

# Chapter 9

## Global Information Systems

### Detailed Chapter Outline

#### I. Why Go Global?

The global economy is creating customers who demand integrated worldwide services, and the expansion of global markets is a major factor in developing global information systems to handle these integrated services. The growing trend toward global customers and products means globalization has also become an important factor in purchasing and the supply chain. Worldwide purchasing gives suppliers the incentive to consider foreign competition as well as domestic competition. Furthermore, large global organizations can reduce costs in purchasing, manufacturing, and distribution because they have access to cheaper labor and can sell products and services locally as well as internationally.

##### A. E-Business: A Driving Force

E-business is a major factor in the widespread use of global information systems. E-business includes transactions that support revenue generation as well as those that focus on buying and selling goods and services. These revenue-generating transactions include generating demand for goods and services, offering sales support and customer service, and facilitating communication between business partners.

E-business builds on the advantages and structures of traditional business by adding the flexibility that networks offer. By generating and delivering timely and relevant information supported by networks, e-business creates new opportunities for conducting commercial activities.

As e-business matures and more companies conduct business online, consumers can engage in comparison shopping more easily, for example. Small companies have discovered they can not only conduct business online just as large companies do, but they can lower costs by using the Internet to replace internal networks.

##### B. Growth of the Internet

Today, the Internet is a part of daily life in most parts of the world. According to the Miniwatts Marketing Group, which tracked the worldwide growth of the Internet from 2000 to 2017, the highest growth has occurred in Africa; the lowest in North America. As of June 2017, there were approximately 3.89 billion worldwide Internet users.

With the explosive growth of the Internet and e-commerce, businesses that are active in the global market should make their Web sites more appealing to global customers. Some companies create separate Web sites for each country in which they do business. This is called “localization of a Web site.”

#### II. Global Information Systems: An Overview

A **global information system (GIS)** is an information system that works across national borders, facilitates communication between headquarters and subsidiaries in other countries, and incorporates all the technologies and applications found in a typical information system to gather, store, manipulate, and transmit data across cultural and geographic boundaries.

With a GIS in place, an international company can increase its control over its subsidiaries and better coordinate

their activities, thereby gaining access to new global markets. Strategic planning is also a core function of a GIS. By being able to efficiently share information among subsidiaries, international companies can track performance, production schedules, shipping alternatives, and accounting items.

A GIS can be defined along two dimensions: control and coordination. Control consists of using managerial power to ensure adherence to the organization's goals. Coordination is the process of managing the interaction among activities in different, specialized parts of an organization. Control requires a centralized architecture for data, standardized definitions used across the organization, standard formats for reports, defined behaviors for different processes (such as how to respond when a customer has a complaint), and performance-tracking systems. Global organizations may use a combination of high control and high coordination, high control and low coordination, low control and high coordination, or low control and low coordination.

High coordination has the following advantages:

- Flexibility in responding to competitors in different countries and markets.
- Ability to respond in one country to a change in another country
- Ability to maintain control of market needs around the world
- Ability to share and transfer knowledge between departments and international branches
- Increased efficiency and effectiveness in meeting customers' needs
- Reduced operational costs

### **A. Components of a Global Information System**

Although a GIS can vary quite a bit depending on a company's size and business needs, most GISs have two basic components:

- A global database
- Information-sharing technologies

#### **Global Database**

Designing and implementing a global database is a technical challenge, mainly because of the different character sets required for the names of people and places and the different formats required for phone numbers and postal codes.

#### **Information-Sharing Technologies**

International companies can use a variety of technologies for an integrated GIS. Depending on the system's use, a GIS might consist of a network for e-mail, remote data entry, audio, video, computer conferencing, and distributed databases. However, small companies might take advantage of existing public network providers, such as the Internet or value-added networks, for multicountry communication. Value-added networks are private multipoint networks managed by a third party and used by organizations on a subscription basis. They offer electronic data interchange standards, encryption, secure e-mail, data synchronization, and other services.

In addition to the usual components of a domestic network, a global network requires bridges, routers, and gateways that allow several networks to connect worldwide. In addition, a global network must have switching nodes to guide packets to their destinations.

An information system manager must determine the best communication media to meet global performance and traffic needs, such as fiber optics, satellite, microwave, or conventional phone lines. Factors to consider include bandwidth, range, noise, and cost. In addition, an information system manager must choose the best transmission technology for the global network's needs. Without reliable transmission, a network has no value. Current transmission technologies are synchronous, asynchronous, multiplexing, digital (baseband), and analog (broadband). With synchronous transmission, both parties are connected at the same time, as in a phone call. With asynchronous transmission, they do not have to be connected at the same time, as is true of e-mail.

