



IT OFFSHORING: History, Prospects and Challenges¹

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Abstract

Offshore provision of IS/IT related services has been growing rapidly in recent years and seems firmly set to continue. This trend is fueled by the many advantages of offshore service procurement; however, there are dangers in this practice. Furthermore, offshoring requires adaptation of the IS function and IS management. This, in turn suggests the need for modifications of IS curricula in order to prepare graduates for the new environment. The advantages of offshoring are those of outsourcing in general – cost saving and allowing the organization to focus on its core activities. The main dangers include loss of possibly-important business skills and reliance on remote suppliers who face risks that are unfamiliar to the client firm. The loss of jobs due to offshoring also introduces political considerations. Offshore IS activities are generally the responsibility of an organization's CIO. This management responsibility requires awareness of cultural and legal differences and of risks associated with offshoring and outsourcing in general. Offshoring has an effect on job opportunities for graduates of

¹ Detmar Straub was the accepting senior editor. This paper was submitted on April 14th 2005 and went through 3 revisions.

information systems programs. The number of some jobs will shrink, but new positions with new responsibilities are likely to emerge. Training of students in the U.S. and other countries in the developed world to function in an environment of offshored operations will introduce new IS roles and skills and require the adaptations of IS curricula.

Keywords: advantages of outsourcing, culture, offshoring, politics, risks, trends

Introduction

This paper examines the practice of outsourcing various information systems activities to offshore providers of these services. The paper discusses information technology offshoring in terms of five major related issues that are of importance to what scholars teach and research:

1. The economic and business logic for information technology offshoring and its impact on nations and organizations
2. The risks and dangers in offshoring information technology activities
3. The effect on the information management function of taking over responsibility for the supervision and management of offshoring
4. The effect of offshoring on information technology job opportunities
5. Changes to the curriculum in information systems management that may need to be considered to prepare future IS/IT managers to manage offshoring.

The paper focuses on the *offshore outsourcing of IT activities*. First, it stresses the economic and management logic that suggests that offshoring will increase in both importance and risk for those who manage information systems functions and infrastructures for an organization. The paper then addresses the questions of how this development will change the management of the information systems function and employment in IT work in organizations and how these changes may need to be reflected in the IS curriculum. The paper therefore adopts a holistic view of how organizations, the IS profession and the IS educational curricula of Western countries may need to adapt in order to reap the benefits of offshoring while avoiding its risks. In tracing the linkages from the benefits and risks of offshoring to the IS management implications and to implications for the IS profession, including IS curricula, the paper seeks to exploit the authors' experience in the IS academic world to better understand the structural changes that are taking place at organizational and national levels and to prescribe how IS managers and academics should respond.

Definitions and Focus

Offshoring is defined as the provision of organizational products and services from locations in other countries, whether they are actually overseas or not. This may be accomplished in one of two ways. First, an organization may outsource some of its activities to service providers in other countries. In this case, the service provider hires, trains, supervises, and manages its personnel. Typically, a contract specifies the services to be provided, as well as time and quality measures (Rubin, 1997; Chang and King, 2005). Second, the organization may set up service operations in the other

countries. The operations are then managed as a remote service site. Workers are hired, trained, supervised, and managed by the organization rather than by an outside contractor (Dibbern et al. 2004). In the IT industry, Wipro is an example of the former means of outsourcing while General Electric's wholly-owned Indian subsidiary is illustrative of the latter.

While these two modes of offshoring have many similarities, there are some significant differences. In order to maintain clarity, we focus primarily on the vendor-client situation, which may be considered as a baseline for addressing the "offshore insourcing" situation.

An Association for Computing Machinery Report (Aspray et al., 2006) delineates six varieties of work related to IS that are often offshored: (1) programming, software testing, and software maintenance; (2) IT research and development; (3) high-end jobs such as software architecture, product design, project management, IT consulting, and business strategy; (4) physical product manufacturing – semiconductors, computer components, computers; (5) business process outsourcing/IT Enabled Services – insurance claim processing, medical billing, accounting, bookkeeping, medical transcription, digitization of engineering drawings, desktop publishing, and high-end IT enabled services such as financial analysis and reading of X-rays; and (6) call centers and telemarketing.

