

Introduction to Management Information Systems

Summary

1. *Explain why information systems are so essential in business today.*

Information systems are a foundation for conducting business today. In many industries, survival and even existence is difficult without extensive use of information technology. Information systems have become essential for helping organizations operate in a global economy. 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. Businesses today use information systems to achieve six major objectives: operational excellence; new products, services, and business models; customer/supplier intimacy; improved decision making; competitive advantage; and day-to-day survival.

2. *Define an information systems from both a technical and a business perspective.*

From a technical perspective, 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 provides a solution to a problem or challenge facing a firm and provides real economic value to the business.

3. *Identify and describe the three dimensions of information systems.*

An information system represents a combination of management, organization, and technology elements. The management dimension of information systems involves leadership, strategy, and management behavior. The technology dimensions consist of computer hardware, software, data management technology, and networking/telecommunications technology (including the Internet). The organization dimension of information systems involves the organization's hierarchy, functional specialties, business processes, culture, and political interest groups.

Review Questions

1. **List and describe six reasons why information systems are so important for business today.**

Six reasons why information systems are so important for business today include:

- Operational excellence
- New products, services, and business models
- Customer and supplier intimacy
- Improved decision making
- Competitive advantage
- Survival

Information systems are the 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.

2. What is an information system? What activities does it perform?

The textbook defines an information system as a set of interrelated components that work together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization. In addition to supporting decision making, coordination, and control, information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products.

3. What is the difference between data and information?

Data are 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.

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

4. What is information systems literacy? How does it differ from computer literacy?

Information literacy is more concerned with creating information useful to an organization and its employees, whereas computer literacy addresses the simple use of computers. As technology uses spread beyond traditional computers, information literacy enables employees and organizations to gain an edge over their competition

5. List and describe the organizational, management, and technology dimensions of information systems.

Organization: The organization dimension of information systems involves issues such as the organization's hierarchy, functional specialties, business processes, culture, and political interest groups.

Management: The management dimension of information systems involves issues such as training, job attitudes, and management behavior.

Technology: The technology dimension consists of computer hardware, software, data management technology, and networking/telecommunications technology.

Chapter 2

Key Terms

The following alphabetical list identifies the key terms discussed in this chapter.

Chief information officer (CIO) — senior manager in charge of the information systems function in the firm.

Customer relationship management (CRM) systems — 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.

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.

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 (e-commerce) — the process of buying and selling goods and services electronically, involving transactions using the Internet, networks, and other digital technologies.

End users — representative of departments outside the information systems group for whom applications are developed.

Enterprise applications — a system that can coordinate activities, decisions, and knowledge across many different functions, levels, and business management systems, and knowledge management systems.

Enterprise systems — integrated enterprise-wide information systems that coordinate key internal processes of the firm.

Executive support systems (ESS) — information systems at the organization's strategic level designed to address unstructured decision making through advanced graphics and communications.

Finance and accounting information systems — systems used to keep track of the firm's financial assets and fund flows.

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.

Information systems department — the formal organizational unit that is responsible for the information systems function in the organization.

Information systems managers — leaders of the various specialists in the information systems department.

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

Knowledge management systems (KMS) — systems that support the creation, capture, storage, and dissemination of firm expertise and knowledge.

Management information systems (MIS) — the study of information systems focusing on their use in business and management.

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.

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.

Programmers — highly trained technical specialists who write computer software instructions.

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.

Supply chain management (SCM) systems — information systems that automate the flow of information between a firm and its suppliers to optimize the planning, sourcing, manufacturing, and delivery of products and services.

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

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.

Summary

1. Define and describe business processes and their relationship to information systems.

A business process is a logically related set of activities that define how specific business tasks are performed, and a business can be viewed as a collection of business processes. Business processes are concrete workflows of material, information, and knowledge. 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 its business, and thus be 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 greater efficiencies by automating parts of these processes or by helping organizations redesign and streamline them. Firms can become more flexible and efficient by coordinating their business processes closely, and, in some cases, integrating these processes so they are focused on efficient management of resources and customer service.

