

Chapter 15

Managing Global Systems

LEARNING OBJECTIVES

After reading this chapter, you will be able to answer the following questions:

1. What major factors are driving the internationalization of business?
2. What are the alternative strategies for developing global businesses?
3. How can information systems support different global business strategies?
4. What are the challenges posed by global information systems and management solutions for these challenges?
5. What are the issues and technical alternatives to be considered when developing international information systems?

CHAPTER OUTLINE

15.1 THE GROWTH OF INTERNATIONAL INFORMATION SYSTEMS

Developing an International Information Systems Architecture
The Global Environment: Business Drivers and Challenges
State of the Art

15.2 ORGANIZING INTERNATIONAL INFORMATION SYSTEMS

Global Strategies and Business Organization
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Reorganizing the Business

15.3 MANAGING GLOBAL SYSTEMS

A Typical Scenario: Disorganization on a Global Scale
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The Management Solution: Implementation

15.4 TECHNOLOGY ISSUES AND OPPORTUNITIES FOR GLOBAL VALUE CHAINS

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Connectivity
Software Localization

Interactive Sessions:

Hasbro Develops a Global Systems Strategy

CombineNet ASAP Helps Primark Manage Its Global Supply Chain

L'ORÉAL'S GLOBAL MAKEOVER

L'Oréal Group is the world's largest cosmetics and beauty company, and it is a truly global brand. Virtually everyone has heard of this company or used its products, with world-name brands including L'Oréal Paris and Maybelline (mass-market), Lancôme (luxury), Redken and SoftSheen-Carson (retail and salon), and The Body Shop natural cosmetics. Altogether L'Oréal has more than 23 global brands in 130 countries and more than 67,000 employees. This is a very challenging company to manage worldwide.

Each of L'Oréal's 42 manufacturing sites deals with hundreds or even thousands of different recipes for L'Oréal products. Every recipe must be followed exactly, and every ingredient must be tested for quality. This level of complexity increases the chances of human error and waste. L'Oréal's management believed the company needed to do more to ensure that its products are all manufactured worldwide under uniform production and quality standards.

L'Oréal's various operating units in different regions and countries were running their own versions of SAP enterprise resource planning (ERP) systems. In order to achieve the goal of global product uniformity, these disparate systems had to be standardized and consolidated. It was hoped that productivity, quality, and safety would be improved by standardizing on best-practice processes throughout the company.

Management knew that this level of organizational change required changes in employee behavior, and it dedicated significant resources to change management and promoting knowledge-sharing across geographical and cultural boundaries. The company assigned a business "owner" for each core business process who would help analyze the processes at each site and implement the necessary changes. L'Oréal's information systems team would then create the system design and implementation plan for the solution.

L'Oréal was able to implement a single global instance of SAP's ERP system and integrate that with Apriso's FlexNet for operations management using a core model that is replicated at each site. FlexNet is a unified suite of manufacturing software applications for coordinating all manufacturing operations—within the plant, between plants, and across a company's supply chain and enterprise. L'Oréal named its new system ISIS, standing for Integrated Solution for Industrial Systems. L'Oréal's transactional processes, financial controls, and purchasing are all integrated into the FlexNet manufacturing operations system on the shop floor run. L'Oréal runs ISIS at its central data center in Montpellier, France, where it keeps the master data for the business. FlexNet runs on servers in individual factories so that operations can continue if there is a problem with L'Oréal's main servers.

ISIS guides factory operators through each recipe for a product and automatically records the weight of each ingredient to ensure exact quantities are being used. All ingredients are tested, and raw materials that have passed tests for quality are given labels that must be scanned by the worker before being added to the recipe. In the past, shop workers used to rummage around for informa-



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tion on recipes or raw materials. The labels also provide forklift drivers with directions on which materials need to be taken to the packaging station.

With this level of centralization and global processes, L'Oréal is able to implement new processes and related systems changes globally much more rapidly than in the past. For example, when the company had multiple versions of SAP running in different operating units, it could take two to five years for the entire company to upgrade to the latest version of the software. With its global enterprise wide version of SAP and FlexNet, a recent L'Oréal's upgrade took just one weekend. That means that the company can easily update its systems without disrupting its factories and bring new factories on board much more quickly. For example, a recently acquired Yves St. Laurent factory was able to be integrated with L'Oréal's global quality assurance, safety, and efficiency practices within a few months. However, there is still some flexibility in the system to tailor some processes to local needs if necessary.

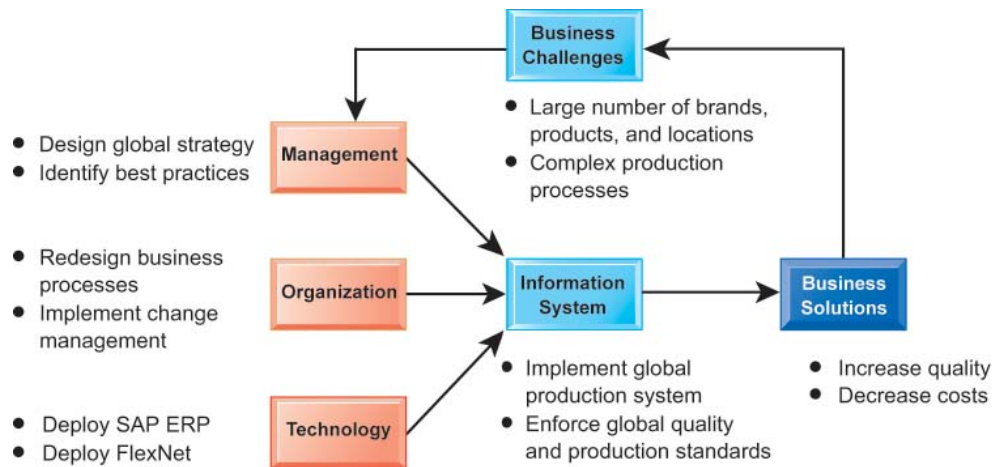
L'Oréal management believes the company's overall capacity has increased and that the workplace is more productive and efficient. Shop workers have asserted that the system is easy to use and has reduced confusion and stress. Fewer materials are wasted, there are fewer discrepancies between actual versus planned production, and the company is able to maintain lower, better managed inventories.

Sources: Jacques Playe, "L'Oréal's Manufacturing Makeover," *Baseline*, January/February 2011; www.aprison.com, accessed October 1, 2012; and www.lorealusa.com, accessed October 1, 2012.

L'Oréal's efforts to create global manufacturing systems identify some of the issues that truly global organizations need to consider if they want to operate world wide. Like many large, multinational firms, L'Oréal has numerous operating units in many different countries. Even though these units were running SAP ERP software, they used their own versions and business processes. As a result, L'Oréal was unable to effectively coordinate global manufacturing operations or ensure that its vast array of products met global quality and production standards.

The chapter-opening diagram calls attention to important points raised by this case and this chapter. To solve its global management and business challenges, L'Oréal had all of its business units adopt a standard core version of SAP software and standard manufacturing and production processes. The ERP system was integrated with the FlexNet manufacturing software suite to coordinate manufacturing operations on a global scale. Management realized that this level of organizational change required careful attention to change management. Although L'Oréal now has standard global manufacturing and production systems and business processes, it is sensitive to local differences and gives units some leeway to tailor processes to local needs.

Here are some questions to think about: How did information technology improve operations at L'Oréal? Why did management think it desirable to centralize its systems by developing a single ERP system across all its operational units?

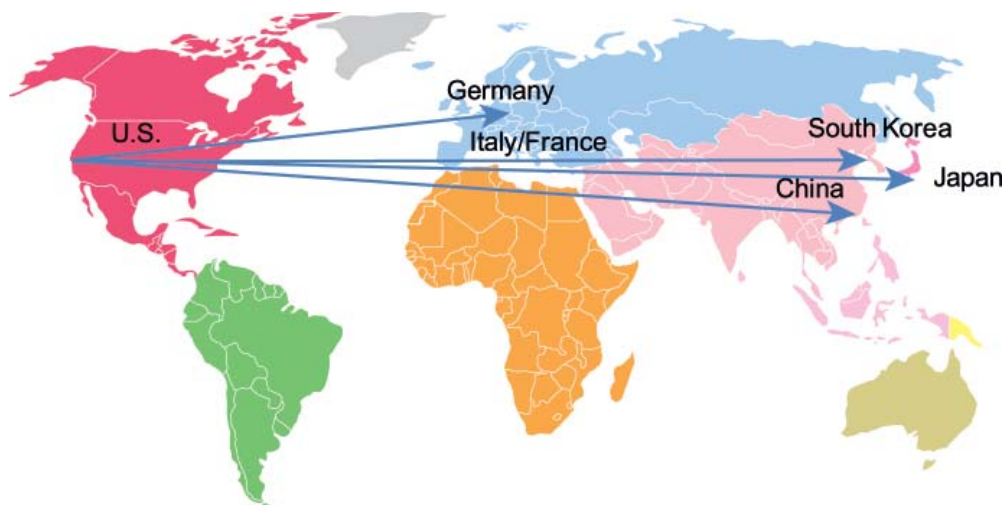


15.1 THE GROWTH OF INTERNATIONAL INFORMATION SYSTEMS

In earlier chapters, we describe the emergence of a global economic system and global world order driven by advanced networks and information systems. The new world order is sweeping away many national corporations, national industries, and national economies controlled by domestic politicians. Many localized firms will be replaced by fast-moving networked corporations that transcend national boundaries. The growth of international trade has radically altered domestic economies around the globe.