The Economic And Business Logic For Offshoring Of IS/IT Activities

The current high level of interest in offshoring is a logical extension of the large-scale outsourcing phenomenon that occurred in the 20th and early 21st centuries (Weber, 2004) although offshoring has existed as an organizational and societal issue since the dawn of the Industrial Revolution (Davis, 2004). In that respect, offshoring is not a new phenomenon; it shares many of the underlying issues of outsourcing that are discussed by economists, international business and information technology researchers, and others. The importance of offshoring as part of global strategy development, for example, was discussed by Stopford and Wells as early as 1966.

This long-term trend was amplified by airlines and computer service companies during the 1990s through offshore sourcing of back-office services. American Express has been offshoring a variety of back-office processing tasks to India since 1994. GE Capital opened its GE Capital International Services (GECIS) in India in 1997. More recently, financial service firms have used cost factors to justify offshoring back-end functions including software design and call center support. Between 1989, when Kodak outsourced its information technology, and 1995, the IT outsourcing market grew to 76 billion dollars (Lacity and Willcocks, 1998). More than 50% of U.S. firms are expected to deploy IT outsourcing in 2006 (AMR Research, 2003), and European firms like Siemens have begun outsourcing to Eastern Europe and Asia. The sourcing issue is, moreover, among the top five agenda items for IT executives (Vijayan, J., 2004).

Of course, outsourcing is not limited to information technology. The most visible outsourcing is the transfer of manufacturing processes to countries that have lower costs for labor. These manufacturing operations have tended to move around the world, transferring to new sites when labor costs change. For example, some organizations

transferred manufacturing first to Mexico and then to Asia. In fact, scholars of international business in management schools have long been studying the choices that organizations make in foreign direct investment (FDI), making this topic one of the major streams in the field (Wei & Liu, 2006; Banga, 2006; Chan et al., 2006).

All of the varieties of domestic outsourcing and international offshoring are very visible in discussions in the popular press and are often cited as sources of unemployment in the U.S. Thus, outsourcing and offshoring will continue to be a significant political issue.

The Basis for Outsourcing

IT outsourcing is based on a general philosophy expressed by Larry Ellison of Oracle: “Why should every automaker, publisher or doctor’s office have to be a tech company too, employing high-paid staff who spend all of their time fiddling around with computers?” [As quoted in *Wall Street Journal*, Feb. 11, 2004]. In Ellison’s pragmatic statement lies the profound idea, well-known to academics and business professionals, that a firm should consider not performing activities that are outside its core competencies, because others can generally do such functions better, less expensively, and/or faster.

There is an important exception to this principle of outsourcing activities that are outside an organization’s core competencies that requires the addition of the phrase, “unless these activities are not core competencies but are critical success factors (CSFs)—something that is necessary, but not sufficient, for the success of a firm—and are not generally available in the marketplace.” In such cases, activities should be done in-house through the creation of new capabilities or functions (King, 2001).

IS was such an activity in the early computer era. While computers and operating software were widely available, vendors who specialized in operating computer systems and in developing or providing specialized applications software were not widely available. Therefore, most companies developed IT departments that focused on systems operations, maintenance, and applications software development.

Today, the circumstances are quite different. IBM, long a manufacturer of hardware and software, now derives greater revenue from selling its services than from selling its products. There are many IT service vendors in many nations. In effect, many IT activities no longer have the unique combination of attributes—not being an organizational core competence, yet being a CSF, and not having external providers available—that they had in earlier periods.

The Evolution of Outsourcing

Outsourcing may be viewed as a natural step in the evolution of a business. In the early 20th century, auto manufacturers made almost all of the parts for a car. Over the years, they subcontracted (outsourced) the manufacture of parts to others who could focus on producing a few parts. Initially, this was done to achieve cost savings, but through their limited focus, parts manufacturers often developed higher quality levels than the automakers, with their wide diversity of activities, could attain. This process is sometimes referred to as vertical dis-integration.

Today, virtually every auto company outsources parts, sub-assemblies, assemblies, and modules of autos. One auto assembly plant in Brazil does nothing but assemble major modules that are produced by others and delivered on a just-in-time basis. Many Asian firms can deliver replenishment orders by airfreight in a much more timely fashion than U.S. suppliers. This exploitation of international cost differentials has been termed "global arbitrage" (Sawhney, 2002) as it is an extension of the classic economic arbitrage strategy.

