriad business processes and data flows inside the firm (and in the case of supply chain management systems, between the firm and its external supply chain partners) to streamline operations and to make better management decisions. Employees are often unprepared for new procedures and roles. Enterprise applications cannot provide value if they are implemented atop flawed processes or if firms do not know how to use these systems to measure performance improvements.

Companies can meet these challenges by putting business objectives first, securing top management support, paying attention to data and data management, and providing education and training.

[Return to Top](#)

Chapter 12: Summary

[Back to Contents](#)

1. Assess the role of knowledge management and knowledge management programs in business.

Knowledge management is a set of processes to create, store, transfer, and apply knowledge in the organization. Businesses need knowledge management programs because knowledge has become a central productive and strategic asset in today's information economy and a potential source of competitive advantage. Much of a firm's value depends on its ability to create and manage knowledge. Knowledge management promotes organizational learning by increasing the ability of the organization to learn from its environment and to incorporate knowledge into its business processes. Effective knowledge management systems require organizational and management capital to promote a knowledge culture and programs for knowledge management, including the creation of a chief knowledge officer. There are three major types of knowledge management systems: enterprise wide knowledge management systems, knowledge work systems, and intelligent techniques.

2. Define and describe the types of systems used for enterprise- wide knowledge management and demonstrate how they provide value for organizations.

Enterprise-wide knowledge management systems are firmwide efforts to collect, store, distribute, and apply digital content and knowledge. Structured knowledge systems provide databases and tools for organizing and storing structured documents, whereas semistructured knowledge systems provide databases and tools for organizing and storing semistructured knowledge, such as e-mail or rich media. Knowledge network systems provide directories and tools for locating firm employees with special expertise who are important sources of tacit knowledge. Often these systems include group collaboration tools, portals to simplify information access, search tools, and tools for classifying information based on a taxonomy that is appropriate for the organization. Enterprise-wide knowledge management systems can provide considerable value if they are well designed and enable employees to locate, share, and use knowledge more efficiently.

3. Define and describe the major types of knowledge work systems and assess how they provide value for firms.

Knowledge work systems (KWS) support the creation of new knowledge and its integration into the organization. KWS require easy access to an external knowledge base; powerful computer hardware that can support software with intensive graphics, analysis, document management, and communications capabilities; and a user-friendly interface. These capabilities can increase the productivity of highly paid knowledge workers. KWSs often run on workstations that are customized for the work they must perform. Computeraided design (CAD) systems and virtual reality systems, which create interactive simulations that behave like the real world, require graphics and powerful modeling capabilities. KWS for financial professionals provide access to external databases and the ability to analyze massive amounts of financial data very quickly.

4. Evaluate the business benefits of using intelligent techniques for knowledge

management.

Artificial intelligence lacks the flexibility, breadth, and generality of human intelligence, but it can be used to capture, codify, and extend organizational knowledge. Businesses can use artificial intelligence to help them capture and preserve tacit knowledge; for knowledge discovery; to generate solutions to specific problems that are too massive and complex to be analyzed by human beings on their own; and to help firms search for and filter information.

Expert systems capture tacit knowledge from a limited domain of human expertise and express that knowledge in the form of rules. The strategy to search through the knowledge base, called the inference engine, can use either forward or backward chaining. Expert systems are most useful for problems of classification or diagnosis. Case-based reasoning represents organizational knowledge as a database of cases that can be continually expanded and refined. When the user encounters a new case, the system searches for similar cases, finds the closest fit, and applies the solutions of the old case to the new case. The new case is stored with successful solutions in the case database.

Fuzzy logic is a software technology for expressing knowledge in the form of rules that use approximate or subjective values. Fuzzy logic has been used for controlling physical devices and is starting to be used for limited decision-making applications.

Neural networks consist of hardware and software that attempt to mimic the thought processes of the human brain. Neural networks are notable for their ability to learn without programming and to recognize patterns that cannot be easily described by humans. They are being used in science, medicine, and business primarily to discriminate patterns in massive amounts of data.

Genetic algorithms develop solutions to particular problems using genetically based processes such as fitness, crossover, and mutation. Genetic algorithms are beginning to be applied to problems involving optimization, product design, and monitoring industrial systems where many alternatives or variables must be evaluated to generate an optimal solution.

Intelligent agents are software programs with builtin or learned knowledge bases that carry out specific, repetitive, and predictable tasks for an individual user, business process, or software application. Intelligent agents can be programmed to navigate through large amounts of data to locate useful information and in some cases act on that information on behalf of the user.

5. Identify the challenges posed by knowledge management systems and management solutions.

Knowledge management systems are difficult to implement successfully and they do not always provide value after they are put in place. Firms can provide appropriate organizational and management capital to make these systems successful by rewarding knowledge sharing, promoting communities of practice and a knowledge culture, and designing appropriate taxonomies for organizing knowledge. Proper planning, development of appropriate measurements of benefits, and staged rollout can increase the chances of success for knowledge management projects. Key management decisions include identifying business

processes for which knowledge management systems can provide the most value.

[Return to Top](#)

Chapter 13: Summary

[Back to Contents](#)

1. Describe different types of decisions and the decisionmaking process.

The different levels in an organization (strategic, management, operational) have different decision-making requirements. Decisions can be structured, semistructured, or unstructured, with structured decisions clustering at the operational level of the organization and unstructured decisions at the strategic level. Decision making can be performed by individuals or groups and includes employees as well as operational, middle, and senior managers. There are four stages in decision making: intelligence, design, choice, and implementation. Systems to support decision making do not always produce better manager and employee decisions that improve firm performance because of problems with information quality, management filters, and organizational inertia.

2. Evaluate the role of information systems in helping people working individually and in a group make decisions more efficiently.

Specialized systems for business intelligence are specifically designed to help managers and employees make better decisions. Business intelligence includes management information systems (MIS), decisionsupport systems (DSS), group decision-support systems (GDSS), and executive support systems (ESS) and makes use of data from enterprise applications and technologies such as data mining and online analytical processing (OLAP).

Management information systems (MIS) provide information on firm performance to help managers monitor and control the business, often in the form of fixed, regularly scheduled reports based on data summarized from the firm's transaction processing systems. MIS support structured decisions and some semistructured decisions.

Decision-support systems (DSS) combine data, sophisticated analytical models and tools, and user-friendly software into a single powerful system that can support semistructured or unstructured decision making. The components of a DSS are the DSS database, the DSS software system, and the user interface. There are two kinds of DSS: model-driven DSS and data-driven DSS. DSS can help support decisions for pricing, asset utilization, supply chain management, and customer relationship management as well model alternative business scenarios. DSS targeted toward customers as well as managers are becoming available on the Web. A special category of DSS called geographic information systems (GIS) uses data visualization technology to analyze and display data for planning and decision making with digitized maps.

People working together in a group can use group decision- support systems to help them in the process of arriving at a decision. Group decision-support systems have hardware, software, and people components. Hardware components consist of the conference room facilities, including seating arrangements and computer and other electronic hardware. Software components include tools for organizing ideas, gathering information, ranking and setting priorities, and documenting meeting sessions. People components include participants, a trained facilitator, and staff to support the hardware and software.

A GDSS helps decision makers meeting together to arrive at a decision more efficiently and is especially useful for increasing the productivity of meetings of more than four or five people. However, the effectiveness of a GDSS is contingent on the composition of the group, the task, appropriate tool selection and meeting support, and the organizational context of the meeting.

3. Demonstrate how executive support systems can help senior managers make better decisions.

Executive support systems (ESS) help senior managers with unstructured problems that occur at the strategic level of the firm. ESS provide data from both internal and external sources and provide a generalized computing and communications environment that can be focused and applied to a changing array of problems. ESS help senior executives monitor firm performance, spot problems, identify opportunities, and forecast trends. These systems can filter out extraneous details for high-level overviews, or they can drill down to provide senior managers with detailed transaction data if required. ESS are starting to take advantage of firmwide data provided by enterprise systems.

ESS help senior managers analyze, compare, and highlight trends so that the managers may more easily monitor organizational performance or identify strategic problems and opportunities. They are very useful for environmental scanning, providing business intelligence to help management detect strategic threats or opportunities from the organization's environment. ESS can increase the span of control of senior management, allowing them to oversee more people with fewer resources.

4. Assess how systems that support decision making can provide value for the firm.

DSS, GDSS, and ESS are starting to take advantage of more accurate firmwide data provided by enterprise systems and the new information technology infrastructure to support very fine-grained decisions for guiding the firm, coordinating work activities across the enterprise, and responding rapidly to changing markets and customers. DSS can be used to guide company-wide decisions in supply chain management, customer relationship management, and business planning scenarios. ESS can be used to monitor company-wide performance using both traditional financial metrics and the balanced scorecard model. The ability to explore the outcomes of alternative organizational scenarios, use precise firmwide information, and provide tools to facilitate group decision processes can help managers make decisions that help the firm achieve its strategic objectives.

5. Identify the challenges posed by decision-support systems, group decision-support systems, and executive support systems and management solutions.

Systems to support decision making do not always lead to better decisions or improved organizational performance. It is not always easy to understand a managerial decision problem if its very unstructured. Managers may not be able to change their thinking to harness the power of these systems, to ask better questions of their data, and to interpret system output accurately. There may be some resistance to ESS at lower levels of the organization if senior management is using them to monitor performance carefully. These systems are more likely to be successful if they are designed and built with flexibility and if they have adequate

management support and training programs.

[Return to Top](#)

Chapter 14: Summary

[Back to Contents](#)

1. Demonstrate how building new systems produces organizational change.

Building a new information system is a form of planned organizational change that involves many different people in the organization. Because information systems are sociotechnical entities, a change in information systems involves changes in work, management, and the organization. Four kinds of technology-enabled change are (a) automation, (b) rationalization of procedures, (c) business process reengineering, and (d) paradigm shift, with far-reaching changes carrying the greatest risks and rewards. Many organizations are attempting business process reengineering to redesign work flows and business processes in the hope of achieving dramatic productivity breakthroughs. Information systems can also be used to support business process management, total quality management (TQM), six sigma, and other initiatives for incremental process improvement.

2. Explain how a company can develop information systems that fit its business plan.

Organizations should develop information systems plans that describe how information technology supports the attainment of their business goals. The plans indicate the direction of systems development, the rationale, the implementation strategy, and the budget. Enterprise analysis and critical success factors (CSFs) can be used to elicit organization-wide information requirements that must be addressed by the plans.

3. Identify and describe the core activities in the systems development process.

The core activities in systems development are systems analysis, systems design, programming, testing, conversion, production, and maintenance. Systems analysis is the study and analysis of problems of existing systems and the identification of requirements for their solutions. Systems design provides the specifications for an information system solution, showing how its technical and organizational components fit together.

4. Evaluate alternative methods for building information systems and alternative methodologies for modeling systems.

There are a number of alternative methods for building information systems, each suited to different types of problems. The oldest method for building systems is the systems life cycle, which requires that information systems be developed in formal stages. The stages must proceed sequentially and have defined outputs; each requires formal approval before the next stage can commence. The system life cycle is useful for large projects that need formal specifications and tight management control over each stage of systems building. However, this approach is very rigid and costly and is not well suited for unstructured, decision-oriented applications for which requirements cannot be immediately visualized.

Prototyping consists of building an experimental system rapidly and inexpensively for end users to interact with and evaluate. The prototype is refined and enhanced until users are satisfied that it includes all of their requirements and can be used as a template to create the final system. Prototyping encourages end-user involvement in systems development and

iteration of design until specifications are captured accurately. The rapid creation of prototypes can result in systems that have not been completely tested or documented or that are technically inadequate for a production environment.

