# Management Information Systems

## MANAGING THE DIGITAL FIRM

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## *Chapter 3:* Information Systems, Organizations and Strategy

## *Learning Track 1:* The Changing Business Environment of Information Technology

A combination of information technology innovations and a changing domestic and global business environment makes the role of IT in business even more important for managers than just a few years ago. The Internet revolution is not something that happened and then burst, but instead has turned out to be an ongoing, powerful source of new technologies with significant business implications for much of this century.

There are five factors to consider when assessing the growing impact of IT in business firms both today and over the next ten years.

- Internet growth and emergence of the mobile platform
- Transformation of the business enterprise
- Growth of a globally connected economy
- Growth of knowledge and information-based economies
- Emergence of the digital firm

These changes in the business environment, summarized in Table 1-1, pose a number of new challenges and opportunities for business firms and their managements.

## The Internet, Mobile Platform, and Technology Convergence

One of the most frequently asked questions by Wall Street investors, journalists, and business entrepreneurs is, "What's the next big thing?" As it turns out, the next big thing is in front of us: We are in the midst of a networking and communications revolution driven by the growth of the Internet, the ascendant mobile platform, and new business models and processes that leverage the new technologies. In 2013, nearly half of Internet access occurs through smartphones and tablet computers.

Although "digital convergence" was predicted a decade ago, it is now an undeniable reality. Four massive industries are moving toward a common platform: the $1 trillion computer hardware and software industry in the United States, the $250 billion consumer electronics industry, the $1.6 trillion

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communications industry (traditional and wireless telephone networks), and the $900 billion content industry (from Hollywood movies, to music, text, and research industries).

**TABLE 1-1** The Changing Contemporary Business Environment

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| **INTERNET GROWTH AND TECHNOLOGY CONVERGENCE** |
| New business technologies with favorable costs |
| Explosive growth of the mobile platform |
| E-business, e-commerce, and e-government |
| Rapid changes in markets and market structure |
| Increased obsolescence of traditional business models |
| **TRANSFORMATION OF THE BUSINESS ENTERPRISE** |
| Flattening |
| Decentralization |
| Flexibility |
| Location independence |
| Low transaction and coordination costs |
| Empowerment |
| Collaborative work and teamwork |
| **GLOBALIZATION** |
| Management and control in a global marketplace |
| Competition in world markets |
| Global workgroups |
| Global delivery systems |
| **RISE OF THE INFORMATION ECONOMY** |
| Knowledge- and information-based economies |
| New products and services |
| Knowledge as a central productive and strategic asset |
| Time-based competition |
| Shorter product life |
| Turbulent environment |
| Limited employee knowledge base |
| **EMERGENCE OF THE DIGITAL FIRM** |
| Digitally enabled relationships with customers, suppliers, and employees |
| Core business processes accomplished using digital networks |
| Digital management of key corporate assets |
| Agile sensing and responding to environmental changes |

Although each industry has its favored platform, the outlines of the future are clear: a world of near universal, online, on-demand, and personalized information services from text messaging on cell phones, to games, education, and entertainment.

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The Internet is bringing about a convergence of technologies, roiling markets, entire industries, and firms in the process. Traditional boundaries and business relationships are breaking down, even as new ones spring up. Telephone networks are merging into the Internet, and cellular phones are becoming Internet access devices. Handheld storage devices such as iPods are emerging as potential portable game and entertainment centers. The Internet-connected personal computer is moving toward a role as home entertainment control center.

Traditional markets and distribution channels are weakening and new markets are being created. For instance, the markets for music CDs and video DVDs and the music and video store industries are undergoing rapid change. New markets for online streaming media and for music and video downloads have materialized. DVD movie sales, and CD music sales, have plunged by 50% since their heyday in 2005.

Today, networking and the Internet are nearly synonymous with doing business. Firms' relationships with customers, employees, suppliers, and logistic partners are becoming digital relationships. As a supplier, you cannot do business with Wal-Mart, or Sears, or most national retailers unless you adopt their well-defined digital technologies. As a consumer, you will increasingly interact with sellers in a digital environment. As an employer, you'll be interacting more electronically with your employees and giving them new digital tools to accomplish their work.