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 or services, and control 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. Evaluate the role played by systems serving the various levels of management in a business and their relationship to each other.

There are four major types of information systems in contemporary organizations serving operational, middle, and senior management. Systems serving operational management are transaction processing systems (TPS), such as payroll or order processing, that track the flow of the daily routine transactions necessary to conduct business. MIS and DSS provide middle management with reports and access to the organization's current performance and historical records. Most MIS reports condense information from TPS and are not highly analytical. 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. ESS support senior management 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.

4. *Explain how enterprise applications and intranets 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 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, improve 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, and distribution of knowledge to improve business processes and management decisions.

Intranets and extranets use Internet technology and standards to assemble information from various systems and present it to the user in a Web page format. Extranets make portions of private corporate intranets available to outsiders.

Review Questions

1. What are business processes? What role do they play in organizations? How are they enhanced by information systems?

A business process is a logically related set of activities that define how specific business tasks are performed. Business processes are the ways in which organizations

coordinate and organize work activities, information, and knowledge to produce their valuable products or services.

Business processes for the manufacturing and production area include product assembling, quality checking, and producing bills of materials. For the sales and marketing area, business processes include identifying customers, making customers aware of the product, and selling the product. For finance and accounting, business processes includes paying creditors, creating financial statements, and managing cash accounts. For human resources, business processes include hiring employees, evaluating job performance of employees, and enrolling employees in benefits plans.

2. List and describe the information systems serving each of the major functional areas of a business.

Sales and marketing information systems help the firm identify customers for the organizations products and services, develop products and services to meet customers' needs, promote the products and services, sell the products and services, and provide ongoing customer support. Specific sales and marketing information systems include order processing, pricing analysis, and sales trend forecasting.

Manufacturing and production information systems provide information for planning, product development, production or service scheduling, and controlling the flow of products and services. Specific manufacturing and production information systems include machine control, production planning, and facilities location.

Finance and accounting information systems track the organizations financial assets and fund flows. Financial and accounting systems include accounts receivable, budgeting, and profit planning.

Human resources information systems maintain employee records; track employee skills, job performance, and training; and support planning for employee compensation, including pensions and benefits, legal and regulatory requirements, and career development. Systems include training and development, compensation analysis, and human resources planning.

3. What are the characteristics of transaction processing systems? What role do they play in a business?

Transaction processing systems (TPS) are computerized systems that perform and record the daily routine transactions necessary to conduct the business; they serve the organization's operational level. The principal purpose of systems at this level is to answer routine questions and to track the flow of transactions through the organization.

- At the operational level, tasks, resources, and goals are predefined and highly structured.
- Managers need TPS to monitor the status of internal operations and the firm's relations with the external environment.
- TPS are also major producers of information for the other types of systems.
- Transaction processing systems are often so central to a business that TPS failure for a few hours can lead to a firm's demise and perhaps that of other firms linked to it.

Examples of transaction processing systems for a university include a registration system, student transcript system, curriculum class control systems, and an alumni benefactor system.

4. What are the characteristics of MIS? How do MIS differ from TPS? From DSS?

Middle management needs systems to help with monitoring, controlling, decision-making, and administrative activities.

- MIS provide middle managers with reports on the organization's current performance. This information is used to monitor and control the business and predict future performance.
- MIS summarize and report the company's basic operations using data supplied by TPSs. The basic transaction data from TPS are compressed and usually presented in reports that are produced on a regular schedule.
- MIS serve managers primarily interested in weekly, monthly, and yearly results, although some MIS enable managers to drill down to see daily or hourly data if required.
- MIS generally provide answers to routine questions that have been specified in advance and have a predefined procedure for answering them.
- MIS systems generally are not flexible and have little analytical capability.
- Most MIS use simple routines, such as summaries and comparisons, as opposed to sophisticated mathematical models or statistical techniques.

Examples include sales and profit per customer and per region, relocation summary and analysis, inventory control, capital investment analysis, and even a report on students who were here in the autumn but did not to return in the spring.

MIS differs from TPS in that MIS deals with summarized and compressed data from the TPS and sometimes analysis of that summarized data.