Developing an information system using an application software package eliminates the need for writing software programs when developing an information system. Using a software package reduces the amount of design, testing, installation, and maintenance work required to build a system. Application software packages are helpful if a firm does not have the internal information systems staff or financial resources to custom develop a system. To meet an organization's unique requirements, packages may require extensive modifications that can substantially raise development costs.

End-user development is the development of information systems by end users, either alone or with minimal assistance from information systems specialists. End-user-developed systems can be created rapidly and informally using fourth-generation software tools. The primary benefits of end-user development are improved requirements determination; reduced application backlog; and increased end-user participation in, and control of, the systems development process. However, end-user development, in conjunction with distributed computing, has introduced new organizational risks by propagating information systems and data resources that do not necessarily meet quality assurance standards and that are not easily controlled by traditional means.

Outsourcing consists of using an external vendor to build (or operate) a firm's information systems. The work is done by the vendor rather than by the organization's internal information systems staff. Outsourcing can save application development costs or enable firms to develop applications without an internal information systems staff. However, firms risk losing control over their information systems and becoming too dependent on external vendors.

Structured methodologies and object-oriented development are alternative methodologies for designing and modeling systems. Structured methodologies are process-oriented, whereas object-oriented development models a system as a collection of objects that combine processes and data. Managers should be aware of the strengths and weaknesses of each systems-building approach and the types of problems for which each is best suited.

5. Assess the challenges of building information systems and management solutions.

Businesses today are often required to build e-commerce and e-business applications very rapidly to remain competitive. New systems are likely to have more interorganizational requirements and processes than in the past. Companies are turning to rapid application design, joint application design (JAD), and reusable software components to improve the systems development process. Rapid application development (RAD) uses object-oriented software, visual programming, prototyping, and fourth-generation tools for very rapid creation of systems. Component-based development expedites application development by grouping objects into suites of software components that can be combined to create large-scale business applications.

Web services enable firms to obtain software application components delivered over the Internet for building new systems or integrating existing systems. Web services provide a common set of standards that enable organizations to link their systems regardless of their

technology platform through standard plug and play architecture.

[Return to Top](#)

Chapter 15: Summary

[Back to Contents](#)

1. Evaluate models for understanding the business value of information systems.

Information systems can provide business value for a firm in many different ways, including increased profitability and productivity. Some, but not all, of these business benefits can be quantified and measured.

Capital budgeting models are used to determine whether an investment in information technology produces sufficient returns to justify its costs. The principal capital budgeting models are the payback method, accounting rate of return on investment (ROI), net present value, cost-benefit ratio, profitability index, and internal rate of return (IRR).

Other models for evaluating information systems investments involve nonfinancial and strategic considerations. Portfolio analysis and scoring models can be used to evaluate alternative information systems projects. Real options pricing models, which apply the same techniques for valuing financial options to systems investments, can be useful when considering highly uncertain IT investments.

Although information technology has increased productivity in manufacturing, especially the manufacture of information technology products, the extent to which computers have enhanced the productivity of the service sector remains under debate. In addition to reducing costs, computers may increase the quality of products and services for consumers or may create entirely new products and revenue streams. These intangible benefits are difficult to measure and consequently are not addressed by conventional productivity measures.

2. Analyze the principal causes of information system failure.

A very large percentage of information systems fail to deliver benefits or solve the problems for which they were intended because the process of organizational change surrounding system building was not properly addressed. The principal causes of information system failure are (1) insufficient or improper user participation in the systems development process, (2) lack of management support, (3) high levels of complexity and risk in the systems development process, and (4) poor management of the implementation process. There is a very high failure rate among business process reengineering and enterprise application projects because they require extensive organizational change that is often resisted by members of the organization. Enterprise applications as well as system changes resulting from mergers and acquisitions are also difficult to implement successfully because they usually require far-reaching changes to business processes.

3. Assess the change management requirements for building successful systems.

Building an information system is a process of planned organizational change that must be carefully managed. The term implementation refers to the entire process of organizational change surrounding the introduction of a new information system. One can better understand system success and failure by examining different patterns of implementation. Especially

important is the relationship between participants in the implementation process, notably the interactions between system designers and users. Conflicts between the technical orientation of system designers and the business orientation of end users must be resolved. The success of organizational change can be determined by how well information systems specialists, end users, and decision makers deal with key issues at various stages in implementation. Eliciting user support and maintaining an appropriate level of user involvement at all stages of system building are essential.

4. Select appropriate strategies to manage the system implementation process.

Management support and control of the implementation process are essential, as are mechanisms for dealing with the level of risk in each new systems project. Some companies experience organizational resistance to change. Project risk factors can be brought under some control by a contingency approach to project management. The level of risk in a systems development project is determined by three key dimensions: (1) project size, (2) project structure, and (3) experience with technology. The risk level of each project determines the appropriate mix of external integration tools, internal integration tools, formal planning tools, and formal control tools to be applied.

Appropriate strategies can be applied to ensure the correct level of user participation in the systems development process and to minimize user resistance. Information systems design and the entire implementation process should be managed as planned organizational change. Participatory design emphasizes the participation of the individuals most affected by a new system. Sociotechnical design aims for an optimal blend of social and technical design solutions.

5. Identify the challenges posed by implementing new systems and management solutions.

Building successful systems is something of an art form. It is becoming increasingly difficult to determine the costs and benefits of systems, especially those in which benefits are primarily intangible or those that are interrelated with other systems and pieces of technology in the firm. Implementing large-scale systems and obtaining benefits from such investments are especially challenging. Management solutions include developing metrics and processes to make sure information systems investments provide business value and using more dynamic approaches to project management.

[Return to Top](#)

Chapter 16: Summary

[Back to Contents](#)

1. Identify the major factors driving the internationalization of business.

There are general cultural factors and specific business factors to consider. The growth of cheap international communication and transportation has created a world culture with stable expectations or norms. Political stability and a growing global knowledge base that is widely shared contribute also to the world culture. These general factors create the conditions for global markets, global production, coordination, distribution, and global economies of scale.

2. Compare strategies for developing global businesses.

There are four basic international strategies: domestic exporter, multinational, franchiser, and transnational. In a transnational strategy, all factors of production are coordinated on a global scale. However, the choice of strategy is a function of the type of business and product.

3. Demonstrate how information systems can support different global business strategies.

There is a connection between firm strategy and information systems design. Transnational firms must develop networked system configurations and permit considerable decentralization of development and operations. Franchisers almost always duplicate systems across many countries and use centralized financial controls. Multinationals typically rely on decentralized independence among foreign units with some movement toward development of networks. Domestic exporters typically are centralized in domestic headquarters with some decentralized operations permitted.

4. Evaluate the issues and technical alternatives to be considered when developing international information systems.

Implementing a global system requires an implementation strategy that considers both business design and technology platforms. Typically, global systems have evolved without a conscious plan. The remedy is to define a small subset of core business processes and focus on building systems that could support these processes. Tactically, you will have to co-opt widely dispersed foreign units to participate in the development and operation of these systems, being careful to maintain overall control.

The main hardware and telecommunications issues are systems integration and connectivity. The choices for integration are to go either with a proprietary architecture or with open systems technology. Global networks are extremely difficult to build and operate. Firms can build their own global networks or they can create global networks based on the Internet (intranets or virtual private networks). The main software issue concerns building interfaces to existing systems and selecting applications that can work with multiple cultural, language, and organizational frameworks.

5. Identify the challenges posed by global information systems and management solutions.

Global information systems pose challenges because cultural, political, and language diversity magnifies differences in organizational culture and business processes and encourages proliferation of disparate local information systems that are difficult to integrate. Businesses may have to struggle to find the right global business strategy. Management solutions include identifying a common set of user requirements for the entire global enterprise; coordinating applications development and software releases; and using legitimacy and cooptation to enlist user support in the change process.

[Return to Top](#)

GLOSSARY **2.5G Networks**

Wireless cellular networks that are packet-switched and to provide higher-speed data transmission rates ranging from 50 to 144 Kbps using the existing cellular network infrastructure.

3G Networks

Cellular networks based on packet-switched technology with speeds ranging from 144 Kbps for mobile users to over 2 Mbps for stationary users, enabling users to transmit video, graphics, and other rich media, in addition to voice.

802.11b

Wireless LAN standard that can transmit up to 11 Mbps in the unlicensed 2.4-GHz band and has an effective distance of 30 to 50 meters.

Acceptable Use Policy (AUP)

Defines acceptable uses of the firm's information resources and computing equipment, including desktop and laptop computers, wireless devices, telephones, and the Internet, and specifies consequences for noncompliance.

Acceptance Testing

Provides the final certification that the system is ready to be used in a production setting.

Access Control

Policies and procedures a company uses to prevent improper access to systems by unauthorized insiders and outsiders.

Access Point

Box in a wireless LAN consisting of a radio receiver/transmitter and antennae that link to a wired network, router, or hub.

Accountability

The mechanisms for assessing responsibility for decisions made and actions taken.

Accounting Rate of Return on Investment (ROI)

Calculation of the rate of return on an investment by adjusting cash inflows produced by the investment for depreciation. Approximates the accounting income earned by the investment.

Accumulated Balance Digital Payment Systems

Systems enabling users to make micropayments and purchases on the Web, accumulating a debit balance on their credit card or telephone bills.

Activity-based Costing

Model for identifying all the company activities that cause costs to occur while producing a

specific product or service so that managers can see which products or services are profitable or losing money and make changes to maximize firm profitability.

Administrative Controls

Formalized standards, rules, procedures, and disciplines to ensure that the organization's controls are properly executed and enforced.

Agency Theory

Economic theory that views the firm as a nexus of contracts among self-interested individuals who must be supervised and managed.

AI Shell

The programming environment of an expert system.

Analog Signal

A continuous waveform that passes through a communications medium; used for voice communications.

Analytical CRM

Customer relationship management applications dealing with the analysis of customer data to provide information for improving business performance.

Antivirus Software

Software designed to detect, and often eliminate, computer viruses from an information system.

Application Controls

Specific controls unique to each computerized application.

Application Proxy Filtering

Firewall screening technology that uses a proxy server to inspect and transmit data packets flowing into and out of the organization so that all the organization's internal applications communicate with the outside using a proxy application.

Application Server

Software that handles all application operations between browser-based computers and a company's back-end business applications or databases.

Application Service Provider (ASP)

Company providing software that can be rented by other companies over the Web or a private network.

Application Software Package

A set of prewritten, precoded application software programs that are commercially available for sale or lease.

Application Software

Programs written for a specific application to perform functions specified by end users.

Artificial Intelligence (AI)

The effort to develop computer-based systems that can behave like humans, with the ability to learn languages, accomplish physical tasks, use a perceptual apparatus, and emulate human expertise and decision making.

Asynchronous Transfer Mode (ATM)

A networking technology that parcels information into 8-byte cells, allowing data to be transmitted between computers from different vendors at any speed.

Attribute

A piece of information describing a particular entity.

Authentication

The ability of each party in a transaction to ascertain the identity of the other party.

Authorization Management Systems

Systems for allowing each user access only to those portions of a system or the Web that person is permitted to enter, based on information established by a set of access rules.

Authorization Policies

Determine differing levels of access to information assets for different levels of users in an organization.

Automation

Using the computer to speed up the performance of existing tasks.

Autonomic Computing

Effort to develop systems that can manage themselves without user intervention.

Application Proxy Filtering

Firewall screening technology that uses a proxy server to inspect and transmit data packets flowing into and out of the organization so that all the organization's internal applications communicate with the outside using a proxy

Backbone

Part of a network handling the major traffic and providing the primary path for traffic flowing to or from other networks.

Backward Chaining

A strategy for searching the rule base in an expert system that acts like a problem solver by beginning with a hypothesis and seeking out more information until the hypothesis is either proved or disproved.