The IT industry has gone through, and is going through, similar phases. The outsourcing of IT began with the hiring of external consultants to aid in areas where companies did not have sufficient skills and/or people to accomplish the range of necessary applications and systems. Computer operations, once carried out internally, were outsourced to vendors who could achieve high efficiencies through combining the computing tasks of various clients on a limited set of hardware and software. Now, virtually any IT activity can be considered as a candidate for outsourcing, since specialized firms offer software packages of the most sophisticated varieties (e.g., ERP) as well as operational services.

The cost factor has been, and remains, one of the most critical practical arguments for offshoring put forward by companies. Moxon (1995) empirically examined inexpensive labor as the primary motivation for offshore production for the electronics industry. The importance of production costs has also been suggested in information system studies (Ang and Straub, 1998; Wang, 2002). Clearly, advancements in communication and computer technologies in recent years have made this argument ever more plausible, and offshoring opportunities ever more feasible, particularly in the service domain. With the increase in the "export" of high-skilled, highly-paid jobs, the expectation for cost advantages has also increased. However, if cost reduction is the primary goal, a significant cost difference is necessary before an offshore venture can be considered worthwhile (Rottman and Lacity, 2004; Wang et al., 1997).

Just as auto firms began outsourcing to achieve cost efficiencies only to find that quality, and eventually delivery time, also improved, some argue that the same objectives can be sequentially achieved in IT. Already, some companies that have outsourced call center operations to India report that customer satisfaction has increased. In fact, the quality gap is closing rapidly in a broader context. A survey of software projects conducted by the Center for eBusiness at Massachusetts Institute of Technology found that projects developed in India had only 10% more bugs than comparable U.S. projects (Ante, 2004). Many software development teams in India use Six Sigma and CMM-I approaches to quality management that are equivalent to those in use in Western world-class firms (McDougall, 2005). Given the abundance of skills at offshore sites as well as pressure on executives to drive down costs, there is little doubt that this trend will continue and even increase for some time (Overby, 2003) despite warnings and cautions (Thurm, 2004).

The Current Status Of Offshoring: A Global Perspective

Offshoring is a new version of the old principle of achieving greater total profit by specialization and trade, first formulated by David Ricardo in the 19th century. Until recently, such specialization was limited to manufacturing and gave rise to the phenomenon known as globalization. With the advent of the offshoring of IT services, it

is now applied to services as well. This has been referred to as “global labor arbitrage,” signifying the transfer of labor employment to the most advantageous location (*Economist*, Dec. 11, 2003). However, offshore outsourcing offers many benefits and risks that transcend labor cost savings.

Although a major reason for engaging in offshoring is to benefit from lower labor costs, the economic benefits are not equal for all countries participating in offshoring. McKinsey Global Institute [2004] estimates that U.S. firms save 58 cents for every dollar’s worth of back-office services and IT jobs moved to India. They estimate that Germany, on the other hand, saves only 52 cents for every dollar it spends in India because of differences in language and culture that raise the cost of offshore work. Furthermore, most German offshoring is to Eastern Europe, where the savings are even lower because labor and infrastructure costs there are higher than in India. Thus, developments in offshoring need to be placed in a global perspective if they are to be fully understood.

Table 1 exhibits the level of offshored IT-related employment in the main offshore destinations.

Country	Number of export-focused IT professionals	IT export revenues (£ million) ¹	IT export revenues (\$ million) ²
Canada	30,000	1,175	2,220
China	42,000	940	1,776
Central and Eastern Europe	9,000	150	283
India	212,000	4,235	8174
Ireland	60,000	2,150	4,063
Israel	15,000	505	954
Mexico, Malaysia & Latin America	4,000	75	142
The Philippines	5,000	95	180
Russia	8,000	160	302

Source: Aggarwal and Pandey (2004)

1. As reported in BCS (2004)
2. Converted at April 1, 2005 rate: £1 = \$1.8899

The principal outsourcing origins and destinations mentioned in a variety of sources are mapped in Table 2. Some patterns not mentioned in Table 1 are added here.

origin \ destination	France	Germany	Hong Kong	India	Japan	Spain	UK	US
Northern Africa	X							
Western Africa		X						
Central America						X		
South America	X							
China			X	X	X			X
Central & Eastern Europe		X					X	
India	X	X					X	X
Ireland	X	X					X	X