Consider the path to market for an iPhone, which is illustrated in Figure 15.1. The iPhone was designed by Apple engineers in the United States, sourced with more than 100 high-tech components from around the world, and assembled

FIGURE 15.1 APPLE IPHONE'S GLOBAL SUPPLY CHAIN



Apple designs the iPhone in the United States, and relies on suppliers in the United States, Germany, Italy, France, and South Korea for other parts. Final assembly occurs in China.

in China. Among the iPhone's major suppliers, Samsung Electronics in South Korea has supplied the flash memory and applications processor. The iPhone 4's accelerator and gyroscope are made in Italy and France by STMicroelectronics, and its electronic compass is made by AKM Semiconductor in Japan. Germany's Infineon Technologies supplies chips that send and receive phone calls and data. Texas Instruments (TI) supplies the touch screen controller, while South Korea's LG Display makes the high-definition display screen. Foxconn, a Chinese division of Taiwan's Hon Hai Group, is in charge of manufacturing and assembly.

DEVELOPING AN INTERNATIONAL INFORMATION SYSTEMS ARCHITECTURE

This chapter describes how to go about building an international information systems architecture suitable for your international strategy. An **international information systems architecture** consists of the basic information systems required by organizations to coordinate worldwide trade and other activities. Figure 15.2 illustrates the reasoning we follow throughout the chapter and depicts the major dimensions of an international information systems architecture.

The basic strategy to follow when building an international system is to understand the global environment in which your firm is operating. This means understanding the overall market forces, or business drivers, that are pushing your industry toward global competition. A **business driver** is a force in the environment to which businesses must respond and that influences the direction of the business. Likewise, examine carefully the inhibitors or negative factors that create *management challenges*—factors that could scuttle the development of a global business. Once you have examined the global environment, you will need to consider a corporate strategy for competing in

FIGURE 15.2 INTERNATIONAL INFORMATION SYSTEMS ARCHITECTURE



The major dimensions for developing an international information systems architecture are the global environment, the corporate global strategies, the structure of the organization, the management and business processes, and the technology platform.

that environment. How will your firm respond? You could ignore the global market and focus on domestic competition only, sell to the globe from a domestic base, or organize production and distribution around the globe. There are many in-between choices.

After you have developed a strategy, it is time to consider how to structure your organization so it can pursue the strategy. How will you accomplish a division of labor across a global environment? Where will production, administration, accounting, marketing, and human resource functions be located? Who will handle the systems function?

Next, you must consider the management issues in implementing your strategy and making the organization design come alive. Key here will be the design of business processes. How can you discover and manage user requirements? How can you induce change in local units to conform to international requirements? How can you reengineer on a global scale, and how can you coordinate systems development?

The last issue to consider is the technology platform. Although changing technology is a key driving factor leading toward global markets, you need to have a corporate strategy and structure before you can rationally choose the right technology.

After you have completed this process of reasoning, you will be well on your way toward an appropriate international information systems portfolio capable of achieving your corporate goals. Let's begin by looking at the overall global environment.

THE GLOBAL ENVIRONMENT: BUSINESS DRIVERS AND CHALLENGES

Table 15.1 lists the business drivers in the global environment that are leading all industries toward global markets and competition.

The global business drivers can be divided into two groups: general cultural factors and specific business factors. Easily recognized general cultural factors have driven internationalization since World War II. Information, communication, and transportation technologies have created a *global village* in which communication (by telephone, television, radio, or computer network) around the globe is no more difficult and not much more expensive than communication down the block. The cost of moving goods and services to and from geographically dispersed locations has fallen dramatically.

The development of global communications has created a global village in a second sense: A **global culture** created by television, the Internet, and

TABLE 15.1 THE GLOBAL ENVIRONMENT: BUSINESS DRIVERS AND CHALLENGES

GENERAL CULTURAL FACTORS	SPECIFIC BUSINESS FACTORS
Global communication and transportation technologies	Global markets
Development of global culture	Global production and operations
Emergence of global social norms	Global coordination
Political stability	Global workforce
Global knowledge base	Global economies of scale

other globally shared media such as movies now permits different cultures and peoples to develop common expectations about right and wrong, desirable and undesirable, heroic and cowardly. The collapse of the Eastern bloc has speeded the growth of a world culture enormously, increased support for capitalism and business, and reduced the level of cultural conflict considerably.

A last factor to consider is the growth of a global knowledge base. At the end of World War II, knowledge, education, science, and industrial skills were highly concentrated in North America, western Europe, and Japan, with the rest of the world euphemistically called the *Third World*. This is no longer true. Latin America, China, India, southern Asia, and eastern Europe have developed powerful educational, industrial, and scientific centers, resulting in a much more democratically and widely dispersed knowledge base.

These general cultural factors leading toward internationalization result in specific business globalization factors that affect most industries. The growth of powerful communications technologies and the emergence of world cultures lay the groundwork for *global markets*—global consumers interested in consuming similar products that are culturally approved. Coca-Cola, American sneakers (made in Korea but designed in Los Angeles), and Cable News Network (CNN) programming can now be sold in Latin America, Africa, and Asia.

Responding to this demand, global production and operations have emerged with precise online coordination between far-flung production facilities and central headquarters thousands of miles away. At Sealand Transportation, a major global shipping company based in Newark, New Jersey, shipping managers in Newark can watch the loading of ships in Rotterdam online, check trim and ballast, and trace packages to specific ship locations as the activity proceeds. This is all possible through an international satellite link.

The new global markets and pressure toward global production and operation have called forth whole new capabilities for global coordination. Production, accounting, marketing and sales, human resources, and systems development (all the major business functions) can be coordinated on a global scale.

Frito Lay, for instance, can develop a marketing sales force automation system in the United States and, once provided, may try the same techniques and technologies in Spain. Micromarketing—marketing to very small geographic and social units—no longer means marketing to neighborhoods in the United States, but to neighborhoods throughout the world! These new levels of global coordination permit for the first time in history the location of business activity according to comparative advantage. Design should be located where it is best accomplished, as should marketing, production, and finance.

Finally, global markets, production, and administration create the conditions for powerful, sustained global economies of scale. Production driven by worldwide global demand can be concentrated where it can best be accomplished, fixed resources can be allocated over larger production runs, and production runs in larger plants can be scheduled more efficiently and precisely estimated. Lower-cost factors of production can be exploited wherever they emerge. The result is a powerful strategic advantage to firms that can organize globally. These general and specific business drivers have greatly enlarged world trade and commerce.

Not all industries are similarly affected by these trends. Clearly, manufacturing has been much more affected than services that still tend to be domestic and highly inefficient. However, the localism of services is breaking down in telecommunications, entertainment, transportation, finance, law, and

general business. Clearly, those firms within an industry that can understand the internationalization of the industry and respond appropriately will reap enormous gains in productivity and stability.

Business Challenges

Although the possibilities of globalization for business success are significant, fundamental forces are operating to inhibit a global economy and to disrupt international business. Table 15.2 lists the most common and powerful challenges to the development of global systems.

At a cultural level, **particularism**, making judgments and taking action on the basis of narrow or personal characteristics, in all its forms (religious, nationalistic, ethnic, regionalism, geopolitical position) rejects the very concept of a shared global culture and rejects the penetration of domestic markets by foreign goods and services. Differences among cultures produce differences in social expectations, politics, and ultimately legal rules. In certain countries, such as the United States, consumers expect domestic name-brand products to be built domestically and are disappointed to learn that much of what they thought of as domestically produced is in fact foreign made.

Different cultures produce different political regimes. Among the many different countries of the world are different laws governing the movement of information, information privacy of their citizens, origins of software and hardware in systems, and radio and satellite telecommunications. Even the hours of business and the terms of business trade vary greatly across political cultures. These different legal regimes complicate global business and must be considered when building global systems.

For instance, European countries have very strict laws concerning transborder data flow and privacy. **Transborder data flow** is defined as the movement of information across international boundaries in any form. Some European countries prohibit the processing of financial information outside their boundaries or the movement of personal information to foreign countries. The European Union Data Protection Directive, which went into effect in October 1998, restricts the flow of any information to countries (such as the United States) that do not meet strict European information laws on personal information. Financial services, travel, and health care companies are often directly affected. In response, most multinational firms develop information systems within each European country to avoid the cost and uncertainty of moving information across national boundaries.

Cultural and political differences profoundly affect organizations' business processes and applications of information technology. A host of specific barriers

TABLE 15.2 CHALLENGES AND OBSTACLES TO GLOBAL BUSINESS SYSTEMS

GLOBAL	SPECIFIC
Cultural particularism: Regionalism, nationalism, language differences	Standards: Different Electronic Data Interchange (EDI), e-mail, telecommunications standards
Social expectations: Brand-name expectations, work hours	Reliability: Phone networks not uniformly reliable
Political laws: Transborder data and privacy laws, commercial regulations	Speed: Different data transfer speeds, many slower than United States
	Personnel: Shortages of skilled consultants

arise from the general cultural differences, everything from different reliability of phone networks to the shortage of skilled consultants.

National laws and traditions have created disparate accounting practices in various countries, which impact the ways profits and losses are analyzed. German companies generally do not recognize the profit from a venture until the project is completely finished and they have been paid. Conversely, British firms begin posting profits before a project is completed, when they are reasonably certain they will get the money.

These accounting practices are tightly intertwined with each country's legal system, business philosophy, and tax code. British, U.S., and Dutch firms share a predominantly Anglo-Saxon outlook that separates tax calculations from reports to shareholders to focus on showing shareholders how fast profits are growing. Continental European accounting practices are less oriented toward impressing investors, focusing rather on demonstrating compliance with strict rules and minimizing tax liabilities. These diverging accounting practices make it difficult for large international companies with units in different countries to evaluate their performance.