While MIS have an internal orientation, DSS will often use data from external sources, as well as data from TPS and MIS. DSS supports "right now" analysis rather than the long-term structured analysis of MIS. MIS are generally not flexible and provide little analytical capabilities. In contrast, DSS are designed for analytical purposes and are flexible.

5. What are the characteristics of DSS? How do they differ from those of ESS?

Decision-support systems (DSS) support nonroutine decision making for middle managers.

- DSS provide sophisticated analytical models and data analysis tools to support semistructured and unstructured decision-making activities.
- DSS use data from TPS, MIS, and external sources, provide more analytical power than other systems, combine data, and are interactive.
- DSS focus on problems that are unique and rapidly changing, for which the procedure for arriving at a solution may not be fully predefined in advance.
- DSS use a variety of models to analyze data, or they condense large amounts of data in a form in which decision makers can analyze them. Typically, they provide the ability to do “what if” analysis.
- DSS use data from TPS, MIS, and external sources, provide more analytical power than other systems, combine data, and are interactive.
- DSS are designed so that users can work with them directly; these systems explicitly include user-friendly software.

Executive support systems help senior managers address strategic issues and long-term trends, both in the firm and in the external environment.

- ESS address nonroutine decisions requiring judgment, evaluation, and insight because there is no agreed-on procedure for arriving at a solution.
- ESS provide a generalized computing and communications capacity that can be applied to a changing array of problems.
- ESS are designed to incorporate data about external events, such as new tax laws or competitors, but they also draw summarized information from information from internal MIS and DSS.
- DSS filter, compress, and track critical data, displaying the data of greatest importance to senior managers.
- ESS may be less analytical than DSS with less use of models such as linear programming or forecasting. However, they often rely on external data and rely heavily on graphics.

6. Describe the relationship between TPS, MIS, DSS, and ESS.

The various types of systems in the organization exchange data with one another. TPS are typically a major source of data for other systems, especially MIS and DSS. TPS are operational-level systems that collect transaction data. Examples of these are payroll or order processing that track the flow of the daily routine transactions that are necessary to conduct business. TPS provide data that are required by MIS and DSS, although these systems may also use other data. DSS not only use data from TPS but also from MIS. MIS rely heavily on data from TPS. ESS are primarily a recipient of data from lower-level systems. They obtain most of their internal data from MIS and DSS.

7. Why are organizations trying to integrate their business processes? What are the four key enterprise applications?

An organization operates in an ever-increasing competitive and global environment. Operating in a global environment requires an organization to focus on the efficient execution of its processes, customer service, and speed to market. To accomplish these goals, the organization must exchange valuable information across different functions, levels, and business units. By integrating its processes, the organization can more efficiently exchange information among its functional areas, business units, suppliers, and customers.

The four key enterprise applications are:

- enterprise systems
- supply chain management systems
- customer relationship management systems
- knowledge management systems

8. What are enterprise systems? How do they benefit businesses?

Enterprise systems integrate the key business processes of an organization into a single central data repository. Data from various functional areas are maintained centrally where they can be accessed and used by other functions and cross-functional processes. This makes it possible for information that was previously fragmented in different systems to be shared across the firm and for different parts of the business to work more closely together.

This changes the work flow of an organization.

- Allows information to seamlessly flow throughout the organization, improving coordination, efficiency, and decision making.
- Speeds the communication of information throughout the company, making it easier for businesses to coordinate their daily operations.
- Gives companies the flexibility to respond rapidly to customer requests while producing and stocking inventory only with what is needed to fulfill existing orders.
- Enables increased accuracy and on-time shipments, minimizes costs, and increases customer satisfaction that adds to the firm's profitability.
- Provides much valuable information for improving management decision making. Corporate headquarters has access to up-to-the-minute data on sales, inventory, and production and uses this information to create more accurate sales and production forecasts.
- Provides company-wide information to help managers analyze overall product profitability or cost structures.