Israel		X						X
UK								X

Sources: (BCS, 2004; Deutsche-Welle 2005; *Economist* July 17, 2003; Economist Intelligence Unit 2005; OECD 2005; Silicon.com Dec. 9, 2003)

Table 2 clearly does not present the full picture, as it is based only on specific links mentioned in the sources. Other known offshoring arrangements also exist. Many such links are probably relatively small and so are not mentioned in the literature. An additional problem inherent in Table 2 is that the offshoring map is extremely dynamic and changing rapidly. In particular, new offshore service providers continue to appear. Thus, one survey (NeoIT, 2004) states that: "Although India and Canada remain growing powerhouses in the industry, emerging markets such as the Philippines, Russia, Czech Republic, Poland, Hungary and Mexico have made significant headway during the past year." Another source (E-Business Strategiew, 2005) ranks offshore locations by current and future potential as:

- Current:* India, China, Canada, Mexico, South Africa, Ireland, Russia, and the Philippines, Brazil, the Caribbean region, Eastern Europe, Malaysia, Israel, Singapore, and Vietnam
- Future:* Northern Ireland, Bangladesh, Ghana, Korea, Malaysia, Mauritius, Nepal, Senegal, Sri Lanka, Taiwan, and Thailand.

This ranking and Table 2 point to the emergence of a noticeable pattern: Western European countries send their outsourced work to Eastern Europe, whereas the U.S. sends much of its work to Mexico and Canada. This has given rise to the term "nearshoring", to differentiate outsourcing to out-of-country providers that are still on the same continent. In fact, it is becoming common to distinguish between onshore, nearshore, and offshore outsourcing, especially the latter two (e.g., Dibbern et al., 2005; NeoIT, 2004).

Much IT offshoring is clearly language dependent, as it involves services such as call centers, programming, and system integration, in which good communication skills are essential. It is not surprising, therefore, that the offshore locations chosen by different countries show a tendency for language compatibility. Countries without offshore locations in which their languages are prevalent may have to devise creative solutions. One example of such a solution is provided by an Indian firm, Technovate, that employs on one-year contracts young Swiss, Swedish, French, Germans, and others who want to spend extended stays in India. The European firms then get their offshore services performed by native speaker but at Indian wages! While it may seem strange that young European professionals are prepared to work for Indian wages, the opportunity to experience India for a year apparently more than compensates for the wage differential. (*Economist*, Feb 17, 2005).

One of the major issues arising from offshoring at the national and international levels is its effect on employment and the ramifications of those effects. Agarwal and Paney (2004) estimate, as in Table 1 above, that, worldwide, 380,000 IT professionals are employed offshore. Predictions of the future extent of the phenomenon suggest much larger numbers. According to a widely-cited projection released by U.S. technology research firm Forrester Research, 3.3 million service jobs could be lost to offshoring in the next 15 years (Banque de France, 2005). Evaluserve (2003) predicts that by 2010, 102,000 IT and software jobs will have been offshored from the UK, which is equivalent

to about 12% of today's IT workforce. One estimate puts the number of IT jobs at risk in Germany at 130,000 (Moczadlo, 2004). A more conservative estimate by Forrester Research (Parker, 2004) estimates that 150,000 pure IT jobs will move offshore from Europe by 2015. The apparent inconsistencies in these numbers highlights the lack of consistent forecasts on offshoring in general, and IT offshoring in particular (Bartsch, 2004).

The actual and potential job loss naturally causes concern among those likely to be affected, and service sector trade unions in Europe have met on the issue. The *Economist* (Nov. 11, 2003) reports that the loss of call center jobs is a particular worry in Britain's less prosperous regions. Call centers currently employ around 500,000 people, many of them in declining manufacturing areas that have already suffered a loss of industrial employment. Germany's Chancellor Schröder has condemned job offshoring as unpatriotic (Benoit, 2004). As a recent survey indicates that 40% of Western Europe's 500 largest firms have begun moving service operations offshore, these concerns are not without a factual basis (McKinsey Global Institute, 2004). The concerns mentioned may be exacerbated by the fact that, in the case of Germany, offshoring is also viewed as a means of obtaining greater flexibility in employment than is possible in Germany itself.

