Global Information and Decision Technology Management

(with K. J. Engemann)


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GLOBAL INFORMATION AND DECISION TECHNOLOGY MANAGEMENT

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Abstract

To remain competitive, firms are striving to expand their markets globally. Information technology (IT) is a primary force behind the current globalization of business and is important in the process of creating infrastructures and strategies to enable firms to be competitive in the global marketplace. Aligning business strategies with a firm's IT is significant to the efficient management of the firm's resources. One of the most difficult challenges facing IT managers in global firms is that of integrating various technologies, processes, and operating units into competitive organizations. The development and management of telecommunication networks to support global operations present enormous opportunities. The success of a transnational business depends on how well networks deliver the right information to the right people at the right time. Decision support systems for transnational businesses provide the knowledge needs for decision making at strategic, managerial, and operational levels. The understanding of business globalization, IT and decision technology will be an increasingly important concern in management education.

Keywords

Information technology; decision technology; business globalization; decision support systems, transnational business; business education.

Introduction

Businesses view the entire world as a potential marketplace and depend on technology to eliminate inefficiencies in the global flow of information. As people become more affluent, their knowledge of the availability of worldwide products increases and so does their demand for better and cheaper goods. Not only are the largest corporations doing a greater amount of their business activities globally, but even ordinary companies are depending on global markets for an increased proportion of their profits. Information technology (IT) is a significant reason for the fast paced globalization of business activity.

Globalization of Business

Global opportunities are being sought out because of five dominant economic factors (Senn, 1994): the chance to participate in large markets, the need to distribute large fixed costs, the need to serve customers who are themselves involved in international business, the desire of firms to replace low wage strategies with strategies to provide meaningful value added products, and, the decreased importance of a home-country base. There is a fundamental shift in where and how the world's work gets done. The emergence of a capable global labor force is moving much
work out of industrialized countries. New technology and the continuing drive for higher productivity enable companies to build facilities in undeveloped countries that require only a fraction of the personnel needed back home. Advances by several nations to enhance their educational systems have allowed a myriad of more sophisticated work, such as engineering and computer programming, to be outsourced to these countries. As globalization proliferates, the use of local sourcing is becoming widespread. Products are increasingly becoming composites of the global services of many nations.

A firm's global strategy depends on the type of industry it is in. In a multinational industry, local differentiation is essential. The competitive advantage of a firm is largely specific to each country. Consumer package goods is an example in which there is little standardization of products worldwide. Product attributes and marketing strategies need to be responsive to the different national markets. In a global industry, a firm's competitive position in one country is significantly influenced by its position in other countries. Important characteristics like consumer needs and efficient scale are defined by the global economy. Consumer electronics is an example of an industry that benefits by global efficiency. In an international industry the key to success lies in the ability to transfer technology to overseas units and to manage the international product life-cycle efficiently and flexibly. An example is the telecommunication switching industry because of monopoly purchasing in most countries by a government owned post, telegraph, and telephone (PTT).

Firms taking part in world markets using a multinational strategy - serving the multiple needs of national markets through relatively independent local organizations - use responsiveness as a dominant approach. In a global strategy - supplying standardized products to the world markets by means of global scale operations - efficiency is the key. In an international strategy, exploiting learning and transferring technological knowledge is paramount. Increasingly, there are fewer examples of industries that are purely multinational, global or international. Instead more businesses require a transnational strategy - maximizing global economies while being responsive to the restrictions imposed by the various countries. This requires the ability to manage efficiency, responsiveness, and learning on a worldwide basis (Bartlett and Ghoshal, 1992). In an growing number of industries, the benefits of exploiting global economies of scale enhances the need for integration and coordination of activities. At the same time, variable exchange rates, national policies, resistance to standardized products, and the changing economies of flexible manufacturing increase the value of national responsiveness. Transnational companies are faced with the task of optimizing global-scale efficiency, national-level flexibility, and cross-market capacity to leverage learning.