Balanced Scorecard

Model for analyzing firm performance which supplements traditional financial measures with measurements from additional business perspectives, such as customers, internal business processes, and learning and growth.

Bandwidth

The capacity of a communications channel as measured by the difference between the highest and lowest frequencies that can be transmitted by that channel.

Banner Ad

A graphic display on a Web page used for advertising. The banner is linked to the advertiser's Web site so that a person clicking on it will be transported to the advertiser's Web site.

Batch Processing

A method of collecting and processing data in which transactions are accumulated and stored until a specified time when it is convenient or necessary to process them as a group.

Baud

A change in signal from positive to negative or vice versa that is used as a measure of transmission speed.

Behavioral Models

Descriptions of management based on behavioral scientists' observations of what managers actually do in their jobs.

Benchmarking

Setting strict standards for products, services, or activities and measuring organizational performance against those standards.

Best Practices

The most successful solutions or problem-solving methods that have been developed by a specific organization or industry.

Biometric Authentication

Technology for authenticating system users that compares a person's unique characteristics such as fingerprints, face, or retinal image, against a stored set profile of these characteristics.

Bit

A binary digit representing the smallest unit of data in a computer system. It can only have one of two states, representing 0 or 1.

Blade Server

Entire computer that fits on a single, thin card (or blade) and that is plugged into a single chassis to save space, power and complexity.

Blog

Popular term for Weblog, designating an informal yet structured Web site where individuals can publish stories, opinions, and links to other Web sites of interest.

Bluetooth

Standard for wireless personal area networks that can transmit up to 722 Kbps within a 10-meter area.

Broadband

High-speed transmission technology. Also designates a single communications medium that can transmit multiple channels of data simultaneously.

Bugs

Program code defects or errors.

Bullwhip Effect

Distortion of information about the demand for a product as it passes from one entity to the next across the supply chain.

Bundling

Cross-selling in which a combination of products is sold as a bundle at a price lower than the total cost of the individual products.

Bureaucracy

Formal organization with a clear-cut division of labor, abstract rules and procedures, and impartial decision making that uses technical qualifications and professionalism as a basis for promoting employees.

Bureaucratic Models of Decision Making

Models of decision making where decisions are shaped by the organization's standard operating procedures (SOPs).

Bus Network

Network topology linking a number of computers by a single circuit with all messages broadcast to the entire network.

Business Continuity Planning

Planning that focuses on how the company can restore business operations after a disaster strikes.

Business Driver

A force in the environment to which businesses must respond and that influences the direction of business.

Business Ecosystem

Loosely coupled but interdependent networks of suppliers, distributors, outsourcing firms, transportation service firms, and technology manufacturers

Business Functions

Specialized tasks performed in a business organization, including manufacturing and production, sales and marketing, finance and accounting, and human resources.

Business Intelligence

Applications and technologies to help users make better business decisions.

Business Model

An abstraction of what an enterprise is and how the enterprise delivers a product or service, showing how the enterprise creates wealth.

Business Process Management

Methodology for revising the organization's business processes to use business processes as fundamental building blocks of corporate information systems.

Business Process Reengineering

The radical redesign of business processes, combining steps to cut waste and eliminating repetitive, paper-intensive tasks in order to improve cost, quality, and service, and to maximize the benefits of information technology.

Business Processes

The unique ways in which organizations coordinate and organize work activities, information, and knowledge to produce a product or service.

Business Strategy

Set of activities and decisions that determine the products and services the firm produces, the industries in which the firm competes, firm competitors, suppliers, and customers, and the firm's long-term goals.

Business-to-Business (B2B) Electronic Commerce

Electronic sales of goods and services among businesses.

Business-to-Consumer (B2C) Electronic Commerce

Electronic retailing of products and services directly to individual consumers.

Byte

A string of bits, usually eight, used to store one number or character in a computer system.

Cable Modem

Modem designed to operate over cable TV lines to provide high-speed access to the Web or corporate intranets.

Call Center

An organizational department responsible for handling customer service issues by telephone and other channels.

Campus area Network (CAN)

An interconnected set of local area networks in a limited geographical area such as a college or corporate campus.

Capacity Planning

The process of predicting when a computer hardware system becomes saturated to ensure that adequate computing resources are available for work of different priorities and that the

firm has enough computing power for its current and future needs.

Capital Budgeting

The process of analyzing and selecting various proposals for capital expenditures.

Carpal Tunnel Syndrome (CTS)

Type of RSI in which pressure on the median nerve through the wrist's bony carpal tunnel structure produces pain.

Case-Based Reasoning (CBR)

Artificial intelligence technology that represents knowledge as a database of cases and solutions.

Cellular Telephone

A device that transmits voice or data, using radio waves to communicate with radio antennas placed within adjacent geographic areas called cells.

Centralized Processing

Processing that is accomplished by one large central computer.

Change Agent

In the context of implementation, the individual acting as the catalyst during the change process to ensure successful organizational adaptation to a new system or innovation.

Channel Conflict

Competition between two or more different distribution chains used to sell the products or services of the same company.

Channel

The link by which data or voice are transmitted between sending and receiving devices in a network.

Chat

Live, interactive conversations over a public network.

Chief Information Officer (CIO)

Senior manager in charge of the information systems function in the firm.

Chief Knowledge Officer (CKO)

Senior executive in charge of the organization's knowledge management program.

Chief Security Officer (CSO)

Heads a formal security function for the organization and is responsible for enforcing the firm's security policy.

Choice

Simon's third stage of decision making, when the individual selects among the various solution alternatives.

Churn Rate

Measurement of the number of customers who stop using or purchasing products or services from a company. Used as an indicator of the growth or decline of a firm's customer base.

Classical Model of Management

Traditional description of management that focused on its formal functions of planning, organizing, coordinating, deciding, and controlling.

Clicks-and-Mortar

Business model where the Web site is an extension of a traditional bricks-and-mortar business.

Clickstream Tracking

Tracking data about customer activities at Web sites and storing them in a log.

Client

The user point-of-entry for the required function in client/server computing. Normally a desktop computer, workstation, or laptop computer.

Client/Server Computing

A model for computing that splits processing between clients and servers on a network, assigning functions to the machine most able to perform the function.

Clustering

Linking two computers together so that the second computer can act as a backup to the primary computer or speed up processing.

Coaxial Cable

A transmission medium consisting of thickly insulated copper wire; can transmit large volumes of data quickly.

Code Division Multiple Access (CDMA)

Major cellular transmission standard in the United States that transmits over several frequencies, occupies the entire spectrum, and randomly assigns users to a range of frequencies over time.

Collaborative Commerce

The use of digital technologies to enable multiple organizations to collaboratively design, develop, build and manage products through their life cycles.

Collaborative Filtering

Tracking users' movements on a Web site, comparing the information gleaned about a user's behavior against data about other customers with similar interests to predict what the user would like to see next.

Collaborative Planning, Forecasting, and Replenishment (CPFR)

Firms collaborating with their suppliers and buyers to formulate demand forecasts, develop production plans, and coordinate shipping, warehousing, and stocking activities.

Communications Technology

Physical devices and software that link various computer hardware components and transfer data from one physical location to another.

Competitive Forces Model

Model used to describe the interaction of external influences, specifically threats and opportunities, that affect an organization's strategy and ability to compete.

Complementary Assets

Additional assets required to derive value from a primary investment.

Component-based Development

Building large software systems by combining pre-existing software components.

Computer

Physical device that takes data as an input, transforms the data by executing stored instructions, and outputs information to a number of devices.

Computer Abuse

The commission of acts involving a computer that may not be illegal but are considered unethical.

Computer Crime

The commission of illegal acts through the use of a computer or against a computer system.

Communities of Practice (COPS)

Informal social networks of professionals and employees inside and outside the firm who have similar work-related activities and interests.

Computer Forensics

The scientific collection, examination, authentication, preservation, and analysis of data held on or retrieved from computer storage media in such a way that the information can be used as evidence in a court of law.

Computer Hardware

Physical equipment used for input, processing, and output activities in an information system.

Computer Literacy

Knowledge about information technology, focusing on understanding of how computer-based technologies work.

Computer Software

Detailed, preprogrammed instructions that control and coordinate the work of computer

hardware components in an information system.

Computer Virus

Rogue software program that attaches itself to other software programs or data files in order to be executed, often causing hardware and software malfunctions.

Computer Vision Syndrome (CVS)

Eyestrain condition related to computer display screen use; symptoms include headaches, blurred vision, and dry and irritated eyes.

Computer-Aided Design (CAD)

Information system that automates the creation and revision of designs using sophisticated graphics software.

Computer-Aided Software Engineering (CASE)

Automation of step-by-step methodologies for software and systems development to reduce the amounts of repetitive work the developer needs to do.

Computer-Based Information Systems (CBIS)

Information systems that rely on computer hardware and software for processing and disseminating information.

Conceptual Schema

The logical description of the entire database showing all the data elements and relationships among them.

Connectivity

The ability of computers and computer-based devices to communicate with each other and share information in a meaningful way without human intervention.

Consumer-to-Consumer (C2C)

Electronic commerce Consumers selling goods and services electronically to other consumers.

Control Unit

Component of the CPU that controls and coordinates the other parts of the computer system.

Controls

All of the methods, policies, and procedures that ensure protection of the organization's assets, accuracy and reliability of its records, and operational adherence to management standards.

Converged Network

Network with technology to enable voice and data to run over a single network.

Conversion

The process of changing from the old system to the new system.

Cookies

Tiny file deposited on a computer hard drive when an individual visits certain Web sites. Used to identify the visitor and track visits to the Web site.

Cooptation

Bringing the opposition into the process of designing and implementing a solution without giving up control of the direction and nature of the change.

Copyright

A statutory grant that protects creators of intellectual property against copying by others for any purpose for a minimum of 70 years.

Core Competency

Activity at which a firm excels as a world-class leader.

Core Systems

Systems that support functions that are absolutely critical to the organization.

Cost-Benefit Ratio

A method for calculating the returns from a capital expenditure by dividing total benefits by total costs.

Counterimplementation

A deliberate strategy to thwart the implementation of an information system or an innovation in an organization.

Critical Success Factors (CSFs)

A small number of easily identifiable operational goals shaped by the industry, the firm, the manager, and the broader environment that are believed to assure the success of an organization. Used to determine the information requirements of an organization.

Cross-Selling

Marketing complementary products to customers.

Customer-Decision-Support System (CDSS)

System to support the decision-making process of an existing or potential customer.

Customer Lifetime Value (CLTV)

Difference between revenues produced by a specific customer and the expenses for acquiring and servicing that customer minus the cost of promotional marketing over the lifetime of the customer relationship, expressed in today's dollars.

Customer Relationship Management (CRM)

Business and technology discipline that uses information systems to coordinate all of the business processes surrounding the firm's interactions with its customers in sales, marketing, and service.

Customer Relationship Management Systems

Information systems that track all the ways in which a company interacts with its customers and analyze these interactions to optimize revenue, profitability, customer satisfaction, and customer retention.

Customization

The modification of a software package to meet an organization's unique requirements without destroying the package software's integrity.

Chief Security Officer (CSO)

Heads a formal security function for the organization and is responsible for enforcing the firm's security policy.

Data

Streams of raw facts representing events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use.

Data Administration

A special organizational function for managing the organization's data resources, concerned with information policy, data planning, maintenance of data dictionaries, and data quality standards.

Data Cleansing

Activities for detecting and correcting data in a database or file that are incorrect, incomplete, improperly formatted, or redundant. Also known as data scrubbing.

Data Definition Language

The component of a database management system that defines each data element as it appears in the database.

Data Dictionary

An automated or manual tool for storing and organizing information about the data maintained in a database.

Data-Driven DSS

A system that supports decision making by allowing users to extract and analyze useful information that was previously buried in large databases.