However, these numbers need to be put in perspective. The U.S., the largest arbitrageur of jobs offshore, has lost several hundred thousand jobs over the last few years. But this number becomes less alarming when viewed in light of the fact that more than one million people change jobs in the U.S. *every month*. Furthermore, the U.S. Bureau of Labor Statistics recently reported that the offshoring of service work accounted for only 1% of U.S. job losses in the first quarter of 2004 (McKinsey Global Institute, 2004). Furthermore, the ACM task force notes (ACM, 2005) that "high-wage IT jobs, which demand sector-specific knowledge and network administration, are increasing in the U.S., while low-wage jobs such as programming are at greater risk of being relocated offshore." Kierkegaard [2004] estimates the shift in jobs from 1999 to 2003 as a reduction of 26% in "call center type" and "low-wage (\$25,000/year) technology" workers while "high wage (\$69,000/year) technology workers" jobs increased by 10%. Thus the jobs at risk are less attractive than the new jobs created.

A significant factor mitigating the impact of offshoring is the fact that offshoring is not a one-way street, and countries sending jobs offshore may not only serve as offshore origins but may also benefit from serving as offshore destinations. Thus, one report notes that losses from British companies sending work offshore have been outweighed by gains from foreign companies sending work to Britain (*Economist* Nov. 11, 2004). We already mentioned the mutual arbitrage between China and India, with employment flowing in both directions.

There are significant benefits from offshoring in addition to direct cost savings and job upgrading for countries sending work abroad, and additional employment and income for the countries performing the work. In the countries sending work abroad, the savings permit price reductions with benefits to local consumers and a consequent increase in employment in areas in which the savings are spent. Furthermore, savings from offshoring are repatriated to the benefit of shareholders as well as consumers. Finally, the offshore firms performing services must also purchase certain resources such as hardware and software, which may also benefit the originating country. (McKinsey Global Institute, 2004).

Thus, it seems that from a global perspective, offshoring should be viewed as an international restructuring of service provision, akin to similar restructurings in manufacturing that have occurred many times in the past. Full understanding of global offshoring will require constant tracking of the arbitrage channels and of the costs and benefits involved. As these are likely to change continuously and rapidly, the structure of the global IT service market will almost certainly be highly volatile. This points to an urgent need to improve the availability of reliable data on the global offshoring phenomenon.

The Future of Outsourcing

Information technology researchers and others have extended their research agenda to include studies that involve offshoring, its impact, and its management (Lacity and Willcocks, 1998; Kotabe and Swan, 1993; Ang and Cummings, 1997; Giddens, 1999, 2000; Erber and Sayed-Ahmed, 2005). Studies of national and international economics suggest a diverse and positive impact on the home-nation economy due to outsourcing and the globalization of information technology (Levy, 1995; McLaren, 2000; Mann, 2003). Dibbern et al. (2004) provide an extensive survey of the literature on outsourcing.

The logic of international economics suggests that offshoring benefits everyone—job seekers, stockholders, client firms, vendors, etc.—in the long run. International economic theories of absolute advantage argue that the entire global system is better off when goods and services are produced the most efficiently (Aspray et al., 2006; Farrell, 2005; Farrell and Agrawal, 2003). Even countries that lose jobs can benefit if they innovate. For example, components usually become less expensive with offshore procurement; this opens up opportunities for new businesses that assemble components. When trade is free, developed countries shift their production to areas that call for higher levels of skill, and they create new products that, according to product life cycle theory, are often based in developed countries. As previously stated, the cost advantages that are usually the basis for outsourcing and offshoring also free up funds in the client firm to do other things, thus creating new, and probably higher-paying, jobs (Simon, 1965). Thus, one line of argument is that, unless political systems behave irrationally, the offshore outsourcing trend in IT is likely to continue.

The number of offshoring destinations is increasing, with China, Malaysia, the Philippines, and South Africa rapidly encroaching on India (*Economist*, July 17, 2003; Nov 20, 2003). Furthermore, some of the outsourcing destinations are beginning to arbitrage among themselves. Thus India has begun to outsource to China and vice versa (*Economist*, March 5, 2005).

Another source lists 50 global sourcing countries as “leaders and challengers”, “emerging countries,” or “early entrants” (Gautama, 2005). Thus, offshoring is not only global but seems to be headed for near universality.