Global Information Technology Management

IT is in the forefront of the transition of a firm to a globally coordinated and managed organization. By analyzing global business drivers (GBDs) a firm may achieve close alignment between its global vision and its IT strategy. GBDs are those entities that benefit from global economies of scale, and thus contribute to the global business strategy. Examples of GBDs are resources, operations, risk, products, quality, suppliers, and customers. The GBD approach is a tool for determining the business entities that will benefit most from integrated global IT management. Studies suggest that if IT is to add value to global business operations, it should be applied through the firm's GBDs (Ives et al, 1996). GBDs provide a means for assessing high-level global information requirements and focus on broad business entities to determine information that is shared across dispersed operating units. Once GBDs are agreed upon, they form the basis for an IT strategy and applications portfolio. Examples in which GBD analysis is beneficial include: leveraging human resources through employee databases and teleconferencing; providing economies of scale through worldwide flexible operations; managing cash flow and investment risk through risk management systems; engineers accessing a database of designs, permitting access to work done in other countries; tracing defective products back to their origin; coordinating worldwide procurement; and, providing consistent customer service across a firm's country units through communication and information processing. GBD analysis helps to identify the business entities where global coordination can provide a competitive advantage and where an integrated global IT portfolio and infrastructure can realize that advantage.

A global information system (GIS) is a distributed data-processing system that crosses national boundaries. GISs are exposed to wide variations in business, technological and regulatory environments. The available IT
infrastructure in a given country is a major issue for a global firm. Resource availability varies due to import restrictions and telecommunications technology varies among countries. Few vendors provide worldwide service, and local vendor support is variable. Telecommunication regulations can impose serious constraints on the operation of GISs. Regulations may restrict the use of leased lines or import of hardware and software. The price and availability of service, and transborder dataflow (TBDF) restrictions vary widely from one country to another. The PTT in most countries sets limits based on volume of traffic. TBDF regulations govern the content of international data flows. Certain kinds of data may be required to be processed and maintained locally. These regulations can adversely affect the economies of GISs by forcing global firms to decentralize their operations. Telecommunications standards vary widely from one country to another concerning the technical details of connecting equipment. Telecommunication standards are set by various governments, international agencies, equipment vendors and industry groups.

Corporate information systems architecture provides a guide for systems development, facilitates the integration and data sharing among applications, and supports development of integrated, corporate systems that are based on a data resource with corporate-wide accessibility. The key components of a GIS management strategy are: a centralized and/or coordinated business/technology strategy on establishing data communications architecture and standards, a centralized and/or coordinated data management strategy for creation of corporate databases, and alignment of global business and GIS management strategy (Karimi and Konsynski, 1991).

The development and management of international networks present enormous opportunities and challenges. To meet those challenges, corporations must address five major areas of networking: technical knowledge, network design and planning, country-by-country service requirements, network management operations, and network management interoperability (Gilbert, 1992). Corporations have a wide selection of services and capabilities to choose from. They can: build extensive network management expertise themselves and procure the necessary equipment, training, and technical assistance; deal with evolving consortiums of PTTs, equipment vendors, and service providers for specific elements of network management; and, work with a vendor that can provide all or part of its needs.

**Global Decision Technology Management**

Although IT provides the necessary infrastructure for transmitting business information, it alone cannot guarantee business success. The success of a global business organization depends on how information networks are used to deliver the right information to the right people at the right time. A decision support systems (DSS) uses IT to enhance management decision-making by incorporating methodological tools from the decision sciences. Increasingly, transnational businesses are using DSSs to ensure effective global strategy formulation and implementation. DSSs are especially crucial to transnational business managers for several reasons, including: geographical dispersion of activities; difficulties in determining organizational structure; decisions concerning differentiation versus integration of activities; cultural, legal, economic, and political diversities; and high degrees of uncertainty (Iyer and Schkade, 1996).

The purpose of a DSS is to supplement one or more of a decision maker's abilities in addressing unstructured or semistructured decisions (Holsapple and Whinston, 1996). Numerous DSS applications have been cited in a wide variety of areas which include budgeting, marketing, investing, and operations, among many others. Artificially intelligent DSSs use computer-based mechanisms from the field of artificial intelligence including expert systems, natural language processing, knowledge representation, machine learning, automatic programming, and pattern recognition. Multiparticipant DSSs support decision-making efforts of multiple participants and include Group DSSs, Organizational DSSs, and Negotiation DSSs. Executive Support Systems are DSSs designed to satisfy the wide-ranging needs of top executives in selectively filtering, extracting, compressing, and viewing information about the organization and its environment, in addition to providing modelling and communication support. DSSs are aiding in the effort to manage knowledge, and businesses are recognizing themselves as knowledge-based organizations that have the management of knowledge as their primary driving activity. Accordingly, organizations
are creating the position of chief knowledge officer to manage the capture, distribution, and productive use of knowledge.