So much business is now enabled by or based upon digital networks that we use the terms electronic business and electronic commerce frequently throughout this text. Electronic business, or e-business, designates the use of Internet and digital technology to execute all of the activities in the enterprise. E-business includes activities for the internal management of the firm and for coordination with suppliers and other business partners. It also includes electronic commerce, or e-commerce. E-commerce is the part of e-business that deals with the buying and selling of goods and services electronically with computerized business transactions using the Internet, networks, and other digital technologies. It also encompasses activities supporting those market transactions, such as advertising, marketing, customer support, delivery, and payment.

The technologies associated with e-commerce and e-business have also brought about similar changes in the public sector. Governments on all levels are using Internet technology to deliver information and services to citizens, employees, and businesses with which they work. E-government is the application of the Internet and related technologies to digitally enable government and public sector agencies' relationships with citizens, businesses, and other arms of government. In addition to improving delivery of government services, e-government can make government operations more efficient and also empower citizens by giving them easier access to information and the ability to network electronically with other citizens. For example, citizens in some states can renew their driver's licenses or apply for unemployment benefits online, and the Internet has become a powerful tool for instantly mobilizing interest groups for political action and fund-raising.

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# Transformation of the Business Enterprise

Along with rapid changes in markets and competitive advantage are changes in the firms themselves. The Internet and the new markets are changing the cost and revenue structure of traditional firms and are hastening the demise of traditional business models.

For instance, in the United States, in 2013, 55% percent of travel sales are made online, and experts believe that 70 percent of travel sales will be online within a decade. Realtors have had to reduce commissions on home sales because of competition from Internet real estate sites. The business model of traditional local telephone companies, and the value of their copper-based networks, is rapidly declining as millions of consumers switch to cellular and Internet telephones.


At the Orbitz Web site, visitors can make online reservations for airlines, hotels, rental cars, cruises, and vacation packages and obtain information on travel and leisure topics. Such online travel services are supplanting traditional travel agencies.

The Internet and related technologies make it possible to conduct business across firm boundaries almost as efficiently and effectively as it is to conduct business within the firm. This means that firms are no longer limited by traditional organizational boundaries or physical locations in how they design, develop, and produce goods and services. It is possible to maintain close relationships with suppliers and other business partners at great distances and outsource work that firms formerly did themselves to other companies.

For example, Cisco Systems does not manufacture the networking products it sells; it uses other companies, such as Flextronics, for this purpose. Cisco uses the Internet to transmit orders to Flextronics and to monitor the status of orders as they are shipped. GKN Aerospace North America, which fabricates engine parts for aircraft and aerospace vehicles, uses a system called Sentinel with a Web interface to monitor key indicators of the production systems of Boeing Corporation, its main customer. Sentinel responds automatically to Boeing's need for parts by increasing, decreasing, or shutting down GKN's systems according to parts usage (Mayor, 2004).

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In addition to these changes, there has also been a transformation in the management of the enterprise. The traditional business firm was—and still is—a hierarchical, centralized, structured arrangement of specialists who typically relied on a fixed set of standard operating procedures to deliver a mass-produced product (or service). The new style of business firm is a flattened (less hierarchical), decentralized, flexible arrangement of generalists who rely on nearly instant information to deliver mass-customized products and services uniquely suited to specific markets or customers.

The traditional management group relied—and still relies—on formal plans, a rigid division of labor, and formal rules. The new manager relies on informal commitments and networks to establish goals (rather than formal planning), a flexible arrangement of teams and individuals working in task forces, and a customer orientation to achieve coordination among employees. The new manager appeals to the knowledge, learning, and decision making of individual employees to ensure proper operation of the firm. Once again, information technology makes this style of management possible.

## Globalization

A growing percentage of the American economy—and other advanced industrial economies in Europe and Asia—depends on imports and exports. Foreign trade, both exports and imports, accounts for more than 25 percent of the goods and services produced in the United States, and even more in countries such as Japan and Germany. Companies are also distributing core business functions in product design, manufacturing, finance, and customer support to locations in other countries where the work can be performed more cost effectively. The success of firms today and in the future depends on their ability to operate globally.

Today, information systems provide the communication and analytic power that firms need to conduct trade and manage businesses on a global scale. Controlling the far-flung global corporation—communicating with distributors and suppliers, operating 24 hours a day in different national environments, coordinating global work teams, and servicing local and international reporting needs—is a major business challenge that requires powerful information system responses.