Data Element

A field.

Data Flow Diagram (DFD)

Primary tool for structured analysis that graphically illustrates a system's component process and the flow of data between them.

Data Inconsistency

The presence of different values for same attribute when the same data are stored in

multiple locations.

Data Management Software

Software used for creating and manipulating lists, creating files and databases to store data, and combining information for reports.

Data Manipulation Language

A language associated with a database management system that end users and programmers use to manipulate data in the database.

Data Mart

A small data warehouse containing only a portion of the organization's data for a specified function or population of users.

Data Quality Audit

A survey and/or sample of files to determine accuracy and completeness of data in an information system.

Data Redundancy

The presence of duplicate data in multiple data files.

Data Security Controls

Controls to ensure that data files on either disk or tape are not subject to unauthorized access, change, or destruction.

Data Visualization

Technology for helping users see patterns and relationships in large amounts of data by presenting the data in graphical form.

Data Warehouse

A database, with reporting and query tools, that stores current and historical data extracted from various operational systems and consolidated for management reporting and analysis.

Data Workers

People such as secretaries or bookkeepers who process the organization's paperwork.

Database

A group of related files.

Database (rigorous definition)

A collection of data organized to service many applications at the same time by storing and managing data so that they appear to be in one location.

Database Administration

Refers to the more technical and operational aspects of managing data, including physical database design and maintenance.

Database Management System (DBMS)

Special software to create and maintain a database and enable individual business applications to extract the data they need without having to create separate files or data definitions in their computer programs.

Database Server

A computer in a client/server environment that is responsible for running a DBMS to process SQL statements and perform database management tasks.

Dataconferencing

Teleconferencing in which two or more users are able to edit and modify data files simultaneously.

Data Mining

Analysis of large pools of data to find patterns and rules that can be used to guide decision making and predict future behavior.

Debugging

The process of discovering and eliminating the errors and defects--bugs--in program code.

Decisional Roles

Mintzberg's classification for managerial roles where managers initiate activities, handle disturbances, allocate resources, and negotiate conflicts.

Decision-Support Systems (DSS)

Information systems at the organization's management level that combine data and sophisticated analytical models or data analysis tools to support semistructured and unstructured decision making.

Dedicated Lines

Telephone lines that are continuously available for transmission by a lessee. Typically conditioned to transmit data at high speeds for high-volume applications.

Demand Planning

Determining how much product a business needs to make to satisfy all its customers' demands.

Denial of Service (DoS) Attack

Flooding a network server or Web server with false communications or requests for services in order to crash the network.

Dense Wave Division Multiplexing (DWDM)

Technology for boosting transmission capacity of optical fiber by using many different wavelengths to carry separate streams of data over the same fiber strand at the same time.

Descartes' Rule of Change

A principle that states that if an action cannot be taken repeatedly, then it is not right to be taken at any time.

Design

Simon's second stage of decision making, when the individual conceives of possible alternative solutions to a problem.

Development Methodology

A collection of methods, one or more for every activity within every phase of a development project.

Digital Cash

Currency that is represented in electronic form that moves outside the normal network of money.

Digital Certificate

An attachment to an electronic message to verify the identity of the sender and to provide the receiver with the means to encode a reply.

Digital Checking

Systems that extend the functionality of existing checking accounts so they can be used for online shopping payments.

Digital Credit Card Payment System

Secure services for credit card payments on the Internet that protect information transmitted among users, merchant sites, and processing banks.

Digital Dashboard

Displays all of a firm's key performance indicators as graphs and charts on a single screen to provide one-page overview of all the critical measurements necessary to make key executive decisions

Digital Divide

Large disparities in access to computers and the Internet among different social groups and different locations.

Digital Firm

Organization where nearly all significant business processes and relationships with customers, suppliers, and employees are digitally enabled, and key corporate assets are managed through digital means.

Digital Market

A marketplace that is created by computer and communication technologies that link many buyers and sellers.

Digital Millennium Copyright Act (DMCA)

Adjusts copyright laws to the Internet Age by making it illegal to make, distribute, or use devices that circumvent technology-based protections of copy-righted materials.

Digital Signal

A discrete waveform that transmits data coded into two discrete states as 1-bits and 0-bits, which are represented as on-off electrical pulses; used for data communications.

Digital Signature

A digital code that can be attached to an electronically transmitted message to uniquely identify its contents and the sender.

Digital Subscriber Line (DSL)

A group of technologies providing high-capacity transmission over existing copper telephone lines.

Digital Wallet

Software that stores credit card, electronic cash, owner identification, and address information and provides this data automatically during electronic commerce purchase transactions.

Direct Cutover

A risky conversion approach where the new system completely replaces the old one on an appointed day.

Disaster Recovery Planning

Planning for the restoration of computing and communications services after they have been disrupted.

Disintermediation

The removal of organizations or business process layers responsible for certain intermediary steps in a value chain.

Distance Learning

Education or training delivered over a distance to individuals in one or more locations.

Distributed Database

A database that is stored in more than one physical location. Parts or copies of the database are physically stored in one location, and other parts or copies are stored and maintained in other locations.

Distributed Processing

The distribution of computer processing work among multiple computers linked by a communications network.

Documentation

Descriptions of how an information system works from either a technical or end-user standpoint.

Domain Name

English-like name that corresponds to the unique 32-bit numeric Internet Protocol (IP) address for each computer connected to the Internet

Domain Name System (DNS)

A hierarchical system of servers maintaining a database enabling the conversion of domain names to their numeric IP addresses.

Domestic Exporter

Form of business organization characterized by heavy centralization of corporate activities in the home county of origin.

Downsizing

The process of transferring applications from large computers to smaller ones.

Downtime

Period of time in which an information system is not operational.

Drill Down

The ability to move from summary data to lower and lower levels of detail.

DSS Database

A collection of current or historical data from a number of applications or groups. Can be a small PC database or a massive data warehouse.

DSS Software System

Collection of software tools that are used for data analysis, such as OLAP tools, datamining tools, or a collection of mathematical and analytical models.

Due Process

A process in which laws are well-known and understood and there is an ability to appeal to higher authorities to ensure that laws are applied correctly.

Dynamic Page Generation

Technology for storing the contents of Web pages as objects in a database where they can be accessed and assembled to create constantly changing Web pages.

Dynamic Pricing

Pricing of items based on real-time interactions between buyers and sellers that determine what a item is worth at any particular moment.

E-Government

Use of the Internet and related technologies to digitally enable government and public sector agencies' relationships with citizens, businesses, and other arms of government.

E-Learning

Instruction delivered through purely digital technology, such as CD-ROMs, the Internet, or private networks.

Edge Computing

Method for distributing the computing load (or work) across many layers of Internet computers in order to minimize response time.

Efficient Customer Response System

System that directly links consumer behavior back to distribution, production, and supply chains.

Electronic Billing and Payment Presentation System

Systems used for paying routine monthly bills that allow users to view their bills electronically and pay them through electronic funds transfers from banks or credit card accounts.

Electronic Business (e-business)

The use of the Internet and digital technology to execute all the business processes in the enterprise. Includes e-commerce as well as processes for the internal management of the firm and for coordination with suppliers and other business partners.

Electronic Commerce Server Software

Software that provides functions essential for running e-commerce Web sites, such as setting up electronic catalogs and storefronts, and mechanisms for processing customer purchases.

Electronic Commerce

The process of buying and selling goods and services electronically involving transactions using the Internet, networks, and other digital technologies.

Electronic Records Management (ERM)

Policies, procedures and tools for monitoring the retention, destruction, and storage of electronic records.

Electronic Data Interchange (EDI)

The direct computer-to-computer exchange between two organizations of standard business transactions, such as orders, shipment instructions, or payments.

E mail (e-mail)

The computer-to-computer exchange of messages.

Electronic Payment System

The use of digital technologies, such as credit cards, smart cards and Internet-based payment systems, to pay for products and services electronically.

E-mail Handheld

Handheld device for wireless data transmission that includes small display screen and a keypad for typing short e-mail messages.

Employee Relationship Management (ERM)

Software dealing with employee issues that are closely related to CRM, such as setting objectives, employee performance management, performance-based compensation, and employee training.

Encryption

The coding and scrambling of messages to prevent their being read or accessed without authorization.

End Users

Representatives of departments outside the information systems group for whom applications are developed.

End-User Development

The development of information systems by end users with little or no formal assistance from technical specialists.

End-user Interface

The part of an information system through which the end user interacts with the system, such as on-line screens and commands.

Enterprise Analysis

An analysis of organization-wide information requirements by looking at the entire organization in terms of organizational units, functions, processes, and data elements; helps identify the key entities and attributes in the organization's data.

Enterprise Applications

Systems that can coordinate activities, decisions, and knowledge across many different functions, levels, and business units in a firm. Include enterprise systems, supply chain management systems, and knowledge management systems.

Enterprise Application Integration (EAI) Software

Software that works with specific software platforms to tie together multiple applications to support enterprise integration.

Enterprise Networking

An arrangement of the organization's hardware, software, network, and data resources to put more computing power on the desktop and create a company-wide network linking many smaller networks.

Enterprise Portal

Web interface providing a single entry point for accessing organizational information and services, including information from various enterprise applications and in-house legacy systems so that information appears to be coming from a single source.

Enterprise Software

Set of integrated modules for applications such as sales and distribution, financial accounting, investment management, materials management, production planning, plant maintenance, and human resources that allow data to be used by multiple functions and business processes.

Enterprise Systems

Integrated enterprise-wide information systems that coordinate key internal processes of

the firm.

Enterprise Systems

electronic records management (erm)

Entity

A person, place, thing, or event about which information must be kept.

Entity-Relationship Diagram

A methodology for documenting databases illustrating the relationship between various entities in the database.

Ergonomics

The interaction of people and machines in the work environment, including the design of jobs, health issues, and the end-user interface of information systems.

Ethical "no free lunch" Rule

Assumption that all tangible and intangible objects are owned by someone else, unless there is a specific declaration otherwise, and that the creator wants compensation for this work.

Ethics

Principles of right and wrong that can be used by individuals acting as free moral agents to make choices to guide their behavior.

EV-DO

Technology used in Verizon's cellular network service for providing anytime, anywhere broadband wireless Internet access for PCs and other devices at average speeds of 300 to 500 Kbps. Stands for Evolution Data Optimized.

Exchange

Third-party Net marketplace that is primarily transaction oriented and that connects many buyers and suppliers for spot purchasing.

Executive Support Systems (ESS)

Information systems at the organization's strategic level designed to address unstructured decision making through advanced graphics and communications.

Expert System

Knowledge-intensive computer program that captures the expertise of a human in limited domains of knowledge.

Explicit Knowledge

Knowledge that has been documented.

External Integration Tools

Project management technique that links the work of the implementation team to that of users at all organizational levels.

Extranet

Private intranet that is accessible to authorized outsiders.

Facsimile (fax)

A machine that digitizes and transmits documents with both text and graphics over telephone lines.

Fair Information Practices (FIP)

A set of principles originally set forth in 1973 that governs the collection and use of information about individuals and forms the basis of most U.S. and European privacy laws.

Fault-Tolerant Computer Systems

Systems that contain extra hardware, software, and power supply components that can back a system up and keep it running to prevent system failure.

Feasibility Study

As part of the systems analysis process, the way to determine whether the solution is achievable, given the organization's resources and constraints.

Feedback

Output that is returned to the appropriate members of the organization to help them evaluate or correct input.

Fiber-Optic Cable

A fast, light, and durable transmission medium consisting of thin strands of clear glass fiber bound into cables. Data are transmitted as light pulses.

Field

A grouping of characters into a word, a group of words, or a complete number, such as a person's name or age.