Beyond any organization's infrastructure, there are larger-scale technological structures adding a global dimension to what exists within a knowledge-based organization. By accessing such structures, an organization's infrastructure is virtually extended to encompass far more knowledge than would be possible to maintain internally. The best known external structure into which links can be readily made is the Internet.

Most international decision making situations are unstructured or semistructured due to operational complexities, political, economic, and cultural differences among countries, and uncertain and unsettled market environments. DSSs are necessary to assess opportunities and threats in the global marketplace and to evaluate corresponding strategy and resource requirements. For instance, a DSS can be extremely valuable in a comprehensive evaluation for an international investment planning decision. Similarly, a DSS can aid managers in dealing with uncertainty with respect to environmental factors, such as variable foreign exchange rates, different inflation rates in various countries, price controls in different countries, profit repatriation controls, and threats of expropriation or expulsion by national governments. As discussed above, transnational firms need to develop and implement strategies which exploit global efficiency, multinational responsiveness and international technology learning and transfer. DSSs aid in all these dimensions. For example DSSs can help to solve global efficiency related problems involving: scale economies of research and development, mass production, materials handling, labor reduction, assembly operations, product quality and reliability, advertisement investment, and product distribution. Multinational responsiveness issues involve: product differentiation, operations in multiple plants, nationally responsive marketing strategies, and multiple distribution channels. DSSs can also be beneficial in developing and harnessing new technologies and exploiting them internationally. This involves issues of international product cycles, and technology transfer.

Global Information and Decision Technology Management Education

The notion of incorporating a global perspective into the business school curriculum is not new. Nevertheless, the ability to deliver a globalized curriculum is a concern. Some elements that are important to effectively globalizing the business curriculum are: internationally experienced faculty, international teaching materials, practical business experiences, and, foreign culture and language exposure. A greater number of faculty are becoming qualified in the international area as doctoral programs produce more faculty with relevant expertise, and as existing faculty retool themselves through professional development seminars. Although considerable curriculum material has been developed that addresses the global dimensions of accounting, finance, marketing, and management, few resources are currently available that address the global dimensions of IT. Students may obtain practical business experience through internships with companies involved in the global marketplace. Foreign language coursework and study abroad programs help fulfill the need for multiple language development and cultural exposure.

There is a clear need to address the global issues specific to the IT curriculum. Academicians are only in the beginning phase of addressing the issue of how to best globalize the IT curriculum (Deans and Goslar, 1993). Some possible approaches are: present this material in a required introductory course to provide student awareness; have a specialized course to develop better depth of understanding; and, integrate the material throughout the IT curriculum to achieve competency. We believe that integrating internationalization into the relevant traditional IT courses is preferred and will be the approach that most programs will eventually adopt. Globalization is too important to business to allow students to develop at anything less than a competency level, and the globalization of IT must be integrated with other IT issues.

Most relevant global issues can be integrated into a select number of traditional IT courses (Palvia, 1993). Some global topics which should be included in the systems development course include: cultural impact on system requirements, TBDF regulations, systems compatibility and technology availability, and technology transfer. Issues relating to managing globally distributed databases, and national policies related to security and privacy of data should be part of the database course. The telecommunications course should address issues of global variation in telecommunications infrastructure, international standards, and the role of PTTs. The management of IT course
should discuss the link between IT strategy and global business strategy. The decision support systems course should address the issues of providing decision support for global decision making.

The application of decision technology, based on a solid IT infrastructure, to provide global strategies is currently underrepresented in business education. We consider the intersection of the three dimensions of business globalization, IT, and decision technology to be an increasingly important concern for management education. Typically, even in a DSS course whose primary objective is to explore decision technology, it is difficult to educate a student to a level of competency with the skill and ability to develop significant applications. The competency to apply decision technology requires coursework typically not found within an IT program. Additional in depth study of the modeling component of a DSS can remedy this, and relevant topics are generally available though decision science based coursework.

Conclusion

Business today must be concerned with global marketplaces in order to compete successfully. Globalization of the marketplace and the impact of IT on the firm are certainly two major forces transforming business today. IT can be viewed not only as enabling the global marketplace but also as an infrastructure base from which decision technology can aid in addressing global managerial challenges. A better defined global information and decision technology management curriculum will evolve over time as more attention is devoted to it by academicians.

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