Globalization and information technology also bring new threats to domestic business firms: Because of global communication and management systems, customers now can shop in a worldwide marketplace, obtaining price and quality information reliably 24 hours a day. To become competitive participants in international markets, firms need powerful information and communication systems.

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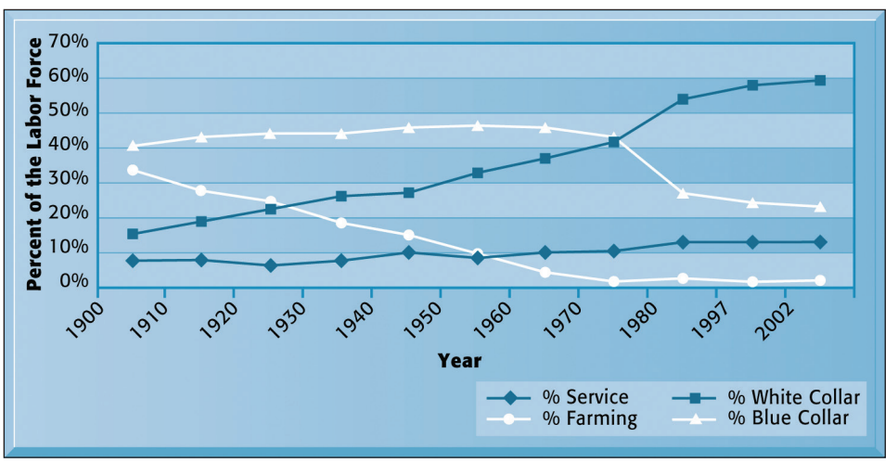
# Rise of the Information Economy

The United States, Japan, Germany, and other major industrial powers are being transformed from industrial economies to knowledge- and information-based service economies, whereas manufacturing has been moving to lower-wage countries. In a knowledge- and information-based economy, knowledge and information are key ingredients in creating wealth.

The knowledge and information revolution began at the turn of the twentieth century and has gradually accelerated. By 1976, the number of white-collar workers employed in offices surpassed the number of farm workers, service workers, and blue-collar workers employed in manufacturing (see Figure 1-1). Today, most people no longer work on farms or in factories but instead are found in sales, education, health care, banks, insurance firms, and law firms; they also provide business services, such as copying, computer programming, or making deliveries. These jobs primarily involve working with, distributing, or creating new knowledge and information. In fact, knowledge and information work now account for a significant 60 percent of the U.S. gross national product and nearly 55 percent of the labor force.

**FIGURE 1-1** The Growth of the Information Economy.




Since the beginning of the twentieth century, the United States has experienced a steady decline in the number of farm workers and blue-collar workers who are employed in factories. At the same time, the country is experiencing a rise in the number of white-collar workers who produce economic value using knowledge and information.

*Sources:* U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 2003, Table 615; and Historical Statistics of the United States, Colonial Times to 1970, Vol. 1, Series D, pp. 182–232.

In knowledge- and information-based economies, the market value of many firms is based largely on intangible assets, such as proprietary knowledge, information, unique business methods, brands, and other "intellectual capital." Physical assets, such as buildings, machinery, tools, and inventory, now

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account for less than 20 percent of the market value of many public firms in the United States (Lev, 2001).

Knowledge and information provide the foundation for valuable new products and services, such as credit cards, overnight package delivery, or worldwide reservation systems. Knowledge- and information-intense products, such as computer games, require a great deal of knowledge to produce, and knowledge is used more intensively in the production of traditional products as well. In the automobile industry, for instance, both design and production now rely heavily on knowledge and information technology.

## Emergence of the Digital Firm

All of the changes we have just described, coupled with equally significant organizational redesign, have created the conditions for a fully digital firm. The digital firm can be defined along several dimensions. A digital firm is one in which nearly all of the organization's significant business relationships with customers, suppliers, and employees are digitally enabled and mediated. Core business processes are accomplished through digital networks spanning the entire organization or linking multiple organizations.

Business processes refer to the set of logically related tasks and behaviors that organizations develop over time to produce specific business results and the unique manner in which these activities are organized and coordinated. Developing a new product, generating and fulfilling an order, creating a marketing plan, and hiring an employee are examples of business processes, and the ways organizations accomplish their business processes can be a source of competitive strength.