File Transfer Protocol (FTP)

Tool for retrieving and transferring files from a remote computer.

File

A group of records of the same type.

Finance and Accounting Information Systems

Systems keep track of the firm's financial assets and fund flows.

Firewall

Hardware and software placed between an organization's internal network and an external network to prevent outsiders from invading private networks.

Focused Differentiation

Competitive strategy for developing new market niches for specialized products or services where a business can compete in the target area better than its competitors.

Formal Control Tools

Project management technique that helps monitor the progress toward completion of a task and fulfillment of goals.

Formal Planning Tools

Project management technique that structures and sequences tasks, budgeting time, money, and technical resources required to complete the tasks.

Formal System

System resting on accepted and fixed definitions of data and procedures, operating with predefined rules.

Forward Chaining

A strategy for searching the rule base in an expert system that begins with the information entered by the user and searches the rule base to arrive at a conclusion.

Fourth-Generation Language

A programming language that can be employed directly by end users or less-skilled programmers to develop computer applications more rapidly than conventional programming languages.

Frame Relay

A shared network service technology that packages data into bundles for transmission but does not use error-correction routines. Cheaper and faster than packet switching.

Framing

Displaying the content of another Web site inside one's own Web site within a frame or a window.

Franchiser

Form of business organization in which a product is created, designed, financed, and initially produced in the home country, but for product-specific reasons relies heavily on foreign personnel for further production, marketing, and human resources.

Fuzzy Logic

Rule-based AI that tolerates imprecision by using nonspecific terms called membership functions to solve problems.

"Garbage can" Model

Model of decision making that states that organizations are not rational and that decisions are solutions that become attached to problems for accidental reasons.

General Controls

Overall controls that establish a framework for controlling the design, security, and use of computer programs throughout an organization.

General Packet Radio Service (GPRS)

2.5 service that transports data over GSM wireless networks and improves wireless Internet access.

Genetic Algorithms

Problem-solving methods that promote the evolution of solutions to specified problems using the model of living organisms adapting to their environment.

Geographic Information System (GIS)

System with software that can analyze and display data using digitized maps to enhance planning and decision-making.

Global Culture

The development of common expectations, shared artifacts, and social norms among different cultures and peoples

Global System for Mobile Communication (GSM)

Major cellular transmission standard outside the United States, with strong international roaming capability, operating primarily in the 900-MHz and 1.8-GHz frequency bands using time division multiple access (TDMA) in which each user is allocated a portion of time on the frequency.

Global Positioning System (GPS)

Worldwide satellite navigational system.

Graphical User Interface (GUI)

The part of an operating system users interact with that uses graphic icons and the computer mouse to issue commands and make selections.

Grid Computing

Applying the resources of many computers in a network to a single problem.

Group Decision-Support System (GDSS)

An interactive computer-based system to facilitate the solution to unstructured problems by a set of decision makers working together as a group.

Groupware

Software that provides functions and services that support the collaborative activities of work groups.

Hacker

A person who gains unauthorized access to a computer network for profit, criminal mischief, or personal pleasure.

Hertz

Measure of frequency of electrical impulses per second, with 1 Hertz equivalent to 1 cycle per second.

Hierarchical DBMS

One type of logical database model that organizes data in a treelike structure. A record is subdivided into segments that are connected to each other in one-to-many parent-child relationships.

High-Availability Computing

Tools and technologies ,including backup hardware resources, to enable a system to recover quickly from a crash.

Hit:

An entry into a Web server's log file generated by each request to the server for a file.

Home Page

A World Wide Web text and graphical screen display that welcomes the user and explains the organization that has established the page.

Hotspot

A specific geographic location in which an access point provides public Wi-Fi network service.

Hubs

Very simple devices that connect network components, sending a packet of data to all other connected devices.

Human Resources Information Systems

Systems that maintain employee records, track employee skills, job performance and training, and support planning for employee compensation and career development.

Hybrid AI Systems

Integration of multiple AI technologies into a single application to take advantage of the best features of these technologies.

Hypermedia Database

An approach to data management that organizes data as a network of nodes linked in any pattern the user specifies; the nodes can contain text, graphics, sound, full-motion video, or executable programs.

Hypertext Markup Language (HTML)

Page description language for creating Web pages and other hypermedia documents.

Hypertext Transport Protocol

The communications standard used to transfer pages on the Web. Defines how messages are formatted and transmitted.

Identity Theft

Theft of key pieces of personal information, such as credit card or Social Security numbers, in order to obtain merchandise and services in the name of the victim or to obtain false credentials.

Immanuel Kant's Categorical Imperative

A principle that states that if an action is not right for everyone to take it is not right for anyone.

I-mode

Standard developed by Japan's NTT DoCoMo mobile phone network for enabling cell phones to received Web-based content and services.

Implementation

Simon's final stage of decision-making, when the individual puts the decision into effect and reports on the progress of the solution.

Industry Structure

The nature of participants in an industry and their relative bargaining power. Derives from the competitive forces and establishes the general business environment in an industry and the overall profitability of doing business in that environment.

Inference Engine

The strategy used to search through the rule base in an expert system; can be forward or backward chaining.

Information

Data that have been shaped into a form that is meaningful and useful to human beings.

Information Appliance

Device that has been customized to perform a few specialized computing tasks well with minimal user effort.

Information Asymmetry

Situation where the relative bargaining power of two parties in a transaction is determined by one party in the transaction possessing more information essential to the transaction than the other party.

Information Center

A special facility within an organization that provides training and support for end-user computing.

Information Partnership

Cooperative alliance formed between two or more corporations for the purpose of sharing information to gain strategic advantage.

Information Policy

Formal rules governing the maintenance, distribution, and use of information in an organization.

Information Requirements

A detailed statement of the information needs that a new system must satisfy; identifies who needs what information, and when, where, and how the information is needed.

Information Rights

The rights that individuals and organizations have with respect to information that pertains to themselves.

Information System

Interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization.

Information Systems Department

The formal organizational unit that is responsible for the information systems function in the organization.

Information Systems Literacy

Broad-based understanding of information systems that includes behavioral knowledge about organizations and individuals using information systems as well as technical knowledge about computers.

Information Systems Managers

Leaders of the various specialists in the information systems department.

Information Systems Plan

A road map indicating the direction of systems development: the rationale, the current situation, the management strategy, the implementation plan, and the budget.

Information Technology (IT) Infrastructure

Computer hardware, software, data, storage technology, and networks providing a portfolio of shared IT resources for the organization.

Informational Roles

Mintzberg's classification for managerial roles where managers act as the nerve centers of their organizations, receiving and disseminating critical information.

Informed Consent

Consent given with knowledge of all the facts needed to make a rational decision.

Input

The capture or collection of raw data from within the organization or from its external environment for processing in an information system.

Input Controls

The procedures to check data for accuracy and completeness when they enter the system.

Instant Messaging

Chat service that allows participants to create their own private chat channels so that a person can be alerted whenever someone on his or her private list is on-line to initiate a chat session with that particular individual.

Intangible Benefits

Benefits that are not easily quantified; they include more efficient customer service or enhanced decision making.

Integrated Services Digital Network (ISDN)

International standard for transmitting voice, video, image, and data to support a wide range of service over the public telephone lines.

Intellectual Property

Intangible property created by individuals or corporations that is subject to protections under trade secret, copyright, and patent law.

Intelligence

The first of Simon's four stages of decision making, when the individual collects information to identify problems occurring in the organization.

Intelligent Agent

Software program that uses a built-in or learned knowledge base to carry out specific, repetitive, and predictable tasks for an individual user, business process, or software application.

Internal Integration Tools

Project management technique that ensures that the implementation team operates as a cohesive unit.

Internal Rate of Return (IRR)

The rate of return or profit that an investment is expected to earn.

International Information Systems Architecture

The basic information systems required by organizations to coordinate worldwide trade and other activities.

Internet Protocol (IP) Address

Four-part numeric address indicating a unique computer location on the Internet.

Internet Service Provider (ISP)

A commercial organization with a permanent connection to the Internet that sells temporary connections to subscribers.

Internet Telephony

Technologies that use the Internet Protocol's packet-switched connections for voice service.

Internet

International network of networks that is a collection of hundreds of thousands of private and public networks.

Internet2

Research network with new protocols and transmission speeds that provides an infrastructure for supporting high-bandwidth Internet applications.

Internetworking

The linking of separate networks, each of which retains its own identity, into an interconnected network.

Interorganizational Systems

Information systems that automate the flow of information across organizational boundaries and link a company to its customers, distributors, or suppliers.

Interpersonal Roles

Mintzberg's classification for managerial roles where managers act as figureheads and leaders for the organization.

Intranet

An internal network based on Internet and World Wide Web technology and standards.

Intrusion Detection System

Tools to monitor the most vulnerable points in a network to detect and deter unauthorized intruders.

Investment Workstation

Powerful desktop computer for financial specialists, which is optimized to access and manipulate massive amounts of financial data.

Iterative

A process of repeating over and over again the steps to build a system.

Java

Programming language that can deliver only the software functionality needed for a particular task, such as a small applet downloaded from a network; can run on any computer and operating system.

Joint Application Design (JAD)

Process to accelerate the generation of information requirements by having end users and information systems specialists work together in intensive interactive design sessions.

Just-in-time

Scheduling system for minimizing inventory by having components arrive exactly at the moment they are needed and finished goods shipped as soon as they leave the assembly line.

Key Field

A field in a record that uniquely identifies instances of that record so that it can be retrieved, updated, or sorted.

Knowledge

Concepts, experience, and insight that provide a framework for creating, evaluating, and using information.

Knowledge-and Information-Intense Products

Products that require a great deal of learning and knowledge to produce.

Knowledge Work Systems (KWS)

Specialized systems for helping knowledge workers create and discover new knowledge.

Knowledge Base

Model of human knowledge that is used by expert systems.

Knowledge Discovery

Identification of novel and valuable patterns in large databases.

Knowledge Engineer

A specialist who elicits information and expertise from other professionals and translates it into a set of rules, or frames, for an expert system.

Knowledge Management

The set of processes developed in an organization to create, gather, store, maintain, and disseminate the firm's knowledge.

Knowledge Management Systems

Systems that support the creation, capture, storage, and dissemination of firm expertise and knowledge.

Knowledge Network System

Online directory for locating corporate experts in well-defined knowledge domains.

Knowledge Repository

Collection of documented internal and external knowledge in a single location for more efficient management and utilization by the organization.

Knowledge Workers

People such as engineers or architects who design products or services and create knowledge for the organization.

Learning Management System (LMS)

Tools for the management, delivery, tracking, and assessment of various types of employee learning.

Legacy System

A system that has been in existence for a long time and that continues to be used to avoid the high cost of replacing or redesigning it.

Legitimacy

The extent to which one's authority is accepted on grounds of competence, vision, or other

qualities. Making judgments and taking actions on the basis of narrow or personal characteristics.

Liability

The existence of laws that permit individuals to recover the damages done to them by other actors, systems, or organizations.

Linux

Reliable and compactly designed operating system that is an offshoot of UNIX and that can run on many different hardware platforms and is available free or at very low cost. Used as alternative to UNIX and Windows NT.

LISTSERV

On-line discussion groups using e-mail broadcast from mailing list servers.

Load Balancing

Distribution of large numbers of requests for access among multiple servers so that no single device is overwhelmed.

Local Area Network (LAN)

A telecommunications network that requires its own dedicated channels and that encompasses a limited distance, usually one building or several buildings in close proximity.

Logistics

Planning and control of all factors that will have an impact on transporting a product or service.

Mainframe

Largest category of computer, used for major business processing.

Maintenance

Changes in hardware, software, documentation, or procedures to a production system to correct errors, meet new requirements, or improve processing efficiency.