Language remains a significant barrier. Although English has become a kind of standard business language, this is truer at higher levels of companies and not throughout the middle and lower ranks. Software may have to be built with local language interfaces before a new information system can be successfully implemented.

Currency fluctuations can play havoc with planning models and projections. A product that appears profitable in Mexico or Japan may actually produce a loss because of changes in foreign exchange rates.

These inhibiting factors must be taken into account when you are designing and building international systems for your business. For example, companies trying to implement "lean production" systems spanning national boundaries typically underestimate the time, expense, and logistical difficulties of making goods and information flow freely across different countries.

STATE OF THE ART

One might think, given the opportunities for achieving competitive advantages as outlined previously and the interest in future applications, that most international companies have rationally developed marvelous international systems architectures. Nothing could be further from the truth. Most companies have inherited patchwork international systems from the distant past, often based on concepts of information processing developed in the 1960s—batch-oriented reporting from independent foreign divisions to corporate headquarters, manual entry of data from one legacy system to another, with little online control and communication. Corporations in this situation increasingly face powerful competitive challenges in the marketplace from firms that have rationally designed truly international systems. Still other companies have recently built technology platforms for international systems but have nowhere to go because they lack global strategy.

As it turns out, there are significant difficulties in building appropriate international architectures. The difficulties involve planning a system appropriate to the firm's global strategy, structuring the organization of systems and business units, solving implementation issues, and choosing the right technical platform. Let's examine these problems in greater detail.

15.2 ORGANIZING INTERNATIONAL INFORMATION SYSTEMS

Three organizational issues face corporations seeking a global position: choosing a strategy, organizing the business, and organizing the systems management area. The first two are closely connected, so we discuss them together.

GLOBAL STRATEGIES AND BUSINESS ORGANIZATION

Four main global strategies form the basis for global firms' organizational structure. These are domestic exporter, multinational, franchiser, and transnational. Each of these strategies is pursued with a specific business organizational structure (see Table 15.3). For simplicity's sake, we describe three kinds of organizational structure or governance: centralized (in the home country), decentralized (to local foreign units), and coordinated (all units participate as equals). Other types of governance patterns can be observed in specific companies (e.g., authoritarian dominance by one unit, a confederacy of equals, a federal structure balancing power among strategic units, and so forth).

The **domestic exporter** strategy is characterized by heavy centralization of corporate activities in the home country of origin. Nearly all international companies begin this way, and some move on to other forms. Production, finance/accounting, sales/marketing, human resources, and strategic management are set up to optimize resources in the home country. International sales are sometimes dispersed using agency agreements or subsidiaries, but even here, foreign marketing relies on the domestic home base for marketing themes and strategies. Caterpillar Corporation and other heavy capital-equipment manufacturers fall into this category of firm.

The **multinational** strategy concentrates financial management and control out of a central home base while decentralizing production, sales, and marketing operations to units in other countries. The products and services on sale in different countries are adapted to suit local market conditions. The organization becomes a far-flung confederation of production and marketing facilities in different countries. Many financial service firms, along with a host of manufacturers, such as General Motors, Chrysler, and Intel, fit this pattern.

Franchisers are an interesting mix of old and new. On the one hand, the product is created, designed, financed, and initially produced in the home country, but for product-specific reasons must rely heavily on foreign personnel for further production, marketing, and human resources. Food franchisers such as

TABLE 15.3 GLOBAL BUSINESS STRATEGY AND STRUCTURE

BUSINESS FUNCTION	DOMESTIC EXPORTER	MULTINATIONAL	FRANCHISER	TRANSNATIONAL
Production	Centralized	Dispersed	Coordinated	Coordinated
Finance/Accounting	Centralized	Centralized	Centralized	Coordinated
Sales/Marketing	Mixed	Dispersed	Coordinated	Coordinated
Human Resources	Centralized	Centralized	Coordinated	Coordinated
Strategic Management	Centralized	Centralized	Centralized	Coordinated

McDonald's, Mrs. Fields Cookies, and KFC fit this pattern. McDonald's created a new form of fast-food chain in the United States and continues to rely largely on the United States for inspiration of new products, strategic management, and financing. Nevertheless, because the product must be produced locally—it is perishable—extensive coordination and dispersal of production, local marketing, and local recruitment of personnel are required.

Generally, foreign franchisees are clones of the mother country units, but fully coordinated worldwide production that could optimize factors of production is not possible. For instance, potatoes and beef can generally not be bought where they are cheapest on world markets but must be produced reasonably close to the area of consumption.

Transnational firms are the stateless, truly globally managed firms that may represent a larger part of international business in the future. Transnational firms have no single national headquarters but instead have many regional headquarters and perhaps a world headquarters. In a **transnational** strategy, nearly all the value-adding activities are managed from a global perspective without reference to national borders, optimizing sources of supply and demand wherever they appear, and taking advantage of any local competitive advantages. Transnational firms take the globe, not the home country, as their management frame of reference. The governance of these firms has been likened to a federal structure in which there is a strong central management core of decision making, but considerable dispersal of power and financial muscle throughout the global divisions. Few companies have actually attained transnational status, but Citigroup, Sony, Ford, and others are attempting this transition.

Information technology and improvements in global telecommunications are giving international firms more flexibility to shape their global strategies. Protectionism and a need to serve local markets better encourage companies to disperse production facilities and at least become multinational. At the same time, the drive to achieve economies of scale and take advantage of short-term local advantage moves transnationals toward a global management perspective and a concentration of power and authority. Hence, there are forces of decentralization and dispersal, as well as forces of centralization and global coordination.

GLOBAL SYSTEMS TO FIT THE STRATEGY

Information technology and improvements in global telecommunications are giving international firms more flexibility to shape their global strategies. The configuration, management, and development of systems tend to follow the global strategy chosen. Figure 15.3 depicts the typical arrangements. By *systems* we mean the full range of activities involved in building and operating information systems: conception and alignment with the strategic business plan, systems development, and ongoing operation and maintenance. For the sake of simplicity, we consider four types of systems configuration. *Centralized systems* are those in which systems development and operation occur totally at the domestic home base. *Duplicated systems* are those in which development occurs at the home base but operations are handed over to autonomous units in foreign locations. *Decentralized systems* are those in which each foreign unit designs its own unique solutions and systems. *Networked systems* are those in which systems development and operations occur in an integrated and coordinated fashion across all units.

FIGURE 15.3 GLOBAL STRATEGY AND SYSTEMS CONFIGURATIONS

SYSTEM CONFIGURATION	Strategy			
	Domestic Exporter	Multinational	Franchiser	Transnational
Centralized	X			
Duplicated			X	
Decentralized	x	X	x	
Networked		x		X

The large Xs show the dominant patterns, and the small Xs show the emerging patterns. For instance, domestic exporters rely predominantly on centralized systems, but there is continual pressure and some development of decentralized systems in local marketing regions.

As can be seen in Figure 15.3, domestic exporters tend to have highly centralized systems in which a single domestic systems development staff develops worldwide applications. Multinationals offer a direct and striking contrast: Here, foreign units devise their own systems solutions based on local needs with few if any applications in common with headquarters (the exceptions being financial reporting and some telecommunications applications). Franchisers have the simplest systems structure: Like the products they sell, franchisers develop a single system usually at the home base and then replicate it around the world. Each unit, no matter where it is located, has identical applications. Last, the most ambitious form of systems development is found in transnational firms: Networked systems are those in which there is a solid, singular global environment for developing and operating systems. This usually presupposes a powerful telecommunications backbone, a culture of shared applications development, and a shared management culture that crosses cultural barriers. The networked systems structure is the most visible in financial services where the homogeneity of the product—money and money instruments—seems to overcome cultural barriers.

REORGANIZING THE BUSINESS

How should a firm organize itself for doing business on an international scale? To develop a global company and information systems support structure, a firm needs to follow these principles:

1. Organize value-adding activities along lines of comparative advantage.
For instance, marketing/sales functions should be located where they can best be performed, for least cost and maximum impact; likewise with production, finance, human resources, and information systems.
2. Develop and operate systems units at each level of corporate activity—regional, national, and international. To serve local needs, there should be *host country systems units* of some magnitude. *Regional systems units* should handle telecommunications and systems development across national boundaries that take place within major geographic regions (European, Asian, American). *Transnational systems units* should be established to create the linkages across major regional areas and coordinate the development and operation of international telecommunications and systems development (Roche, 1992).

- 3. Establish at world headquarters a single office responsible for development of international systems—a global chief information officer (CIO) position.

Many successful companies have devised organizational systems structures along these principles. The success of these companies relies not only on the proper organization of activities, but also on a key ingredient—a management team that can understand the risks and benefits of international systems and that can devise strategies for overcoming the risks. We turn to these management topics next.

15.3 MANAGING GLOBAL SYSTEMS

Table 15.4 lists the principal management problems posed by developing international systems. It is interesting to note that these problems are the chief difficulties managers experience in developing ordinary domestic systems as well. But these are enormously complicated in the international environment.

A TYPICAL SCENARIO: DISORGANIZATION ON A GLOBAL SCALE

Let's look at a common scenario. A traditional multinational consumer-goods company based in the United States and operating in Europe would like to expand into Asian markets and knows that it must develop a transnational strategy and a supportive information systems structure. Like most multinationals, it has dispersed production and marketing to regional and national centers while maintaining a world headquarters and strategic management in the United States. Historically, it has allowed each of the subsidiary foreign divisions to develop its own systems. The only centrally coordinated system is financial controls and reporting. The central systems group in the United States focuses only on domestic functions and production.