It needs to be noted, however, that there are nuances to IT offshoring that make it different from traditional outsourcing. Offshoring is expected to have greater impact on the demand side of IT services by creating new global markets and by adding new products and services through greater talent pools and innovation. The global market challenges of offshoring for IS executives include not only the intricacies of international

law related to contracts and immature capital markets in vendor countries, but also the lessening availability of talent. McDougall (2005) suggests, "While Indian technical schools are churning out more than a half million programmers per year, that's barely enough to meet the growing demand for workers in indigenous services firms and the foreign multinationals that are tapping the country's IT workforce." China is expected to soon become the biggest market for Indian-made software. Oracle alone employs more than 5,000 developers in India, and IBM has plans to hire about 14,000 programmers there (McDougall, 2005). Indian vendor firms are addressing increasing salaries and the declining availability of skilled workers by focusing on the efficiency and quality of their outputs and processes, implementing Six Sigma and hiring engineers and technical professionals before their last year of college to ensure an adequate supply of talent (Hamim, 2005).

The trend toward characterizing and implementing offshoring arrangements as "partnerships" will undoubtedly continue as technology changes (Grover et al., 1996). As vendor-client relationships grow closer, new opportunities for offshore sourcing will be created. IS studies have often distinguished between strategic and non-strategic IS functions; that distinction is influenced by whether or not the client considers IS itself to be a strategic resource. Some argue that the relationship between client and supplier will change to the point that even some strategic functions may be outsourced (Wang, 2002). Others suggest that the belief that suppliers can actually be strategic partners is usually wishful thinking (Lacity et al., 1995). Straub, et al. (2004) found compelling evidence that 26 Global 500 firms that outsourced strategic IT functions experienced lower performance.

Lacity et al. (1995) suggest that IT systems may often be critical but not strategic. They point out that, "Just because an IT activity was business-critical or even strategic did not mean that all its elements had to be kept in-house." They also argue that it is inevitable that a company will clash with its IT suppliers over how to interpret the service levels spelled out in their contracts. They argue: "Such contracts usually contain details that not even a company's legal staff can understand or unravel, especially if the company is outsourcing a technology with which it is not familiar. Contract-management teams require people with deep knowledge of the hired providers, the users, and the contracts."

Lacity et al. (2003) also argue that: once the contract is signed, buyer and seller incentives do not align, and power shifts to the supplier. This can lead to premium prices for additional work, reduced levels of attention from the supplier as time goes on, and an overall deterioration of the relationship into an "us-versus-them" mentality. Based on their experience, Nolan and McFarlan (1995) disagree with Lacity et al.'s (1995) generalization because "Individual companies have very different IT situations and needs." Cullen et al. (2005) mention that outsourcing contracts are agreed to in concept but delivered in detail, and that is the reason that they can break down.

The economic and business logic for offshoring suggests that the offshoring of IT activities will continue to expand. Similar outsourcing phenomena are likely to occur in other areas of business. Generally speaking, these changes will both follow and amplify the existing trends in IS. For instance, various Human Resources (HR) activities are more frequently outsourced than are IT activities (Halvey and Melby, 2000). This is interesting because the technological advantage of HR vendors is usually important to firms who outsource to them. The results of offshoring in a variety of business functional

areas are a lessening of internal demand on the IT function and the shrinking of the internal functional departments as well as the internal IT department.

The creation of outsourcing vendors such as the EDS and CSC some years ago was considered by some to be the end of in-house IT staffs (Dearden, 1987; Overby, 2003). However, the immediate effects were not as predicted. Soon it became apparent that while some jobs were eliminated, others were being created. The information technology profession continued to surge, and the job market continued to grow to the point that new immigration laws and provisions were created to improve the supply of human resources. Investment in international high-technology industries grew rapidly and 'excessive competition' characterized by price and cost competition as well as accelerated innovation and investment changed the nature of contemporary industrial competition (Brahm, 1995).

The nature of potential outsourcing tasks continues to become more complex and sophisticated as do the skills available through offshore vendors. There is no shortage of computer skill and competency offshore. The Software Engineering Institute suggests that about 40% of the top-rated (Level 5) software companies are located in India (Milligan, 2004).