A network's main function is to allow users to share information. After a global network is in place, therefore, an international company must decide which types of information-sharing technology it will be using, such as electronic meeting systems or video conferencing, group support systems, FTP, data synchronization, and application sharing. While making these decisions, information system managers should keep in mind that standardized software and hardware are the ideal but not always feasible. As for using the same software in other countries, that becomes more complicated because of differences in language, business methods, and **transborder data flow (TDF)**, which is subject to restrictions on how the data can be captured and transmitted.

### **B. Requirements of Global Information Systems**

A GIS must be capable of supporting complex global decisions. This complexity stems from the global environment in which **multinational corporations (MNCs)** operate. MNCs are organizations with assets and operations in at least one country other than their home country. They deliver products and services across national borders and are usually centrally managed from their headquarters. A global environment includes four kinds of factors: legal, cultural, economic, and political.

A GIS, like any information system, can be classified according to the different kinds of managerial support it provides: operational, tactical, and/or strategic. Strategic support involves broad and long-term goals; tactical support concentrates on medium-range activities that move the organization toward achieving long-term goals; operational support involves day-to-day activities. Based on this classification, a GIS should collect, process, and generate different types of information in formats that are suitable for each type of support.

The complexities of global decision making mean that a GIS has some functional requirements that differ from a domestic information system's requirements. The first four of the following requirements are classified as operational, the remaining ones as strategic:

- Global data access
- Consolidated global reporting
- Communication between headquarters and subsidiaries
- Management of short-term foreign exchange risks
- Strategic planning support
- Management of global tax risks

### **C. Implementation of Global Information Systems**

Implementing a GIS can be difficult because countries differ in culture, politics, social and economic infrastructures, and business methods. Several issues must be addressed first, including the following:

- The organization must identify its business opportunities in the global marketplace.
- Decision makers must justify the organization's investment in a GIS, given the substantial commitment of

resources that will have to be made, usually years in advance.

- The organization's personnel need to be screened for technical and business expertise, because implementing a GIS is more challenging than implementing a domestic information system.
- Migration to the GIS needs to be coordinated carefully to help personnel move from the old familiar system to the new one.

Using information systems on a global scale is more challenging than doing so on a local scale. To design a successful GIS, management must first determine the kind of information that global companies need to share. In addition, management cannot assume the company's products or services will continue selling the same way because of possible changes in customers' needs and preferences and global competition.

### III. Organizational Structures and Global Information Systems

Four types of organizations do business across national borders:

- Multinational organizations
- Global organizations
- International organizations
- Transnational organizations

#### A. Multinational Structure

In a **multinational structure**, production, sales, and marketing are decentralized and financial management remains the parent company's responsibility. The company's multinational structure is an advantage because it reduces the need for communication between subsidiaries and headquarters, allowing subsidiaries to make many decisions on their own. Local hardware and software vendors influence which applications a multinational company chooses. Inevitably, each subsidiary operates on a different platform, and uniform connections are economically impractical.

#### B. Global Structure

An organization with a **global structure**, sometimes called a "franchiser," uses highly centralized information systems. Subsidiaries have little autonomy and rely on headquarters for all process and control decisions as well as system design and implementation. Consequently, an extensive communication network is necessary to manage this type of organization, and a GIS fits well into this structure.

#### C. International Structure

An organization with an **international structure** operates much like a multinational corporation, but subsidiaries depend on headquarters more for process and production decisions. Information systems personnel are regularly exchanged among locations to encourage joint development of applications for marketing, finance, and production. This exchange encourages a cooperative culture in geographically dispersed personnel, and using a GIS to support an international structure is more feasible because of this cooperative nature.

#### D. Transnational Structure

In an organization with a **transnational structure**, the parent company and all the subsidiaries work together in designing policies, procedures, and logistics for delivering products and services to the right market. This type of organization might have several regional divisions that share authority and responsibility, but in general it does not have its headquarters in a particular country. A transnational organization usually focuses on

optimizing supply sources and using advantages available in subsidiary locations.

The architecture of the GIS in a transnational structure requires a higher level of standardization and uniformity for global efficiency, and yet it must maintain local responsiveness. The level of cooperation and worldwide coordination needed for a transnational structure does not fully exist in today's global environment. However, with increasing cooperation between nations, this structure is becoming more feasible.

### **E. Global Information Systems Supporting Offshore Outsourcing**

**Offshore outsourcing** is an alternative for developing information systems. With this approach, an organization chooses an outsourcing firm in another country that can provide needed services and products. Initially, offshore outsourcing was used mostly in manufacturing to find cheap labor, but now it is used for many information technology tasks, including the following:

- Medical diagnosis
- Tax preparation
- Programming
- Application development
- Web site development
- Help desk/user support
- Quality assurance/software testing

A GIS plays an important role in supporting offshore outsourcing by providing a global network that all participants can use for coordinating development activities, such as product design and global marketing campaigns.