The result is a hodgepodge of hardware, software, and telecommunications. The e-mail systems between Europe and the United States are incompatible. Each production facility uses a different manufacturing resources planning system (or a different version of the same ERP system), and different marketing, sales, and human resource systems. Hardware and database platforms are wildly different. Communications between different sites are poor, given the high cost of European intercountry communications. The central systems group at headquarters in the United States recently was

TABLE 15.4 MANAGEMENT CHALLENGES IN DEVELOPING GLOBAL SYSTEMS

Agreeing on common user requirements
Introducing changes in business processes
Coordinating applications development
Coordinating software releases
Encouraging local users to support global systems

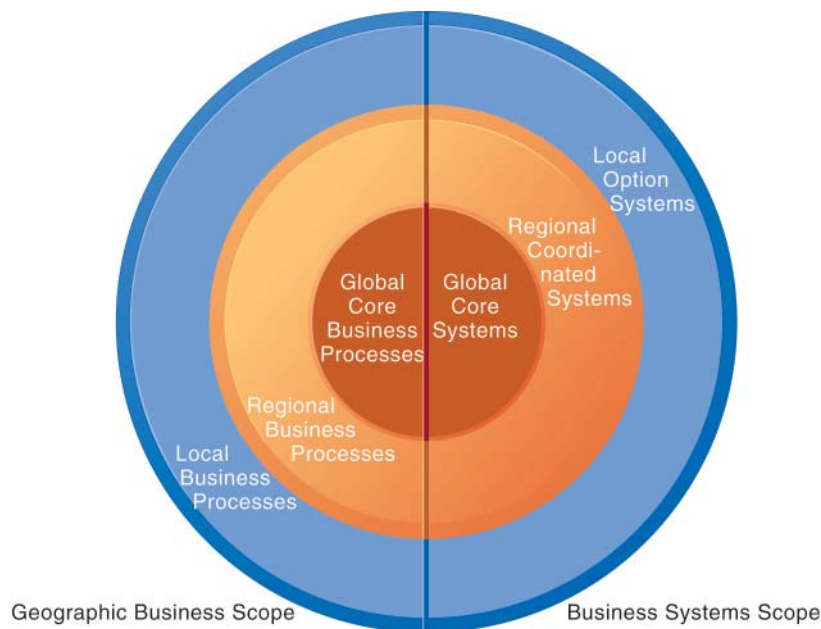
decimated and dispersed to the U.S. local sites in the hope of serving local needs better and reducing costs.

What do you recommend to the senior management leaders of this company, who now want to pursue a transnational strategy and develop an information systems architecture to support a highly coordinated global systems environment? Consider the problems you face by reexamining Table 15.4. The foreign divisions will resist efforts to agree on common user requirements; they have never thought about much other than their own units' needs. The systems groups in American local sites, which have been enlarged recently and told to focus on local needs, will not easily accept guidance from anyone recommending a transnational strategy. It will be difficult to convince local managers anywhere in the world that they should change their business procedures to align with other units in the world, especially if this might interfere with their local performance. After all, local managers are rewarded in this company for meeting local objectives of their division or plant. Finally, it will be difficult to coordinate development of projects around the world in the absence of a powerful telecommunications network and, therefore, difficult to encourage local users to take on ownership in the systems developed.

GLOBAL SYSTEMS STRATEGY

Figure 15.4 lays out the main dimensions of a solution. First, consider that not all systems should be coordinated on a transnational basis; only some

FIGURE 15.4 LOCAL, REGIONAL, AND GLOBAL SYSTEMS



Agency and other coordination costs increase as the firm moves from local option systems toward regional and global systems. However, transaction costs of participating in global markets probably decrease as firms develop global systems. A sensible strategy is to reduce agency costs by developing only a few core global systems that are vital for global operations, leaving other systems in the hands of regional and local units.

Source: From *Managing Information Technology in Multinational Corporations* by Edward M. Roche, © 1993. Adapted by permission of Prentice Hall, Inc., Upper Saddle River, N.J.

core systems are truly worth sharing from a cost and feasibility point of view. **Core systems** support functions that are absolutely critical to the organization. Other systems should be partially coordinated because they share key elements, but they do not have to be totally common across national boundaries. For such systems, a good deal of local variation is possible and desirable. A final group of systems is peripheral, truly provincial, and needed to suit local requirements only.

Define the Core Business Processes

How do you identify core systems? The first step is to define a short list of critical core business processes. Business processes are defined and described in Chapter 2, which you should review. Briefly, business processes are sets of logically related tasks to produce specific business results, such as shipping out correct orders to customers or delivering innovative products to the market. Each business process typically involves many functional areas, communicating and coordinating work, information, and knowledge.

The way to identify these core business processes is to conduct a business process analysis. How are customer orders taken, what happens to them once they are taken, who fills the orders, and how are they shipped to the customers? What about suppliers? Do they have access to manufacturing resource planning systems so that supply is automatic? You should be able to identify and set priorities in a short list of ten business processes that are absolutely critical for the firm.

Next, can you identify centers of excellence for these processes? Is the customer order fulfillment superior in the United States, manufacturing process control superior in Germany, and human resources superior in Asia? You should be able to identify some areas of the company, for some lines of business, where a division or unit stands out in the performance of one or several business functions.

When you understand the business processes of a firm, you can rank-order them. You then can decide which processes should be core applications, centrally coordinated, designed, and implemented around the globe, and which should be regional and local. At the same time, by identifying the critical business processes, the really important ones, you have gone a long way to defining a vision of the future that you should be working toward.

Identify the Core Systems to Coordinate Centrally

By identifying the critical core business processes, you begin to see opportunities for transnational systems. The second strategic step is to conquer the core systems and define these systems as truly transnational. The financial and political costs of defining and implementing transnational systems are extremely high. Therefore, keep the list to an absolute minimum, letting experience be the guide and erring on the side of minimalism. By dividing off a small group of systems as absolutely critical, you divide opposition to a transnational strategy. At the same time, you can appease those who oppose the central worldwide coordination implied by transnational systems by permitting peripheral systems development to progress unabated, with the exception of some technical platform requirements.

Choose an Approach: Incremental, Grand Design, Evolutionary

A third step is to choose an approach. Avoid piecemeal approaches. These surely will fail for lack of visibility, opposition from all who stand to lose from

transnational development, and lack of power to convince senior management that the transnational systems are worth it. Likewise, avoid grand design approaches that try to do everything at once. These also tend to fail, because of an inability to focus resources. Nothing gets done properly, and opposition to organizational change is needlessly strengthened because the effort requires huge resources. An alternative approach is to evolve transnational applications incrementally from existing applications with a precise and clear vision of the transnational capabilities the organization should have in five years. This is sometimes referred to as the “salami strategy,” or one slice at a time.

Make the Benefits Clear

What is in it for the company? One of the worst situations to avoid is to build global systems for the sake of building global systems. From the beginning, it is crucial that senior management at headquarters and foreign division managers clearly understand the benefits that will come to the company as well as to individual units. Although each system offers unique benefits to a particular budget, the overall contribution of global systems lies in four areas.

Global systems—truly integrated, distributed, and transnational systems—contribute to superior management and coordination. A simple price tag cannot be put on the value of this contribution, and the benefit will not show up in any capital budgeting model. It is the ability to switch suppliers on a moment's notice from one region to another in a crisis, the ability to move production in response to natural disasters, and the ability to use excess capacity in one region to meet raging demand in another.

A second major contribution is vast improvement in production, operation, and supply and distribution. Imagine a global value chain, with global suppliers and a global distribution network. For the first time, senior managers can locate value-adding activities in regions where they are most economically performed.

Third, global systems mean global customers and global marketing. Fixed costs around the world can be amortized over a much larger customer base. This will unleash new economies of scale at production facilities.

Last, global systems mean the ability to optimize the use of corporate funds over a much larger capital base. This means, for instance, that capital in a surplus region can be moved efficiently to expand production of capital-starved regions; that cash can be managed more effectively within the company and put to use more effectively.

These strategies will not by themselves create global systems. You will have to implement what you strategize.

THE MANAGEMENT SOLUTION: IMPLEMENTATION

We now can reconsider how to handle the most vexing problems facing managers developing the global information systems architectures that were described in Table 15.4.

Agreeing on Common User Requirements

Establishing a short list of the core business processes and core support systems will begin a process of rational comparison across the many divisions of the company, develop a common language for discussing the business, and naturally lead to an understanding of common elements (as well as the unique qualities that must remain local).

Introducing Changes in Business Processes

Your success as a change agent will depend on your legitimacy, your authority, and your ability to involve users in the change design process. **Legitimacy** is defined as the extent to which your authority is accepted on grounds of competence, vision, or other qualities. The selection of a viable change strategy, which we have defined as evolutionary but with a vision, should assist you in convincing others that change is feasible and desirable. Involving people in change, assuring them that change is in the best interests of the company and their local units, is a key tactic.

Coordinating Applications Development

Choice of change strategy is critical for this problem. At the global level there is far too much complexity to attempt a grand design strategy of change. It is far easier to coordinate change by making small incremental steps toward a larger vision. Imagine a five-year plan of action rather than a two-year plan of action, and reduce the set of transnational systems to a bare minimum to reduce coordination costs.

Coordinating Software Releases

Firms can institute procedures to ensure that all operating units convert to new software updates at the same time so that everyone's software is compatible.

Encouraging Local Users to Support Global Systems

The key to this problem is to involve users in the creation of the design without giving up control over the development of the project to parochial interests. The overall tactic for dealing with resistant local units in a transnational company is cooptation. **Cooptation** is defined as bringing the opposition into the process of designing and implementing the solution without giving up control over the direction and nature of the change. As much as possible, raw power should be avoided. Minimally, however, local units must agree on a short list of transnational systems, and raw power may be required to solidify the idea that transnational systems of some sort are truly required.