Managed Security Service Provider (MSSP)

Company that provides security management services for subscribing clients.

Management Control

Monitoring how efficiently or effectively resources are utilized and how well operational units are performing.

Management Information Systems (MIS)

The study of information systems focusing on their use in business and management.

Management-Level Systems

Information systems that support the monitoring, controlling, decision-making, and administrative activities of middle managers.

Managerial Roles

Expectations of the activities that managers should perform in an organization.

Man-Month

The traditional unit of measurement used by systems designers to estimate the length of time to complete a project. Refers to the amount of work a person can be expected to complete in a month.

Manufacturing and Production Information Systems

Systems that deal with the planning, development, and production of products and services and with controlling the flow of production.

Mass Customization

The capacity to offer individually tailored products or services using mass production resources.

Malware

Malicious Software Program.

Megahertz

A measure of cycle speed, or the pacing of events in a computer; one megahertz equals one million cycles per second.

Message Integrity

The ability to ascertain that a transmitted message has not been copied or altered.

Metric

A standard measurement of performance.

Metropolitan Area Network (MAN)

Network that spans a metropolitan area, usually a city and its major suburbs. Its geographic scope falls between a WAN and a LAN.

Microbrowser

Web browser software with a small file size that can work with low-memory constraints, tiny screens of handheld wireless devices, and low bandwidth of wireless networks.

Micropayment

Payment for a very small sum of money, often less than \$10.

Microprocessor

Very large scale integrated circuit technology that integrates the computer's memory, logic, and control on a single chip.

Microwave

A high-volume, long-distance, point-to-point transmission in which high-frequency radio signals are transmitted through the atmosphere from one terrestrial transmission station to another.

Middle Managers

People in the middle of the organizational hierarchy who are responsible for carrying out the plans and goals of senior management.

Middleware

Software that connects two disparate applications, allowing them to communicate with each other and to exchange data.

Midrange Computer

Middle-size computer that is capable of supporting the computing needs of smaller organizations or of managing networks of other computers.

Minicomputer

Middle-range computer used in systems for universities, factories, or research laboratories.

Mirroring

Duplicating all the processes and transactions of a server on a backup server to prevent any interruption in service if the primary server fails.

MIS Audit

Identifies all the controls that govern individual information systems and assesses their effectiveness.

Mobile Commerce (m-commerce)

The use of wireless devices, such as cell phones or handheld digital information appliances, to conduct both business-to-consumer and business-to-business e-commerce transactions over the Internet.

Mobile Computing

Wireless computing that allows Internet-enabled cell phones, PDAs, and other wireless computing devices to access digital information from the Internet and other sources from any location.

Mobile Data Networks

Wireless networks that enable two-way transmission of data files cheaply and efficiently.

Mobile Wallets (m-wallets)

Store m-commerce shoppers' personal information and credit card numbers to expedite the purchase process.

Model

An abstract representation that illustrates the components or relationships of a phenomenon.

Model-Driven DSS

Primarily stand-alone system that uses some type of model to perform "what-if" and other kinds of analyses.

Modem

A device for translating a computer's digital signals into analog form for transmission over ordinary telephone lines, or for translating analog signals back into digital form for reception by a computer.

Module

A logical unit of a program that performs one or several functions.

Moore's Law

Assertion that the number of components on a chip doubles each year

MP3 (MPEG3)

Compression standard that can compress audio files for transfer over the Internet with virtually no loss in quality.

Multicasting

Transmission of data to a selected group of recipients.

Multimedia

The integration of two or more types of media such as text, graphics, sound, voice, full-motion video, or animation into a computer-based application.

Multinational

Form of business organization that concentrates financial management and control out of a central home base while decentralizing

Multiplexing

Ability of a single communications channel to carry data transmissions from multiple sources simultaneously.

Multitiered (N-tier) Client/Server Architecture

Client/server network which the work of the entire network is balanced over several different levels of servers.

Nanotechnology

Technology that builds structures and processes based on the manipulation of individual atoms and molecules.

Natural Language

Nonprocedural language that enables users to communicate with the computer using conversational commands resembling human speech.

Net Marketplace

A single digital marketplace based on Internet technology linking many buyers to many sellers.

Net Present Value (NPV)

The amount of money an investment is worth, taking into account its cost, earnings, and the time value of money.

Network

The linking of two or more computers to share data or resources, such as a printer.

Network DBMS

Older logical database model that is useful for depicting many-to-many relationships.

Network Economics

Model of strategic systems at the industry level based on the concept of a network where adding another participant entails zero marginal costs but can create much larger marginal gains.

Network Interface Card (NIC)

Expansion card inserted into a computer to enable it to connect to a network.

Network Operating system (NOS)

Special software that routes and manages communications on the network and coordinates network resources.

Neural Network

Hardware or software that attempts to emulate the processing patterns of the biological brain.

Network Address Translation (NAT)

Firewall protection technology that conceals ip addresses of an organization's internal computers.

Nomadic Computing

Wireless computing where users move from wireless hot spot to wireless hot spot to gain network or Internet access.

Nonobvious Relationship Awareness (NORA)

Technology that can find obscure hidden connections between people or other entities by analyzing information from many different sources to correlate relationships.

Normalization

The process of creating small stable data structures from complex groups of data when designing a relational database.

Object

Software building block that combines data and the procedures acting on the data.

Object-Oriented DBMS

An approach to data management that stores both data and the procedures acting on the data as objects that can be automatically retrieved and shared; the objects can contain multimedia.

Object-Oriented Development:

Approach to systems development that uses the object as the basic unit of systems analysis and design. The system is modeled as a collection of objects and the relationship between them.

Object-Oriented Programming

An approach to software development that combines data and procedures into a single object.

Object-Relational DBMS

A database management system that combines the capabilities of a relational DBMS for storing traditional information and the capabilities of an object-oriented DBMS for storing graphics and multimedia.

Office 2000, Office XP, and Office 2003

Integrated desktop productivity software suites with capabilities for supporting collaborative work on the Web or incorporating information from the Web into documents.

Office Systems

Systems such as word processing, desktop publishing, e-mail, electronic scheduling, and videoconferencing, designed to increase worker productivity in the office.

Offshore Software Outsourcing

Outsourcing systems development work or maintenance of existing systems to external vendors in another country.

On-Demand Computing

Firms off-loading peak demand for computing power to remote, large-scale data processing centers, investing just enough to handle average processing loads and paying for only as much additional computing power as the market demands. Also called utility computing.

On-Line Analytical Processing (OLAP)

Capability for manipulating and analyzing large volumes of data from multiple perspectives.

On-Line Processing

A method of collecting and processing data in which transactions are entered directly into the computer system and processed immediately.

On-Line Transaction Processing

Transaction processing mode in which transactions entered on-line are immediately processed by the computer.

Open Systems Interconnect (OSI)

Less widely used network connectivity model developed by International Standards Organization for linking different types of computers and networks.

Open-Source Software

Software that provides free access to its program code, allowing users to modify the program code to make improvements or fix errors.

Operating System

The system software that manages and controls the activities of the computer.

Operational CRM

Customer-facing applications, such as sales force automation, call center and customer service support, and marketing automation.

Operational Managers

People who monitor the day-to-day activities of the organization.

Operational-Level Systems

Information systems that monitor the elementary activities and transactions of the organization.

Opt-In

Model of informed consent permitting prohibiting an organization from collecting any personal information unless the individual specifically takes action to approve information collection and use.

Opt-Out

Model of informed consent permitting the collection of personal information until the consumer specifically requests that the data not be collected.

Optical Network

High-speed networking technologies for transmitting data in the form of light pulses.

Organization (behavioral definition)

A collection of rights, privileges, obligations, and responsibilities that are delicately balanced over a period of time through conflict and conflict resolution.

Organization (technical definition)

A stable, formal, social structure that takes resources from the environment and processes them to produce outputs.

Organizational and Management Capital

Investments in organization and management such as new business processes, management behavior, organizational culture, or training.

Organizational Culture

The set of fundamental assumptions about what products the organization should produce, how and where it should produce them, and for whom they should be produced.

Organizational Impact Analysis

Study of the way a proposed system will affect organizational structure, attitudes, decision making, and operations.

Organizational Learning

Creation of new standard operating procedures and business processes that reflect organizations' experience.

Organizational Memory

The stored learning from an organization's history that can be used for decision making and other purposes.

Organizational Models of Decision Making

Models of decision making that take into account the structural and political characteristics of an organization.

Output Controls

Measures that ensure that the results of computer processing are accurate, complete, and properly distributed.

Output

The distribution of processed information to the people who will use it or to the activities for which it will be used.

Outsourcing

The practice of contracting computer center operations, telecommunications networks, or applications development to external vendors.

P3P

Industry standard designed to give users more control over personal information gathered on Web sites they visit. Stands for Platform for Privacy Preferences Project.

Packet Switching

Technology that breaks messages into small, fixed bundles of data and routes them in the most economical way through any available communications channel.

Packet Filtering

Firewall protection technology that examines selected fields in data packets flowing between a trusted network and the internet.

Paging System

A wireless transmission technology in which the pager beeps when the user receives a message; used to transmit short alphanumeric messages.

Paradigm Shift

Radical reconceptualization of the nature of the business and the nature of the organization.

Parallel Processing

Type of processing in which more than one instruction can be processed at a time by breaking down a problem into smaller parts and processing them simultaneously with

multiple processors.

Parallel Strategy

A safe and conservative conversion approach where both the old system and its potential replacement are run together for a time until everyone is assured that the new one functions correctly.

Particularism

Making judgments and taking action on the basis of narrow or personal characteristics, in all its forms (religious, nationalistic, ethnic, regionalism, geopolitical position).

Partner Relationship Management (PRM)

Automation of the firm's relationships with its selling partners using customer data and analytical tools to improve coordination and customer sales.

Patent

A legal document that grants the owner an exclusive monopoly on the ideas behind an invention for 17 years; designed to ensure that inventors of new machines or methods are rewarded for their labor while making widespread use of their inventions.

Payback Method

A measure of the time required to pay back the initial investment on a project.

Peer-to-Peer Computing

Form of distributed processing that links computers via the Internet or private networks so that they can share processing tasks.

Peer-to-Peer Payment System

Electronic payment system for people who want to send money to vendors or individuals who are not set up to accept credit card payments.

Peer-to-Peer

Network architecture that gives equal power to all computers on the network; used primarily in small networks.

Personal Communication Services (PCS)

A wireless cellular technology that uses lower power, higher frequency radio waves than does cellular technology and so can be used with smaller size telephones.

Personal Digital Assistants (PDA)

Small, pen-based, handheld computers with built-in wireless telecommunications capable of entirely digital communications transmission.

personal Area Network (PAN)

Computer network used for communication among digital devices (including telephones and PDAs) that are close to one person.

Pervasive Computing

Ubiquitous use of computers in every facet of everyday life, including cars, homes, office buildings, tools, and factories, making computers increasingly embedded in people's natural movements and interactions with their environments.

Phased Approach

Introduces the new system in stages either by functions or by organizational units.

Pilot Study

A strategy to introduce the new system to a limited area of the organization until it is proven to be fully functional; only then can the conversion to the new system across the entire organization take place.

Political Models of Decision Making

Models of decision making where decisions result from competition and bargaining among the organization's interest groups and key leaders.

Pop-Up Ad

Ad that opens automatically and does not disappear until the user clicks on it.

Portal

Web interface for presenting integrated personalized content from a variety of sources. Also refers to a Web site service that provides an initial point of entry to the Web.

Portfolio Analysis

An analysis of the portfolio of potential applications within a firm to determine the risks and benefits, and to select among alternatives for information systems.

Post-Implementation Audit

Formal review process conducted after a system has been placed in production to determine how well the system has met its original objectives.