### **IV. Obstacles to Using Global Information Systems**

A GIS helps an organization improve its global coordination, manage the factors that promote globalization, and maintain a competitive edge by supporting strategic planning. However, like any information system project, there are potential problems in implementing and maintaining a GIS. The following factors can hinder the success of a GIS:

- Lack of standardization (including differences in time zones, taxes, language, and work habits)
- Cultural differences
- Diverse regulatory practices
- Poor telecommunication infrastructures
- Lack of skilled analysts and programmers

A more subtle obstacle to GIS development is the organization's unwillingness to delegate control of information systems to host countries. To achieve true integration on an international scale, organizations must empower key personnel in other countries and rely on feedback and information-sharing technologies.

#### **A. Lack of Standardization**

Lack of standardization can impede the development of a cohesive GIS that is capable of sharing information resources across borders. Electronic data interchange, e-mail, and telecommunication standards vary throughout the world, and trying to work with all the various standards is impractical. Too much standardization can be a problem as well, decreasing an organization's flexibility in responding to local preferences—even time

differences. Time zones can also pose difficulties in managing a GIS. A balance between international system development standards, allowing ease of integration, modularization, custom tailoring of systems, and applications for local responsiveness, is needed. Most applications are local in nature and cannot be integrated into a GIS infrastructure. Even if the software can be integrated globally, support and maintenance problems might result.

### **B. Cultural Differences**

Cultural differences in values, attitudes, and behaviors play an important role in using GISs. For example, in some cultures, using technology is considered a boring, low-level task; in others, being technologically knowledgeable is seen as a sign of social importance. Cultural issues are best addressed with education and training.

### **C. Diverse Regulatory Practices**

Diverse regulatory practices also impede the integration process. This obstacle does not necessarily apply to TDF (transborder data flow) regulations; it applies to policies on business practices and technological use. Many countries also restrict the type of hardware and software that can be imported or used, and the vendors that an organization normally deals with might not service certain countries.

Adopting open-source systems could eliminate part of this problem. Jurisdiction issues regarding the contents of a GIS can also be challenging. ISPs, content providers, servers, and organizations owning these entities might be scattered throughout the world and operating under different rules and regulations. The nature of intellectual property laws and how they are enforced in different countries also varies. Other legal issues include privacy and cybercrime laws as well as censorship and government control, which vary widely from country to country.

### **D. Poor Telecommunication Infrastructures**

An organization might have the resources and skills to implement a worldwide integrated system but not be able to change an existing telecommunication infrastructure.

Furthermore, the differences in telecommunication systems make consolidating them difficult. Implementing a GIS that encompasses 25 countries, for instance, is expensive and cumbersome when each country has different service offerings, price schedules, and policies.

In countries where Internet access is slower or more costly, Web pages should not have content with lots of graphics and animation that require more bandwidth. Even when the telecommunication infrastructure in two countries is comparable, differences in standards can cause problems.

### **E. Lack of Skilled Analysts and Programmers**

When forming integrated teams, companies must consider the nature of each culture and differences in skills in other countries. Ideally, an organization would link the skills of people from different countries to form a “dream team.” However, cultural and political differences can affect the cooperative environment needed for global integration. Training and certification programs, many of which are offered through the Internet, are one possible solution for narrowing this skills gap in developing nations.

### **Key Terms**

A **global information system** is an information system that works across national borders, facilitates communication between headquarters and subsidiaries in other countries, and incorporates all the technologies and applications found in a typical information system to gather, store, manipulate, and transmit data across cultural and geographic boundaries.

**Transborder data flow (TDF)** restricts what type of data can be captured and transmitted in foreign countries.

A **multinational corporation (MNC)** is an organization with assets and operations in at least one country other than its home country. An MNC delivers products and services across national borders and is usually centrally managed from its headquarters.

In a **multinational structure**, production, sales, and marketing are decentralized, and financial management remains the parent's responsibility.

A **global structure** (also known as franchiser) uses highly centralized information systems. Subsidiaries have little autonomy and rely on headquarters for all process and control decisions as well as system design and implementation.

An organization with an **international structure** operates much like a multinational corporation, but subsidiaries depend on headquarters more for process and production decisions.

In an organization with a **transnational structure**, the parent and all subsidiaries work together in designing policies, procedures, and logistics for delivering products and services to the right market.

With **offshore outsourcing**, an organization chooses an outsourcing firm in another country that can provide needed services and products.