How should cooptation proceed? Several alternatives are possible. One alternative is to permit each country unit the opportunity to develop one transnational application first in its home territory, and then throughout the world. In this manner, each major country systems group is given a piece of the action in developing a transnational system, and local units feel a sense of ownership in the transnational effort. On the downside, this assumes the ability to develop high-quality systems is widely distributed, and that, a German team, for example, can successfully implement systems in France and Italy. This will not always be the case.

A second tactic is to develop new transnational centers of excellence, or a single center of excellence. There may be several centers around the globe that focus on specific business processes. These centers draw heavily from local national units, are based on multinational teams, and must report to worldwide management. Centers of excellence perform the initial identification and specification of business processes, define the information requirements, perform the business and systems analysis, and accomplish all design and testing. Implementation, however, and pilot testing are rolled out to other parts of the globe. Recruiting a wide range of local groups to transnational centers of excellence helps send the message that all significant groups are involved in the design and will have an influence. The Interactive Session on Organizations describes how Hasbro dealt with these issues as it implemented a new global systems strategy.

INTERACTIVE SESSION: ORGANIZATIONS

HASBRO DEVELOPS A GLOBAL SYSTEMS STRATEGY

If you've ever played in a sandbox with a Tonka dump truck, accessorized a My Little Pony, manipulated a Transformer, or engaged in mock combat with a G.I. Joe, you have experienced a piece of the Hasbro Inc. juggernaut. Begun by brothers Henry, Hilal, and Herman Hassenfeld in 1923 as a pencil box and school supplies company, Hasbro transitioned to toys in the 1940s. Acquisitions, including Milton Bradley, Tonka, and Wizards of the Coast helped drive growth in the second half of the 20th century.

Today Hasbro, based in Pawtucket, RI, is a multinational entertainment giant. It has licensing partnerships with Lucas film's Star Wars franchise and Marvel Entertainment to produce action figures based on some of their films and will release its own productions of a second G.I. Joe, fourth Transformers, and first Stretch Armstrong film in 2014. With Hasbro Studios' television programs climbing the ratings, numerous digital game licensing deals, and a newly opened adventure park ride, Hasbro's self-description as a "branded play" company is strikingly appropriate. With nearly 6,000 employees, two manufacturing plants (Waterford, Ireland and Springfield, MA), offices in 40 countries, and recent expansion to Korea, Russia, China, Czech Republic, Romania, and Latin America, Hasbro requires state-of-the-art management information systems to bolster its global core-brand strategy and \$400 million net earnings.

In the 1990s, Hasbro chose SAP, a German enterprise application software corporation, to provide its enterprise resource planning (ERP) system. Hasbro implemented SAP/R3 and supporting business processes on a broad scale in 27 business units. This sweeping deployment, however, was tempered with customization to suit local needs. If not immediately a drawback, as time went on this became a strategic liability.

There were many different implementations of standard business processes containing only minor variations, such as Hasbro's order-to-cash process. The order-to-cash process entails order placement, fulfillment, shipment, invoicing, and payment. Rather than a standardized process, different Hasbro offices used different terminology for the same step, included unnecessary steps, or contained needless

forms or process divisions. The lack of centralization and standardization was inefficient, hampering coordination between business units. In addition, it stifled new IT initiatives because services and business processes that should have been shared were not, necessitating avoidable modifications.

When Hasbro decided to move to a unified SAP implementation in 2007, it upgraded its enterprise resource planning software to SAP ERP (ECC6) in its mature markets. But the "Way to Work" initiative aimed to do much more. Hasbro wanted to create a shared-services structure that would foster corporate efficiency while still delivering individualized support to local offices, particularly those in emerging markets.

Assimilation of emerging market offices onto the global team was paramount. Hasbro knew that it could expect its largest growth beyond 2010 to come from outside the United States. The 60%:40% ratio of U.S. to foreign revenue would shift to favor its global operations. The new sales and marketing offices needed to be integrated into the SAP environment quickly and efficiently in order to maximize this opportunity. To reduce implementation time and the learning curve, SAP Business One, an ERP system designed for small businesses, was implemented as an interim solution in these emerging markets. After these markets had matured, they could be incorporated into the larger enterprise SAP infrastructure, which was undergoing a thorough overhaul.

The Way to Work initiative for the mature markets first tackled a standardized approach to business processes. Step one was to meet with leaders to outline how their business processes were currently being performed. Face-to-face meetings were also employed to smooth the transition to uniform business intelligence (BI) and data management. Hasbro found that this technique not only promoted a team atmosphere, encouraging people to get onboard, but also motivated leaders to push for consistency in additional areas. The result was a comprehensive reduction in the complexity of Hasbro's systems. Business processes became globally consistent and integrated with the SAP ERP system. A new global demand and supply system was instituted, and a master data management solution was customized to suit Hasbro's material master data needs. Now all

materials Hasbro purchased, produced, and kept in stock had consistent part numbers, stock codes, and descriptions. Consistency in material master data management (MMDM) allows the seamless flow of data into purchasing, accounting, sales, distribution, warehousing, and materials planning and control operations.

Business intelligence and reporting was another key focus of the Way to Work initiative. With business units in different locales choosing their own reporting tools, including Microsoft Access, Microsoft Excel, Cognos, and SAP BusinessObjects, one office would devise an innovative method for querying and analyzing data that could not be replicated by other divisions. The logical solution was to capitalize on the SAP infrastructure by implementing SAP BusinessObjects globally. This BI and Enterprise Performance Management (EPM) tool is particularly adept at providing key performance metrics. Hasbro knew that to continue to expand globally it would need the best tools available for quickly accessing and analyzing trending and sales data. According to Denise Clark, CIO and Senior Vice President, improved analysis of Hasbro's point-of-sale data was a key goal so that Hasbro would have a clearer understanding of who its customers were and how their spending patterns might be influenced.

With the multiple project goals including unifying two ERP systems, standardizing business processes, combining multiple BI and reporting systems into one, adopting a standard global MMDM system, instituting a new global demand and supply system, and consolidating four planning systems, Hasbro's IT department had its work cut out for it. Because it enjoyed vigorous support from Hasbro management, the department decided the traditional systems life cycle waterfall approach could be bypassed. Rather than methodically completing each stage of the life cycle before starting the next

stage, the IT project team chose an agile development approach with 30-day development cycles. This way it could rapidly roll out a series of small subprojects to an IT test team and select employees, receive immediate feedback on any faulty or missing functionality, make any necessary modifications, and then allow all employees to experience a facet of the new functionality. In addition to the ability to stick to an aggressive time table, the agile development method fostered employee acceptance and according to CIO Clark, "allowed users to learn the new system quickly and efficiently." Moreover, it created a core group of power users prepared to train their coworkers and respond to concerns as they surfaced.

Deployment of the revamped systems landscape began in the United States and Canada in 2009. European operations instituted Way to Work in 2011, and adoption by Hasbro's Mexican and Latin American units began in 2012. The final regions to be incorporated are the Far East and Asia Pacific.

Business benefits are already flowing. The common data warehouse in an SQL Server database and revamped materials master data provide data consistency across all business processes. Reliable data passes to SAP BusinessObjects, improving data analysis. A global accounts payable workflow process promotes information sharing and collaboration between business units. Most importantly, a unified vision for the future has been provided to Hasbro's planning teams.

Sources: David Hannon, "Mr. Potato Head Meets New Markets in the Wake of Hasbro's SAP Upgrade," *SAP InsiderPROFILES*, January, 2012; Gregory Schmidt, "Hasbro, Intent on Expanding Its Toy Brands, Is Playing All the Angles," *The New York Times*, February 12, 2012, "Hasbro, Inc. History," www.fundinguniverse.com, accessed June 24, 2012; "Hasbro Investor Fact Sheet," September 2012; and "Hasbro run SAP Business One as part of their 2 Tier ERP Deployment," www.youtube.com/watch?v=ywe1Vm0oFNY&noredirect=1.

CASE STUDY QUESTIONS

1. What problems was Hasbro having with its legacy SAP/R3 enterprise resource planning (ERP) system installed in the 1990s and how did it affect its operations and global strategy?
2. What management, organization, and technology issues did Hasbro address in order to implement a new global systems strategy?
3. Describe Hasbro's new global systems and the problems they solved. How did they improve operations and management decision making?

Even with the proper organizational structure and appropriate management choices, it is still possible to stumble over technology issues. Choices of technology platforms, networks, hardware, and software are the final element in building transnational information systems architectures.

15.4 TECHNOLOGY ISSUES AND OPPORTUNITIES FOR GLOBAL VALUE CHAINS

Once firms have defined a global business model and systems strategy, they must select hardware, software, and networking standards along with key system applications to support global business processes. Hardware, software, and networking pose special technical challenges in an international setting.

One major challenge is finding some way to standardize a global computing platform when there is so much variation from operating unit to operating unit and from country to country. Another major challenge is finding specific software applications that are user friendly and that truly enhance the productivity of international work teams. The universal acceptance of the Internet around the globe has greatly reduced networking problems. But the mere presence of the Internet does not guarantee that information will flow seamlessly throughout the global organization because not all business units use the same applications, and the quality of Internet service can be highly variable (just as with the telephone service). For instance, German business units may use an open source collaboration tool to share documents and communicate, which is incompatible with American headquarters teams, which use Lotus Notes. Overcoming these challenges requires systems integration and connectivity on a global basis.