Predictive Analysis

Use of datamining techniques, historical data, and assumptions about future conditions to predict outcomes of events.

Present Value

The value, in current dollars, of a payment or stream of payments to be received in the future.

Primary Activities

Activities most directly related to the production and distribution of a firm's products or services.

Privacy

The claim of individuals to be left alone, free from surveillance or interference from other individuals, organizations, or the state.

Private Exchange

Another term for a private industrial network.

Private Industrial Networks

Web-enabled networks linking systems of multiple firms in an industry for the coordination of trans-organizational business processes.

Process Specifications

Describe the logic of the processes occurring within the lowest levels of a data flow diagram.

Processing Controls

The routines for establishing that data are complete and accurate during updating.

Processing

The conversion, manipulation, and analysis of raw input into a form that is more meaningful to humans.

Procurement

Sourcing goods and materials, negotiating with suppliers, paying for goods, and making delivery arrangements.

Product Differentiation

Competitive strategy for creating brand loyalty by developing new and unique products and services that are not easily duplicated by competitors.

Product Life Cycle Management (PLM)

Systems are based on a data repository that organizes every piece of information that goes into making a particular product.

Production or Service Workers

People who actually produce the products or services of the organization.

Production

The stage after the new system is installed and the conversion is complete; during this time the system is reviewed by users and technical specialists to determine how well it has met its original goals.

Profiling

The use of computers to combine data from multiple sources and create electronic dossiers of detailed information on individuals.

Profitability Index

Used to compare the profitability of alternative investments; it is calculated by dividing the present value of the total cash inflow from an investment by the initial cost of the investment.

Program-Data Dependence

The close relationship between data stored in files and the software programs that update

and maintain those files. Any change in data organization or format requires a change in all the programs associated with those files.

Programmers

Highly trained technical specialists who write computer software instructions.

Programming

The process of translating the system specifications prepared during the design stage into program code.

Protocol

A set of rules and procedures that govern transmission between the components in a network.

Prototype

The preliminary working version of an information system for demonstration and evaluation purposes.

Prototyping

The process of building an experimental system quickly and inexpensively for demonstration and evaluation so that users can better determine information requirements.

Public Key Infrastructure

System for creating public and private keys using a certificate authority (CA) and digital certificates for authentication.

Pull-Based Model

Supply chain driven by actual customer orders or purchases so that members of the supply chain produce and deliver only what customers have ordered.

Pure-Play

Business models based purely on the Internet.

Push-Based Model

Supply chain driven by production master schedules based on forecasts or best guesses of demand for products, and products are "pushed" to customers.

"Push" Technology

Method of obtaining relevant information on networks by having a computer broadcast information directly to the user based on prespecified interests.

Query Language

Software tool that provides immediate online answers to requests for information that are not predefined.

Radio-Frequency Identification (RFID)

Technology using tiny tags with embedded microchips containing data about an item and its location to transmit short-distance radio signals to special RFID readers that then pass the

data on to a computer for processing.

RAID (Redundant Array of Inexpensive Disks)

Disk storage technology to boost disk performance by packaging more than 100 smaller disk drives with a controller chip and specialized software in a single large unit to deliver data over multiple paths simultaneously.

Rapid Application Development (RAD)

Process for developing systems in a very short time period by using prototyping, fourth-generation tools, and close teamwork among users and systems specialists.

Rational Model

Model of human behavior based on the belief that people, organizations, and nations engage in basically consistent, value-maximizing calculations.

Rationalization of Procedures

The streamlining of standard operating procedures, eliminating obvious bottlenecks, so that automation makes operating procedures more efficient.

Reach

Measurement of how many people a business can connect with and how many products it can offer those people.

Real Options Pricing Models

Models for evaluating information technology investments with uncertain returns by using techniques for valuing financial options.

Record

A group of related fields.

Recovery-Oriented Computing

Computer systems designed to recover rapidly when mishaps occur.

Reintermediation

The shifting of the intermediary role in a value chain to a new source.

Relational DBMS

A type of logical database model that treats data as if they were stored in two-dimensional tables. It can relate data stored in one table to data in another as long as the two tables share a common data element.

Repetitive Stress Injury (RSI)

Occupational disease that occurs when muscle groups are forced through repetitive actions with high-impact loads or thousands of repetitions with low-impact loads.

Request for Proposal (RFP)

A detailed list of questions submitted to vendors of software or other services to determine how well the vendor's product can meet the organization's specific requirements.

Resource Allocation

The determination of how costs, time, and personnel are assigned to different phases of a systems development project.

Responsibility

Accepting the potential costs, duties, and obligations for the decisions one makes.

Reverse Logistics

The return of items from buyers to sellers in a supply chain.

Richness

Measurement of the depth and detail of information that a business can supply to the customer as well as information the business collects about the customer.

Ring Network

A network topology in which all computers are linked by a closed loop in a manner that passes data in one direction from one computer to another.

Risk Assessment

Determining the potential frequency of the occurrence of a problem and the potential damage if the problem were to occur. Used to determine the cost/benefit of a control.

Risk Aversion Principle

Principle that one should take the action that produces the least harm or incurs the least cost.

Router

Specialized communications processor that forwards packets of data from one network to another network.

Routines

Precise rules, procedures and practices that have been developed to cope with expected situations.

Rule Base

The collection of knowledge in an AI system that is represented in the form of IF-THEN rules.

Router

Special communications processor for routing packets of data through different networks and ensuring that the message sent gets to the correct address.

Safe Harbor

Private self-regulating policy and enforcement mechanism that meets the objectives of government regulations but does not involve government regulation or enforcement.

Sales and Marketing Information Systems

Systems that help the firm identify customers for the firm's products or services, develop products and services to meet their needs, promote these products and services, sell the products and services, and provide ongoing customer support.

Satellite

The transmission of data using orbiting satellites that serve as relay stations for transmitting microwave signals over very long distances.

Scalability

The ability of a computer, product, or system to expand to serve a larger number of users without breaking down.

Scoring Model

A quick method for deciding among alternative systems based on a system of ratings for selected objectives.

Search-Based Advertising

Payment to a search service to display a sponsored link to a company's Web site as a way of advertising that company.

Search Costs

The time and money spent locating a suitable product and determining the best price for that product.

Security Policy

An organization's statements ranking information risks, identifying security goals, and specifying the mechanisms for achieving those goals.

Search Engine

A tool for locating specific sites or information on the Internet.

Security

Policies, procedures, and technical measures used to prevent unauthorized access, alteration, theft, or physical damage to information systems.

Semantic Web

Collaborative effort led by the World Wide Web Consortium to make Web searching more efficient by reducing the amount of human involvement in searching for and processing web information.

Semistructured Decisions

Decisions in which only part of the problem has a clear-cut answer provided by an accepted procedure.

Semistructured Knowledge

Information in the form of less structured objects, such as e-mail, chat room exchanges, videos, graphics, brochures, or bulletin boards.

Semistructured Knowledge System

System for organizing and storing less structured information, such as e-mail, voice mail, videos, graphics, brochures, or bulleting boards. Also known as digital asset management system.

Senior Managers

People occupying the topmost hierarchy in an organization who are responsible for making long-range decisions.

Sensitivity Analysis

Models that ask "what-if" questions repeatedly to determine the impact of changes in one or more factors on the outcomes.

Sequence Construct

The sequential single steps or actions in the logic of a program that do not depend on the existence of any condition.

Secure Hypertext Transfer Protocol (S-HTTP)

Protocol for encrypting data in web documents flowing over the internet.

Server

Computer specifically optimized to provide software and other resources to other computers over a network.

Server Farm

Large group of servers maintained by a commercial vendor and made available to subscribers for electronic commerce and other activities requiring heavy use of servers.

Service-Oriented Architecture

Software architecture of a firm built on a collection of software programs that communicate with each other to perform assigned tasks to create a working software application.

Service Platform

Integration of multiple applications from multiple business functions, business units, or business partners to deliver a seamless experience for the customer, employee, manager, or business partner.

Shopping Bot

Software with varying levels of built-in intelligence to help electronic commerce shoppers locate and evaluate products or service they might wish to purchase.

Short Message Service (SMS)

Text message service used by digital cell phone systems to send and receive short alphanumeric messages less than 160 characters in length.

Six Sigma

A specific measure of quality, representing 3.4 defects per million opportunities; used to designate a set of methodologies and techniques for improving quality and reducing costs.

Smart Card

A credit-card-size plastic card that stores digital information and that can be used for electronic payments in place of cash.

Smart Phone

Wireless phone with voice, text, and Internet capabilities.

Sniffer

Type of eavesdropping program that monitors information traveling over a network.

SOAP (Simple Object Access Protocol)

Set of rules that allows Web services applications to pass data and instructions to one another.

Social Engineering

Tricking people into revealing their passwords by pretending to be legitimate users or members of a company in need of information.

Social Networking Sites

Online community for expanding users' business or social contacts by making connections through their mutual business or personal connections.

Sociotechnical Design

Design to produce information systems that blend technical efficiency with sensitivity to organizational and human needs.

Software Metrics

The objective assessments of the software used in a system in the form of quantified measurements.

Software Package

A prewritten, precoded, commercially available set of programs that eliminates the need to write software programs for certain functions.

Source Code

Program instructions written in a high-level language that must be translated into machine language to be executed by the computer.

Spam

Unsolicited commercial e-mail.

Spyware

Technology that aids in gathering information about a person or organization without their knowledge.

Spoofing

Misrepresenting oneself by using a fake e-mail address or web site.

Standard Operating Procedures (SOPs)

Formal rules for accomplishing tasks that have been developed to cope with expected situations.

Star Network

A network topology in which all computers and other devices are connected to a central host computer. All communications between network devices must pass through the host computer.

Storage Area Network (SAN)

A high-speed network dedicated to storage that connects different kinds of storage devices, such as tape libraries and disk arrays so they can be shared by multiple servers.

Storage Service Provider (SSP)

Third-party provider that rents out storage space to subscribers over the Web, allowing customers to store and access their data without having to purchase and maintain their own storage technology.

Stateful Inspection

Firewall protection technology that examines data packets flowing between a trusted network and the internet and determines whether the packets are part of a legitimate communication between sender and receiver.

Storage Technology

Physical media and software governing the storage and organization of data for use in an information system.

Stored Value Payment Systems

Systems enabling consumers to make instant on-line payments to merchants and other individuals based on value stored in a digital account.

Strategic Information Systems

Computer systems at any level of the organization that change goals, operations, products, services, or environmental relationships to help the organization gain a competitive advantage.

Strategic Transitions

A movement from one level of sociotechnical system to another. Often required when adopting strategic systems that demand changes in the social and technical elements of an organization.

Strategic-Level Systems

Information systems that support the long-range planning activities of senior management.

Structure Chart

System documentation showing each level of design, the relationship among the levels, and the overall place in the design structure; can document one program, one system, or part

of one program.

Structured

Refers to the fact that techniques are carefully drawn up, step by step, with each step building on a previous one.

Structured Analysis

A method for defining system inputs, processes, and outputs and for partitioning systems into subsystems or modules that show a logical graphic model of information flow.

Structured Decisions

Decisions that are repetitive, routine, and have a definite procedure for handling them.

Structured Design

Software design discipline encompassing a set of design rules and techniques for designing systems from the top down in hierarchical fashion.

Structured Knowledge

Knowledge in the form of structured documents and reports.

Structured Knowledge System

System for organizing structured knowledge in a repository where it can be accessed throughout the organization. Also known as content management system.

Structured Programming

Discipline for organizing and coding programs that simplifies the control paths so that the programs can be easily understood and modified; uses the basic control structures and modules that have only one entry point and one exit point.

Structured Query Language (SQL)

The standard data manipulation language for relational database management systems.