Key corporate assets—intellectual property, core competencies, and financial and human assets—are managed through digital means. In a digital firm, any piece of information required to support key business decisions is available at any time and anywhere in the firm.

Digital firms sense and respond to their environments far more rapidly than traditional firms, giving them more flexibility to survive in turbulent times. Digital firms offer extraordinary opportunities for more global organization and management. By digitally enabling and streamlining their work, digital firms have the potential to achieve unprecedented levels of profitability and competitiveness. DaimlerChrysler, described earlier, illustrates some of these qualities. Electronically integrating key business processes with suppliers has made this company much more agile and adaptive to customer demands and changes in its supplier network.

Figure 1-2 illustrates a digital firm making intensive use of Internet and digital technology for electronic business. Information can flow seamlessly among different parts of the company and between the company and external entities—its customers, suppliers, and business partners. More and more organizations are moving toward this digital firm vision.

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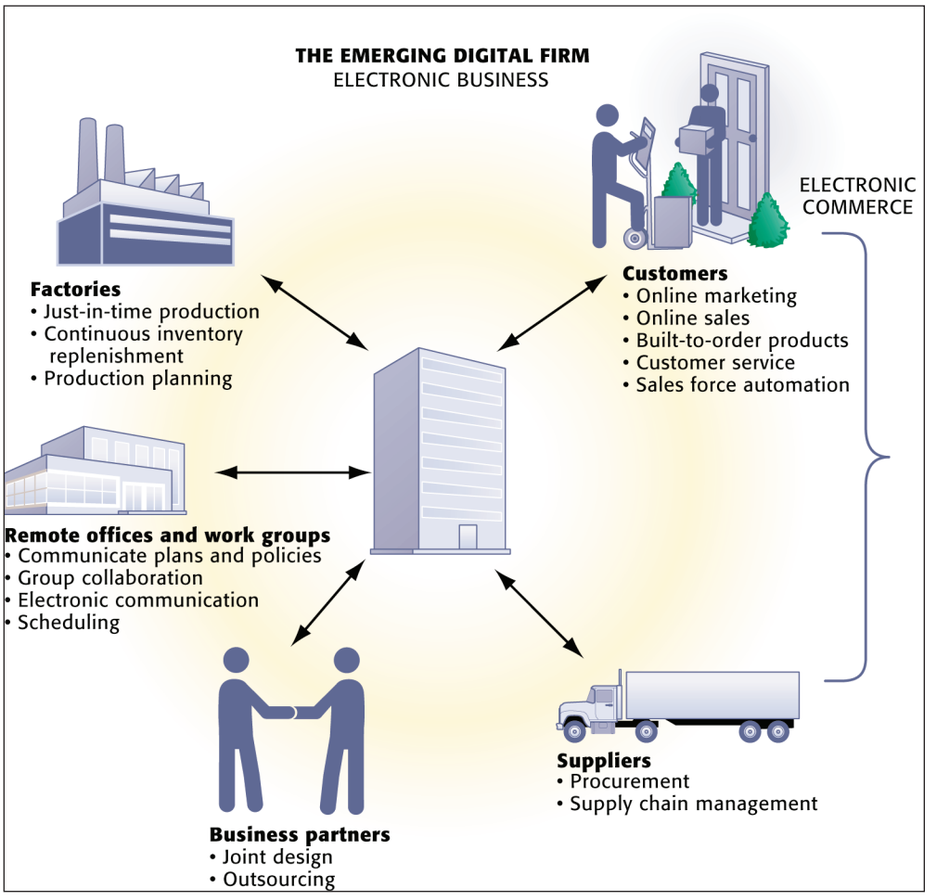
**FIGURE 1-2** Electronic Business and Electronic Commerce in the Emerging Digital Firm.




Companies can use Internet technology for e-commerce transactions with customers and suppliers, for managing internal business processes, and for coordinating with suppliers and other business partners. E-business includes e-commerce as well the management and coordination of the enterprise.

A few firms, such as Cisco Systems or Dell Computers, are close to becoming fully digital firms, using the Internet to drive every aspect of their business. In most other companies, a fully digital firm is still more vision than reality, but this vision is driving them toward digital integration. Firms are continuing to invest heavily in information systems that integrate internal business processes and build closer links with suppliers and customers.