COMPUTING PLATFORMS AND SYSTEMS INTEGRATION

The development of a transnational information systems architecture based on the concept of core systems raises questions about how the new core systems will fit in with the existing suite of applications developed around the globe by different divisions, different people, and for different kinds of computing hardware. The goal is to develop global, distributed, and integrated systems to support digital business processes spanning national boundaries. Briefly, these are the same problems faced by any large domestic systems development effort. However, the problems are magnified in an international environment. Just imagine the challenge of integrating systems based on the Windows, Linux, Unix, or proprietary operating systems running on IBM, Sun, HP, and other hardware in many different operating units in many different countries!

Moreover, having all sites use the same hardware and operating system does not guarantee integration. Some central authority in the firm must establish data standards, as well as other technical standards with which sites are to comply. For instance, technical accounting terms such as the beginning and end of the fiscal year must be standardized (review the earlier discussion of the cultural challenges to building global businesses), as well as the acceptable interfaces between systems, communication speeds and architectures, and network software.

CONNECTIVITY

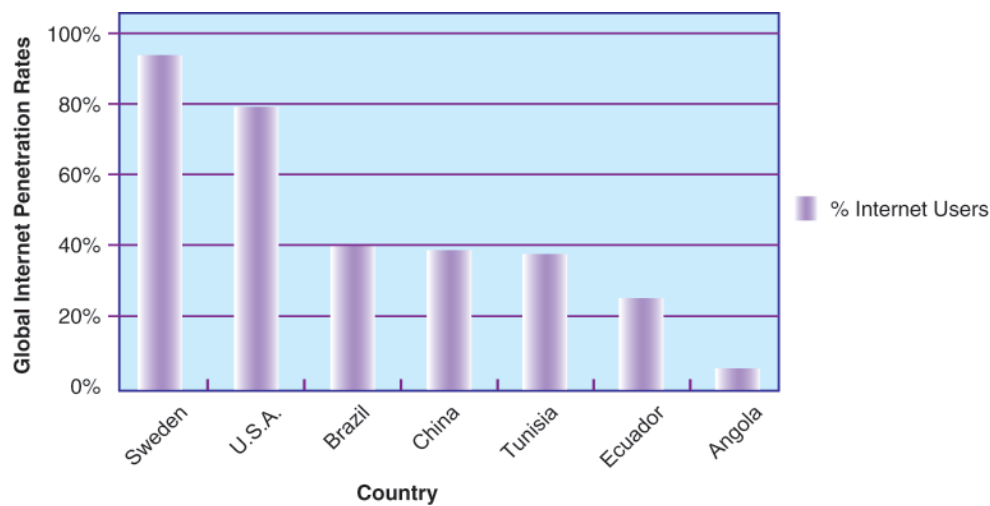
Truly integrated global systems must have connectivity—the ability to link together the systems and people of a global firm into a single integrated network just like the phone system but capable of voice, data, and image transmissions. The Internet has provided an enormously powerful foundation for providing connectivity among the dispersed units of global firms. However, many issues remain. The public Internet does not guarantee any level of service (even in the United States). Few global corporations trust the security of the Internet and generally use private networks to communicate sensitive data, and Internet virtual private networks (VPNs) for communications that require less security. Not all countries support even basic Internet service that requires obtaining reliable circuits, coordinating among different carriers and the regional telecommunications authority, and obtaining standard agreements for the level of telecommunications service provided. Table 15.5 lists the major challenges posed by international networks.

While private networks have guaranteed service levels and better security than the Internet, the Internet is the primary foundation for global corporate networks when lower security and service levels are acceptable. Companies can create global intranets for internal communication or extranets to exchange information more rapidly with business partners in their supply chains. They can use the public Internet to create global networks using VPNs from Internet service providers, which provide many features of a private network using the public Internet (see Chapter 7). However, VPNs may not provide the same level of quick and predictable response as private networks, especially during times of the day when Internet traffic is very congested, and they may not be able to support large numbers of remote users.

The high cost of PCs, and low incomes, limit access to Internet service in many developing countries (see Figure 15.5). Where an Internet infrastructure exists in less-developed countries, it often lacks bandwidth capacity, and is unreliable in part due to power grid issues. The purchasing power of most people in developing countries makes access to Internet services very expensive in local currencies. In addition, many countries monitor transmissions. Governments in China, Singapore, Iran, and Saudi Arabia monitor Internet traffic and block access to Web sites considered morally or politically offensive. On the other hand, the rate of growth in the Internet population is far faster in Asia, Africa, and the Middle East than in North America and Europe, where

TABLE 15.5 PROBLEMS OF INTERNATIONAL NETWORKS

Quality of service
Security
Costs and tariffs
Network management
Installation delays
Poor quality of international service
Regulatory constraints
Network capacity

FIGURE 15.5 INTERNET POPULATION IN SELECTED COUNTRIES

The percentage of the total population using the Internet in developing countries is much smaller than in the United States and Europe, but it is growing rapidly.

Source: Based on data from CIA World Factbook, 2011, Internetworldstats.com, 2012, and authors..

the Internet population is growing slowly if at all. In 2012, China, for instance, had more than 537 million Internet users compared to the United States with about 245 million. Therefore, in the future, Internet connectivity will be much more widely available and reliable in less-developed regions of the world, and it will play a significant role in integrating these economies with the world economy.

SOFTWARE LOCALIZATION

The development of core systems poses unique challenges for application software: How will the old systems interface with the new? Entirely new interfaces must be built and tested if old systems are kept in local areas (which is common). These interfaces can be costly and messy to build. If new software must be created, another challenge is to build software that can be realistically used by multiple business units from different countries given that business units are accustomed to their unique business processes and definitions of data.

Aside from integrating the new with the old systems, there are problems of human interface design and functionality of systems. For instance, to be truly useful for enhancing productivity of a global workforce, software interfaces must be easily understood and mastered quickly. Graphical user interfaces are ideal for this but presuppose a common language—often English. When international systems involve knowledge workers only, English may be the assumed international standard. But as international systems penetrate deeper into management and clerical groups, a common language may not be assumed and human interfaces must be built to accommodate different languages and even conventions. The entire process of converting software to operate in a second language is called **software localization**.

What are the most important software applications? Many international systems focus on basic transaction and management reporting systems. Increasingly, firms are turning to supply chain management and enterprise systems to standardize

Web sites and software interfaces for global systems may have to be translated into multiple languages to accommodate users in other parts of the world.



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their business processes on a global basis and to create coordinated global supply chains. However, these cross-functional systems are not always compatible with differences in languages, cultural heritages, and business processes in other countries (Martinons, 2004; Liang et al., 2004; Davison, 2002). Company units in countries that are not technically sophisticated may also encounter problems trying to manage the technical complexities of enterprise applications.

Electronic Data Interchange (EDI) systems and supply chain management systems are widely used by manufacturing and distribution firms to connect to suppliers on a global basis (see the Interactive Session on Management). Collaboration systems, e-mail, and videoconferencing are especially important worldwide collaboration tools for knowledge- and data-based firms, such as advertising firms, research-based firms in medicine and engineering, and graphics and publishing firms. Internet-based tools will be increasingly employed for such purposes.

INTERACTIVE SESSION: MANAGEMENT

COMBINENET ASAP HELPS PRIMARK MANAGE ITS GLOBAL SUPPLY CHAIN

If you're shopping for budget fashion or "cheap chic" in Great Britain today, Primark is your likely destination. Primark currently has nearly 40,000 employees for its 237 bricks-and-mortar outlets, the bulk of which (156) are in the United Kingdom. With 38 stores in Ireland (where it is headquartered), 27 in Spain, 7 in Germany, 5 in Portugal, 3 in the Netherlands, and one in Belgium, Primark has quickly prospered with its high volume, low-cost retail model. Primark keeps costs low by forgoing advertising outlays for a pure word-of-mouth strategy and using its bulk purchasing power as one of the top 200 retail companies in the world. By volume, it is now the second largest clothing retailer in the United Kingdom and leads the value clothing market segment by targeting fashion-conscious young people under 35.

In the recent economic downturn, Primark continued to thrive as shoppers with diminished disposable incomes turned to lower priced alternatives. However, the increased pressure on Primark to maintain ultra-low prices was coupled with a January 2011 increase in the value added tax (VAT) in the UK, rising labor costs in China, and unpredictable spikes in shipping rates. Switching some of Primark's manufacturing to cheaper labor markets in Vietnam, Bangladesh, and India alleviated one problem while compounding another: How to keep freight costs low when shipping huge amounts of cargo from multiple sites in Asia to Europe for distribution to hundreds of stores.

Primark ships Free On Board (FOB), which in Europe means the seller pays the transportation costs to the port of shipment, including loading the goods onboard the ship. From there, all costs including ocean freight, insurance, unloading, and transportation to its European distribution centers are Primark's obligation. Ocean carriers bid in units of cargo capacity called twenty-foot equivalents (TEU) based on the standard container size of 20 feet long by 8 feet wide. With more origination ports now shipping to Primark's already multiple destination ports, supply chain logistics increased in complexity.

Primark's third-party logistics service provider had always provided effective service; however, its usefulness did not extend beyond comparing bids

between competing shippers, and it could not help Primark with optimization scenarios. The result was ineffective allocation of TEUs and occasions when TEUs had been delivered to the dock by the seller with no carrier available on which to load them. Primark needed to optimize distribution of its TEUs and the shipping rates between each origination and destination port. It also needed to determine which shipper provided the most cost-effective service over a specific time period, be it a week, month, or the entire year. By chance, Martin White, the company's supply chain director, spoke to a manager at ABF who had been using CombineNet's Advanced-Sourcing Application Platform (ASAP) for overland shipping.