Subschema

The specific set of data from the database that is required by each user or application program.

Supply Chain

Network of organizations and business processes for procuring materials, transforming raw materials into intermediate and finished products, and distributing the finished products to customers.

Supply Chain Execution Systems

Systems to manage the flow of products through distribution centers and warehouses to ensure that products are delivered to the right locations in the most efficient manner.

Supply Chain Management

Integration of supplier, distributor, and customer logistics requirements into one cohesive process.

Supply Chain Management Systems

Information systems that automate the flow of information between a firm and its suppliers in order to optimize the planning, sourcing, manufacturing, and delivery of products and services.

Supply Chain Planning Systems

Systems that enable a firm to generate demand forecasts for a product and to develop sourcing and manufacturing plans for that product.

Support Activities

Activities that make the delivery of a firm's primary activities possible. Consist of the organization's infrastructure, human resources, technology, and procurement.

Switch

Device to connect network components that has more intelligence than a hub and can filter and forward data to a specified destination.

Switched Lines

Telephone lines that a person can access from a terminal to transmit data to another computer, the call being routed or switched through paths to the designated destination.

Switching Costs

The expense a customer or company incurs in lost time and expenditure of resources when changing from one supplier or system to a competing supplier or system.

Syndicator

Business aggregating content or applications from multiple sources, packaging them for distribution, and reselling them to third-party Web sites.

System Failure

An information system that either does not perform as expected, is not operational at a specified time, or cannot be used in the way it was intended.

System Software

Generalized programs that manage the computer's resources, such as the central processor, communications links, and peripheral devices.

System Testing

Tests the functioning of the information system as a whole in order to determine if discrete modules will function together as planned.

Systems Analysis

The analysis of a problem that the organization will try to solve with an information system.

Systems Analysts

Specialists who translate business problems and requirements into information requirements and systems, acting as liaison between the information systems department

and the rest of the organization.

Systems Design

Details how a system will meet the information requirements as determined by the systems analysis.

Systems Development

The activities that go into producing an information systems solution to an organizational problem or opportunity.

Systems Lifecycle

A traditional methodology for developing an information system that partitions the systems development process into formal stages that must be completed sequentially with a very formal division of labor between end users and information systems specialists.

T lines

High-speed data lines leased from communications providers, such as T-1 lines (with a transmission capacity of 1.544 Mbps).

Tacit Knowledge

Expertise and experience of organizational members that has not been formally documented.

Tangible Benefits

Benefits that can be quantified and assigned a monetary value; they include lower operational costs and increased cash flows.

Taxonomy

Method of classifying things according to a predetermined system.

Teamware

Group collaboration software that is customized for teamwork.

Technology Standards

Specifications that establish the compatibility of products and the ability to communicate in a network.

Technostress

Stress induced by computer use; symptoms include aggravation, hostility toward humans, impatience, and enervation.

Telecommunications System

A collection of compatible hardware and software arranged to communicate information from one location to another.

Teleconferencing

The ability to confer with a group of people simultaneously using the telephone or electronic-mail group communication software.

Telematics

Wireless services that combine wireless communication with tracking capabilities from the global positioning system (GPS).

Telnet

Network tool that allows someone to log on to one computer system while doing work on another.

Test Plan

Prepared by the development team in conjunction with the users; it includes all of the preparations for the series of tests to be performed on the system.

Testing

The exhaustive and thorough process that determines whether the system produces the desired results under known conditions.

Touch Point

Method of firm interaction with a customer, such as telephone, e-mail, customer service desk, conventional mail, or point-of-purchase.

Topology

The way in which the components of a network are connected.

Total Cost of Ownership (TCO)

Designates the total cost of owning technology resources, including initial purchase costs, the cost of hardware and software upgrades, maintenance, technical support, and training.

Total Quality Management (TQM)

A concept that makes quality control a responsibility to be shared by all people in an organization.

Trade Secret

Any intellectual work or product used for a business purpose that can be classified as belonging to that business, provided it is not based on information in the public domain.

Transaction Cost Theory

Economic theory stating that firms grow larger because they can conduct marketplace transactions internally more cheaply than they can with external firms in the marketplace.

Transaction Processing Systems (TPS)

Computerized systems that perform and record the daily routine transactions necessary to conduct the business; they serve the organization's operational level.

Transborder Data Flow

The movement of information across international boundaries in any form.

Transmission Control Protocol/Internet Protocol (TCP/IP)

Dominant model for achieving connectivity among different networks. Provides a universally agree-on method for breaking up digital messages into packets, routing them to the proper addresses, and then reassembling them into coherent messages.

Transnational

Truly global form of business organization with no national headquarters; value-added activities are managed from a global perspective without reference to national borders, optimizing sources of supply and demand and local competitive advantage.

Trojan Horse

A software program that appears legitimate but contains a second hidden function that may cause damage.

Token Physical device for proving the identity of a single user.

Transport Layer Security (TLS)

Protocol for encrypted data transfer over the internet between client and server.

Tuple

A row or record in a relational database.

Twisted Wire

A transmission medium consisting of pairs of twisted copper wires; used to transmit analog phone conversations but can be used for data transmission.

UDDI (Universal Description, Discovery, and Integration)

Allows a Web service to be listed in a directory of Web services so that it can be easily located by other organizations and systems.

Unified Messaging

System combining voice messages, e-mail, and fax so that they can all be obtained from a single system.

Unified Modeling Language (UML)

Industry standard methodology for analysis and design of an object-oriented software system.

Uniform Resource Locator (URL)

The address of a specific resource on the Internet.

Unit Testing

The process of testing each program separately in the system. Sometimes called program testing.

UNIX

Operating system for all types of computers, which is machine independent and supports multiuser processing, multitasking, and networking. Used in high-end workstations and servers.

Unstructured Decisions

Nonroutine decisions in which the decision maker must provide judgment, evaluation, and insights into the problem definition; there is no agreed-upon procedure for making such decisions.

Up-Selling

Marketing higher-value products or services to new or existing customers.

Usenet

Forums in which people share information and ideas on a defined topic through large electronic bulletin boards where anyone can post messages on the topic for others to see and to which others can respond.

User Interface

The part of the information system through which the end user interacts with the system; type of hardware and the series of on-screen commands and responses required for a user to work with the system.

User-Designer Communications Gap

The difference in backgrounds, interests, and priorities that impede communication and problem solving among end users and information systems specialists.

Utilitarian Principle

Principle that assumes one can put values in rank order and understand the consequences of various courses of action.

Utility Computing

Model of computing in which companies pay only for the information technology resources they actually use during a specified time period. Also called on-demand computing or usage-based pricing.

Value Chain Model

Model that highlights the primary or support activities that add a margin of value to a firm's products or services where information systems can best be applied to achieve a competitive advantage.

Value Web

Customer-driven network of independent firms who use information technology to coordinate their value chains to collectively produce a product or service for a market.

Value-Added Network (VAN)

Private, multipath, data-only, third-party-managed network that multiple organizations use on a subscription basis.

Videoconferencing

Teleconferencing in which participants see each other over video screens.

Virtual Organization

Organization using networks to link people, assets and ideas to create and distribute products and services without being limited to traditional organizational boundaries or physical location.

Virtual Private Network (VPN)

A secure connection between two points across the Internet to transmit corporate data. Provides a low-cost alternative to a private network.

Virtual Reality Modeling Language (VRML)

A set of specifications for interactive three-dimensional modeling on the World Wide Web.

Virtual Reality Systems

Interactive graphics software and hardware that create computer-generated simulations that provide sensations that emulate real-world activities.

Voice Mail

A system for digitizing a spoken message and transmitting it over a network.

Voice over IP (VoIP)

Facilities for managing the delivery of voice information using the Internet Protocol (IP).

Voice Portal

Capability for accepting voice commands for accessing Web content, e-mail, and other electronic applications from a cell phone or standard telephone and for translating responses to user requests for information back into speech for the customer.

Walkthrough

A review of a specification or design document by a small group of people carefully selected based on the skills needed for the particular objectives being tested.

Web Browser

An easy-to-use software tool for accessing the World Wide Web and the Internet.

Web Bugs

Tiny graphic files embedded in e-mail messages and Web pages that are designed to monitor online Internet user behavior.

Web Content Management Tools

Software to facilitate the collection, assembly, and management of content on a Web site, intranet, or extranet.

Web Hosting Service

Company with large Web server computers to maintain the Web sites of fee-paying subscribers.

Web Personalization

The tailoring of Web content directly to a specific user.

Web Server

Software that manages requests for Web pages on the computer where they are stored and that delivers the page to the user's computer.

Web Services

Set of universal standards using Internet technology for integrating different applications from different sources without time-consuming custom coding. Used for linking systems of different organizations or for linking disparate systems within the same organization.

Web Site Performance Monitoring Tools

Software tools for monitoring the time to download Web pages, perform Web transactions, identify broken links between Web pages, and pinpoint other Web site problems and bottlenecks.

Web Site

All of the World Wide Web pages maintained by an organization or an individual.

Webmaster

The person in charge of an organization's Web site.

Wi-Fi

Standards for Wireless Fidelity and refers to the 802.11 family of wireless networking standards.

Wide Area Network (WAN)

Telecommunications network that spans a large geographical distance. May consist of a variety of cable, satellite, and microwave technologies.

WiMax

Popular term for IEEE Standard 802.16 for wireless networking over a range of up to 31 miles with a data transfer rate of up to 75 Mbps. Stands for Worldwide Interoperability for Microwave Access.

Windows

Microsoft family of operating systems for both network servers and client computers.

Windows 2000

Windows operating system for high-performance PCs and network servers. Supports networking, multitasking, multiprocessing, and Internet services.

Windows 2003

Most recent Windows operating system for servers.

Windows XP

Powerful Windows operating system that provides reliability, robustness, and ease of use for both corporate and home PC users.

Wintel PC

Any computer that uses Intel microprocessors (or compatible processors) and a Windows operating system.

Wireless Application Protocol (WAP)

System of protocols and technologies that lets cell phones and other wireless devices with tiny displays, low-bandwidth connections, and minimal memory access Web-based information and services.

Wireless NIC

Add-in-card (network interface card) that has a built-in-radio and antenna.

Wireless Portals

Portals with content and services optimized for mobile devices to steer users to the information they are most likely to need.

Wireless Sensor Networks (WSNs)

Networks of interconnected wireless devices with built-in processing, storage, and radio frequency sensors and antennas that are embedded into the physical environment to provide measurements of many points over large spaces.

Wisdom

The collective and individual experience of applying knowledge to the solution of problems.

WML (Wireless Markup Language)

Markup language for Wireless Web sites; based on XML and optimized for tiny displays.

Work-Flow Management

The process of streamlining business procedures so that documents can be moved easily and efficiently from one location to another.

Workstation

Desktop computer with powerful graphics and mathematical capabilities and the ability to perform several complicated tasks at once.

World Wide Web

A system with universally accepted standards for storing, retrieving, formatting, and displaying information in a networked environment.

Worms

Independent software programs that propagate themselves to disrupt the operation of computer networks or destroy data and other programs.

WSDL(Web Services Description Language)

Common framework for describing the tasks performed by a Web service so that it can be used by other applications.

Wireless NICs

Add-in wireless network interface card (NIC) that has a built-in radio and antenna to enable wireless transmission for a PC.

XHTML (Extensible Hypertext Markup Language)

Hybrid of HTML and XML that provides more flexibility than HTML.

XML (eXtensible Markup Language)

General-purpose language that describes the structure of a document and supports links to multiple documents, allowing data to be manipulated by the computer. Used for both Web and non-Web applications.

ZigBee

Protocol that handles application-level communication between devices in a wireless sensor network. Determines the content of messages transmitted by each node in the network.

[Return to Top](#)