9. What is supply chain management? How do they benefit businesses?

Supply chain management systems help businesses manage relationships with their suppliers. Objective of SCM: get the right amount of products from the companies' source to their point of consumption with the least amount of time and with the lowest cost. SCM provide information to help suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so that they can source, produce, and deliver goods and services efficiently. SCM helps organizations achieve great efficiencies by automating parts of these processes or by helping organizations rethink and streamline these processes. SCM is important to a business because through its efficiency it can coordinate, schedule, and control the delivery of products and services to customers.

Business benefits include: (Table 2–6)

- Decide when and what to produce, store, and move
- Rapidly communicate orders
- Track the status of orders
- Check inventory availability and monitor inventory levels
- Reduce inventory, transportation, and warehousing costs
- Track shipments
- Plan production based on actual customer demand
- Rapidly communicate changes in product design

10. What are customer relationship management systems? How do they benefit businesses?

Customer relationship management is a business and technology discipline to coordinate all of the business processes for helping firms manage their relationships with existing and potential customers. With the growth of the Web, potential customers can easily comparison shop for retail and wholesale goods and even raw materials, so better treatment of customers has become very important.

Business benefits include:

- CRM systems provide information to coordinate all the business processes that deal with customers in sales, marketing, and service to optimize revenue, customer satisfaction, and customer retention. This information helps firms identify, attract, and retain the most profitable customers; provide better service to existing customers; and increase sales.
- Good CRM systems consolidate customer data from multiple sources and provide analytical tools for answering questions such as: What is the value of a particular customer to the firm over his/her lifetime?
- CRM tools integrate the firm's customer-related processes and consolidate customer information from multiple communication channels, so that the firm can put one coherent face to the customer.

- Detailed and accurate knowledge of customers and their preferences helps firms increase the effectiveness of their marketing campaigns and provide higher-quality customer service and support.

11. What is the role of knowledge management systems in the enterprise?

Knowledge management systems enable organizations to better manage processes for capturing and applying knowledge and expertise. These systems collect all relevant knowledge and experience in the firm, and make it available wherever and whenever it is needed to improve business processes and management decisions. They also link the firm to external sources of knowledge.

- KMS support processes for acquiring, storing, distributing, and applying knowledge, as well as processes for creating new knowledge and integrating it into the organization.
- KMS include enterprise-wide systems for managing and distributing documents, graphics, and other digital knowledge objects; systems for creating corporate knowledge directories of employees with special areas of expertise; office systems for distributing knowledge and information; and knowledge work systems to facilitate knowledge creation.
- KMS use intelligent techniques that codify knowledge and experience for use by other members of the organization and tools for knowledge discovery that recognize patterns and important relationships in large pools of data.
- KMS make collected knowledge and experience available when and where it is needed, and provide links to external sources of knowledge. Organizational processes include creating knowledge, discovering and codifying knowledge, sharing knowledge, and distributing knowledge.

12. Describe how the information systems function supports a business. What roles are played by programmers, systems analysts, information systems managers, and the chief information officer (CIO)?

The information systems departments is the formal organizational unit responsible for information technology services. The information systems department is responsible for maintaining the hardware, software, data storage, and networks that comprise the firm's IT infrastructure.

The information systems department consists of specialists, such as programmers, systems analysts, project leaders, and information systems managers.

Programmers are highly trained technical specialists who write the software instructions for computers.

Systems analysts constitute the principal liaisons between the information systems groups and the rest of the organization. The systems analyst's job is to translate business problems and requirements into information requirements and systems.

Information systems managers are leaders of teams of programmers and analysts, project managers, physical facility managers, telecommunications managers, or database specialists.

Chief information officer (CIO) is a senior manager who oversees the use of information technology in the firm.

13. Describe alternative ways of organizing the information systems function in a business.

There are alternative ways of organizing the IT function within a firm.

- A very small company will not have a formal information systems group.
- Large companies will have a separate information systems department, which may be organized along several different lines, depending on the nature and interests of the firm.
- Decentralized arrangement where each functional area of the business has its own information systems department, overseen by a corporate CIO.
- The information systems function may be run as a separate department similar to the other functional departments.
- Very large firms with multiple divisions and product lines may choose to have an information systems department for each division reporting to a high-level central information systems group and CIO.