CombineNet's ASAP is a SaaS (Software as a Service) Web-based supply chain execution system used to optimize all supply chain processes including for direct materials, indirect materials, and transportation services. It can process requests for information (RFIs), requests for proposals (RFPs), and E-auction bidding. A key element of the platform is that it uses an algorithm to incorporate "if-then" conditions into the bidding process, a feature called Expressive Bidding. For example, if a carrier is awarded a certain number of TEUs in the first half of a particular shipment, it will reduce the price for the second half by an additional percentage. Expressive Bidding is beneficial to both parties, encouraging buyer-supplier collaboration and savings. It enables the carrier to engage in price differentiation to optimize its business opportunities, and it enables the transportation purchaser to calculate the savings that can be achieved based on different shipping scenarios.

Primark took CombineNet ASAP for a trial run and discovered that it could create what-if scenarios that would optimize allocation by providing shippers with precise data on the number of TEUs needed per week. Even more crucially, it could coordinate with carriers to optimize August shipping in order to accurately stock holiday shopping. By committing to a specific number of TEUs per week during the remainder of the year, reciprocal arrangements could be fashioned so that Primark properly sourced during its peak shipping period.

The inadequacy of Primark's former supply chain management software was laid bare when it was run side-by-side with CombineNet ASAP. The old system included internal spreadsheets to determine the best route at the best rate and could gather quotes from the market. However, it was unable to handle Primark's complex allocation to its carriers. Even when Supply Chain Director White and his team concocted complex scenarios, CombineNet ASAP was able to promptly pinpoint the lowest cost carrier with space available from any given port and for any given route.

White and his team were so enthusiastic about the optimization engine's processing speed, which 94% of the time is less than 10 seconds, that their initial mistake was layering on too many variables. White soon realized that by restricting the variables to just the three or four most important, the company would be able to isolate transportation procurement and get better insight into that specific level of supply chain execution. Since implementing CombineNet ASAP, Primark has been able to reduce its total transportation costs about two and a half

percent already, amounting to nearly \$2.5 million. In addition, Primark achieved increased visibility into its supply chain that had not previously been readily available.

Future plans include taking the use of CombineNet ASAP to the next level. So far, Primark has been able to add the correct variables to the "if-then" capabilities of the software to optimize its transportation procurement. Next, the company wants to add additional variables to take it into the operations realm, for example, helping Primark to optimize the costs of storing and moving inventory.

Sources: Russell Goodman, "Retailer Dresses up Its Process for Buying Ocean Transportation," SupplyChainBrain, <http://www.supplychainbrain.com>, June 12, 2012; Andrew McCormack, "Primark to unveil first transactional website," Marketing Magazine, <http://www.marketingmagazine.co.uk/news/1086054/>, August 23, 2011; ThePressman, "CombineNet Finds that Greater Than 70% of its Customers Use CombineNet Advanced Sourcing Product to Complement SAP®, Ariba®, Oracle®," Techburgher, <http://www.techburgher.com>, June 18, 2012; "Research and Markets: Primark - Retail Company Briefing - 2012," Business Wire, <http://www.businesswire.com/>, May 10, 2012; www.primark.co.uk, accessed June 20, 2012; <http://www.combine.net.com/>, accessed June 20, 2012.

CASE STUDY QUESTIONS

1. Why is supply chain management so important at a company such as Primark?
2. What set of business conditions prompted Primark to look into upgrading its supply chain management system?
3. What problems was Primark having managing its suppliers and global supply chain?
4. How did the CombineNet ASAP software provide a solution to these problems?
5. How does the CombineNet ASAP software improve supply chain execution for Primark?

Review Summary

1. *What major factors are driving the internationalization of business?*

The growth of inexpensive 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 also contribute to the world culture. These general factors create the conditions for global markets, global production, coordination, distribution, and global economies of scale.

2. *What are the alternative 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. *How can information systems 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. *What are the challenges posed by global information systems and management solutions for these challenges?*

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. Typically, international systems have evolved without a conscious plan. The remedy is to define a small subset of core business processes and focus on building systems to support these processes. Tactically, managers will have to coopt widely dispersed foreign units to participate in the development and operation of these systems, being careful to maintain overall control.

5. *What are 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. 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 issues concern building interfaces to existing systems and selecting applications that can work with multiple cultural, language, and organizational frameworks.

Key Terms

Business driver, 564

Cooptation, 576

Core systems, 574

Domestic exporter, 569

Franchisers, 569

Global culture, 565

International information systems architecture, 564

Legitimacy, 576

Multinational, 569

Particularism, 567

Software localization, 581

Transborder data flow, 567

Transnational, 570

Review Questions

1. What major factors are driving the internationalization of business?
 - List and describe the five major dimensions for developing an international information systems architecture.
 - Describe the five general cultural factors leading toward growth in global business and the four specific business factors. Describe the interconnection among these factors.
 - List and describe the major challenges to the development of global systems.
 - Explain why some firms have not planned for the development of international systems.
2. What are the alternative strategies for developing global businesses?
 - Describe the four main strategies for global business and organizational structure.
3. How can information systems support different global business strategies?
 - Describe the four different system configurations that can be used to support different global strategies.
4. What are the challenges posed by global information systems and management solutions for these challenges?
 - List and describe the major management issues in developing international systems.
 - Identify and describe three principles to follow when organizing the firm for global business.
 - Identify and describe three steps of a management strategy for developing and implementing global systems.
 - Define cooptation and explain how can it be used in building global systems.
5. What are the issues and technical alternatives to be considered when developing international information systems?
 - Describe the main technical issues facing global systems.
 - Identify some technologies that will help firms develop global systems.

Discussion Questions

1. If you were a manager in a company that operates in many countries, what criteria would you use to determine whether an application should be developed as a global application or as a local application?
2. Describe ways the Internet can be used in international information systems.

Hands-On MIS Projects

The projects in this section give you hands-on experience conducting international market research, analyzing international systems issues for an expanding business, and building a job posting database and Web page for an international company.

Management Decision Problems

1. United Parcel Service (UPS) has been expanding its package delivery and logistics services in China, serving both multinational companies and local businesses. UPS drivers in China need to use UPS systems and tools such as its handheld Driver Information and Delivery Acquisition Device for capturing package delivery data. UPS wants to make its WorldShip, CampusShip, and other shipping-management services accessible to

- Chinese and multinational customers via the Web. What are some of the international systems issues UPS must consider in order to operate successfully in China?
2. Your company manufactures and sells tennis rackets and would like to start selling outside the United States. You are in charge of developing a global Web strategy and the first countries you are thinking of targeting are Brazil, China, Germany, Italy, and Japan. Using the statistics in the CIA World Factbook, which of these countries would you target first? What criteria did you use? What other considerations should you address in your Web strategy? What features would you put on your Web site to attract buyers from the countries you target?

Achieving Operational Excellence: Building a Job Database and Web Page for an International Consulting Firm

Software skills: Database and Web page design

Business skills: Human resources internal job postings

Companies with many overseas locations need a way to inform employees about available job openings in these locations. In this project you'll use database software to design a database for posting internal job openings and a Web page for displaying this information.

KTP Consulting operates in various locations around the world. KTP specializes in designing, developing, and implementing enterprise systems for medium- to large-size companies. KTP offers its employees opportunities to travel, live, and work in various locations throughout the United States, Europe, and Asia. The firm's human resources department has a simple database that enables its staff to track job vacancies. When an employee is interested in relocating, she or he contacts the human resources department for a list of KTP job vacancies. KTP also posts its employment opportunities on the company Web site.

What type of data should be included in the KTP job vacancies database? What information should not be included in this database? Based on your answers to these questions, build a job vacancies database for KTP. Populate the database with at least 20 records. You should also build a simple Web page that incorporates job vacancy data from your newly created database. Submit a copy of the KTP database and Web page to your professor.

Improving Decision Making: Conducting International Marketing and Pricing Research

Software skills: Internet-based software

Business skills: International pricing and marketing

In this project you'll use the Web to research overseas distributors and customs regulations and use Internet-based software to calculate prices in foreign currencies.

You are in charge of marketing for a U.S. manufacturer of office furniture that has decided to enter the international market. You have been given the name of Sorin SRL, a major Italian office furniture retailer, but your source had no other information. You want to test the market by contacting this firm to offer it a specific desk chair that you have to sell at about \$125. Using the Web, locate the information needed to contact this firm and to find out how many European euros you would need to get for the chair in the current market. One source for locating European companies is the Europages Business Directory. In addition, consider using the Universal Currency Converter Web site, which determines the value of one currency expressed in other currencies. Obtain both the information needed to contact the firm and the price of your chair in their local currency. Then locate and obtain customs and legal restrictions on the products you will export from the United States and import into Italy. Finally, locate a company that will represent you as a customs agent and gather information on shipping costs.

Video Cases

Video cases and Instructional Videos illustrating some of the concepts in this chapter are available. Contact your instructor.

Collaboration and Teamwork Project

In MyMISLab, you will find a Collaboration and Teamwork Project dealing with the concepts in this chapter. You will be able to use Google Sites, Google Docs, and other open source collaboration tools to complete the assignment.

Sherwin-Williams Paints the World

CASE STUDY

Sherwin-Williams is the United States front-runner and world's third-largest producer of paints, varnishes, and specialty coatings. It also develops and produces refinishing products, motor vehicle and airplane finishes, and industrial finishes for metal, wood, and plastic. A network of exclusive wholesale dealers and agents set up more than a hundred years ago has blossomed into 3,390 company-operated stores, the only authorized outlets for Sherwin-Williams branded products. Mass merchandisers, home centers, independent paint dealers, hardware stores, automotive retailers, and industrial distributors market its other brands. Major brands in the Sherwin-Williams portfolio include Dutch Boy, Krylon, Minwax, Thompson's Water Seal, Ronseal, Becker Acroma, Pratt & Lambert, Sayerlack, Red Devil, Euronavy, Martin-Senour, and Altax. With over 32,000 employees, \$7.78 billion in annual sales, and operations in 109 countries, Sherwin-Williams is truly a global presence. The company logo adopted in 1905, "Sherwin-Williams Covers the Earth" (a paint can pouring paint over the globe), reflects Sherwin-Williams' long-term global aspirations.

Nevertheless, international profits still accounted for less than 20% of Sherwin-Williams's revenues in 2010. Sherwin-Williams needed to broaden its revenue base by entering new overseas markets. Additional market forces compounded the need for globalization. Raw materials providers in Sherwin-Williams' supply chain had shifted their operations overseas. Many of Sherwin-Williams' suppliers and industrial customers had also expanded globally, and international OEMs (original equipment manufacturers) needed the industrial finishes Sherwin-Williams could provide. Thus, global acquisitions were vigorously pursued during the past decade, most recently Becker Acroma, a Stockholm, Sweden manufacturer of industrial wood coatings in 2010, and Leighs Paints LTD, a Bolton, UK paint manufacturer and wholesaler in 2011. When current CEO Christopher Connor began his tenure in 1999, Sherwin-Williams had no presence in Asia and only its London office in Europe. Now it has 13 factories in both regions.

In order to continue its global expansion, Sherwin-Williams knew that more IT investment was vital. Because shipping both its raw materials and finished products is cost prohibitive, when Sherwin-Williams

enters a market it must either have available or establish local supply chains, retail outlets, and customer service operations. Enterprise resource planning (ERP) systems must include multi-language support as well as support for international tax law, differences in accounting procedures, and variations in environmental, financial, and other regulations. According to Tom Lucas, Sherwin-Williams' CIO, in order to become an effective global player, a different application set was necessary, and the company's existing domestic ERP lacked the necessary capabilities.

An additional challenge was that outdated, rudimentary, and even nonfunctional IT systems at newly acquired companies were common. Only a few had serviceable ERP systems, and a standard implementation was needed across all business units. Moreover, a future ERP system needed to centralize data to improve global decision-making while still supporting local differences and avoiding damage to existing local business relationships. Sherwin-Williams chose the Oracle E-Business Suite, which includes dozens of applications that encompass ERP, customer relationship management (CRM), and supply chain management functions.

Implementation began in Mexico in 2005, with solutions deployed for manufacturing, operations, customer service, and financials. Each year since, additional countries and functionality have been brought online. The philosophy pursued by Chandrasekhar A. Yadati, manager of Sherwin-Williams' global ERP team, was to complete an implementation, get feedback, make any necessary changes, and learn from the experience before moving on to the next country or application. This way, best practices could be gleaned and applied in the next phase. The key goals in each country were to gain as much familiarity with the customer as possible and to gain acceptance from local employees and supply chain partners. Yadati and the 40 members of his Oracle team understood that the benefits of ERP would only be realized if it was accepted and correctly used. Following this slow but steady approach, the Oracle software suite was extended to South America, China, and Southeast Asia. Two distinct instances of the Oracle E-Business Suite were deployed, one specifically adapted for

Asia and one for the Americas. ERP users encompass more than 2,000 employees spread throughout the United States, Canada, Mexico, Argentina, Chile, China, Malaysia, Singapore, and Vietnam.

Oracle Product Information Management Data Hub, an enterprise data management (EDM) system, was added in 2008. This defined, centralized, and coordinated Sherwin-Williams's product, vendor, and customer data, enabling non-conflicting data to flow from one business process to another. The company's data center, located in the United States, is managed by a team in Cleveland. Both the Oracle E-Business Suite for the Americas and the Asian adaptation along with a global human resources management system are administered from corporate headquarters. For Sherwin-Williams, this centralized approach team is both cost and operationally efficient.

The centralized data hub has enabled Sherwin-Williams to deploy detailed standard business processes organized into five key areas entitled Forecast to Plan, Procure to Pay, Order to Cash, Accounting to Reporting, and Formulate to Build. Formulate to Build is built on Oracle Process Manufacturing 12.1.2 but encompasses six additional Oracle E-Business Suite modules that handle product information management and inventory, product development, advanced supply chain planning, process execution, quality control, and process manufacturing financials.

The manufacturing process, particularly consistent paint recipes, is obviously of the utmost importance to Sherwin-Williams. Formulate to Build enables paint that meets company quality stipulations and local volatile organic compound (VOC) and other environmental regulations to be manufactured and sold locally using raw materials, such as resins and solvents, which vary with the locale. Although the paint recipe is developed independently, the formula is then input to Oracle E-Business Suite workflows where it is instantly customized for a location, a process that previously took up to two months. In addition to the quality control benefits, Formulate to Build provides detailed records for each paint batch, including which version of a recipe was used, the amounts of each raw material, and the date completed, allowing lots to be easily traced should it ever become necessary.

Integration with the Oracle E-Business Suite enables efficient data distribution to accounting and financial processes. Sherwin-Williams uses standard costing and variance reporting, which estimates

costs of production (assuming normal operating conditions), calculates the difference between the actual cost and the standard cost, and charges the variance to the cost of goods sold. However, using the Oracle E-Business Suite, the company can easily transfer data to a different accounting method such as LIFO (last in, first out), FIFO (first in, first out), or average costing if prescribed by local government regulation or market conditions.

Accounting, manufacturing, logistics, and supply chain business processes are delivered as shared services to either the Asian region or the United States/Latin American region. The benefits have included decreased invoice processing time, the ability to negotiate discounted paperless transactions, and knowledge sharing. If one geographic region revises a manufacturing or accounting process to improve efficiency, it can be readily adopted in other areas. Knowledge sharing is actively encouraged at Sherwin-Williams, and in fact, played a large role in the deployment of the enterprise system. Employees from recently converted locations were temporarily relocated to help other regions through the process, and they were encouraged to find and adopt best practices with the assurance that the Sherwin-Williams Oracle team would be there to support their efforts. The Oracle team is likewise highly mobile, visiting manufacturing plants and offices during rollouts and upgrades to make sure that the solutions they are installing will fulfill the needs of all stakeholders.

After data integrity had been achieved and reliable data was populating business processes, Sherwin-Williams was ready to implement a BI solution. Oracle Business Intelligence Enterprise Edition was deployed in 2009 to expand data querying and analysis capabilities. Planning team members in Cleveland now have instant access to daily sales and margin data as well as the ability to monitor sales trends. End-of-month reporting is a thing of the past. Both CIO Lucas and Alberto Elli, vice president and controller for Sherwin-Williams' Global Finishes Group, agree that the ability to instantly view accurate product margins and compare profitability between divisions has dramatically improved decision making.

Sherwin-Williams is organized into three business units: the Paint Stores Group, the Consumer Group, and the Global Finishes group. Some shared services are organized among and between these major groups rather than regionally. According to global ERP team manager Yadati, this is how the data

warehouse and BI solutions are implemented so that regional data can be aggregated. For example, managers can now total all purchases from a particular global supplier. Recently, rising raw material costs have squeezed profit margins, making this capability particularly valuable to decision makers.

Maintaining cash flow is the driving force behind each new module added to the Oracle software suite, for example, the global product and customer hubs adopted in 2011. According to CIO Lucas, each new addition is guided by boosting sales, expanding margins, and enhancing efficiency. And these decisions are not only top-down. The Sherwin-Williams corporate culture, which encourages employee familiarity with all aspects of the business, has resulted in an innovative program called “A Day in the Life.” IT professionals are sent to staff manufacturing plants and retail stores where they unload trucks, stock shelves, serve customers, and mix paint. The idea is that familiarity with the endpoint, where the dollars are actually generated, imparts an appreciation for how difficult that job actually is as well as an understanding of the supporting tasks that will maximize its efficacy. What's more, it further contributes to an atmosphere conducive to ideas percolating up from the bottom. Lucas reiterates that the role of the IT department is to take the Oracle system to the next level based on input from stakeholders. Learning the business from the ground up and listening to supply chain partners maximizes the collaboration.

Lucas firmly believes that Sherwin-Williams' Oracle infrastructure will continue to present opportunities for innovation. Henry Sherwin would undoubtedly be proud that the legacy of technological innovation and market flexibility on which he built his company continues to propel it towards the future.

Sources: Fred Sandmark, “Covering the Earth with Data,” *Profit Magazine*, November 2011; “Sherwin-Williams Upgrades to Oracle E-Business Suite 12.1 to Support Global Business Operations,” Sherwin-Williams press release, Sept. 21, 2011; Keith Berr, “Chris Connor, CEO of Sherwin-Williams, Photographed by Keith Berr,” Keith Berr Blog, April 29, 2012; Reuben Gregg Brewer, “Company Profile: Sherwin-Williams,” *Value Line*, September 6, 2011; “The Long Case for Sherwin Williams: Healthy Cash Flow Despite Recession,” *Seeking Alpha*, March 8, 2011, Sherwin-Williams Center of Excellence Timeline, http://excellence.sherwin.com/history_timeline.html; accessed July 2, 2012; www.oracle.com, accessed July 5th, 2012.

CASE STUDY QUESTIONS

1. What management problems and challenges typical of global companies was Sherwin-Williams experiencing? What management, organization, and technology factors were responsible for those problems?
2. How did Sherwin-Williams' new global systems support its business strategy? How effective was the solution chosen by the company?
3. What steps did Sherwin-Williams take to make sure that its global systems implementation was successful?