Thus, the same process of evolving IT tasks is occurring again. Programming and systems development jobs in the US are being lost. However, new jobs are being created that focus on the management of vendor relationships and the customizing of externally-developed software. Of the predicted top ten fastest growing job fields between now and 2014, numbers 3, 4, 5, and 6 are computer-related jobs (*Money Magazine*, 2006).

The Risks In Offshoring Information Technology Activities

In many cases, offshoring often has compelling economics. Executives considering the offshoring of IT activities are encouraged to do so by consultants and suppliers of offshore services. The logic of using lower cost, specialized offshore IT services can be supported by numerous examples of successful offshoring in manufacturing. However, IT outsourcing is not identical to outsourcing of manufacturing, and there may be inherent costs and risks that an executive may not consider when making an initial sourcing decision.

There is a greater danger in offshoring information technology activities than in offshoring manufacturing activities. In manufacturing, the product is usually designed by the organization's in-house personnel and only the manufacturing is outsourced. The client company provides specifications, quality control procedures, and so forth. for the company doing the actual manufacturing. The company that designs and outsources the manufacturing normally understands the product and understands the manufacturing process and quality control procedures. User manuals are produced by company personnel rather than being outsourced to foreign personnel. The differences between manufacturing offshoring and IT offshoring may be more significant because the IT activities being outsourced may be less well understood and/or poorly documented by the client firm.

King and Malhotra (2000) identified a number of generic risks associated with IT outsourcing as compared with performing IT activities within the firm. Scott (2004)

indicates a growing awareness of the difficulties inherent in offshoring, pointing out that hidden structural, cultural, legal, and financial risks and costs are often overlooked.

Among the risks are that of deskilling the organization in the relevant capabilities and supporting technologies. Over time, few organizations will be able to maintain skills that are practiced only through an external vendor. This means that the outsourcing decision is not a classic “make or buy” choice, since, when a contract comes up for renewal, the client may no longer have the skills that are necessary to even consider the “make” option (King, 1994).

The counter argument to the deskilling risk is that this does not apply if “commodity” activities are the only ones considered for outsourcing (Quinn and Hilmer, 1994; King, 2004). The problem with this argument is that the distinction between “commodity” and “core” activities is not simple. Quinn and Hilmer (1994) point out that much of the literature that views this distinction to be simple is tautological, since “core” is defined as “key or fundamental.” IT is so integrated into all organizational processes that it is often difficult to make the “core versus commodity” distinction (Earl, 1996). Most IS functions/activities may have components that are core and others that are commodities (Barthelemy, 2003). There is evidence to suggest that some organizations have outsourced IT activities and later discovered that elements of the outsourced activities are part of their core competency (McLellan et al., 1995).

Among the other risks are those of monopoly practices by the vendor and the threat of opportunism on the part of the vendor as the outsourcing firm becomes deskilled. Not only does an outsourcing commitment put the vendor in a monopoly position regarding contract changes and contract renewal, but it offers the vendor the opportunity to learn critical business skills that the vendor could use to compete with the client at some future time. This threat of opportunism also extends to a reduction in the client’s opportunity to influence critical decisions, such as the level of technology that will be applied to the outsourced activity as new technologies become available. Orlikowski and Robey (1991) suggest that technology shifts by the vendor may often reflect more of a focus on the vendor’s goals than on the client’s needs.

Another major risk factor that is specific to offshore outsourcing is the threat of major disruptions arising from political upheaval or war in an offshore host country. Businesses prefer to operate overseas in countries that are politically stable. However, because wages tend to be lower in less stable countries, organizations are often tempted to operate in relatively unstable environments.

The political stability risks associated with offshoring may be significant. For instance, Jeffery Campbell, CIO of Burlington Northern-Santa Fe Railway was quoted in Computerworld as saying, “I have 40% of my applications, development and maintenance... in India. There are ongoing pressures about that region” (Vijayan, 2004). He is referring to the Pakistan-India conflict over Kashmir, which requires his firm to create backup centers outside the region, perform security checks on contractors, and add resources to quality assurance and testing, all of which add to the costs of a venture that has the objective of reducing costs.

Related to this issue is the fact that disaster recovery sites are often shared and operate on a “first-come–first-served” basis. By using them, companies may be exposing themselves to the risk of catastrophic failure when they place so many of their critical IT

backup resources in only one or two locations (Snow et al., 2006). The presumption, like that of insurance, is that a disaster is unlikely to strike multiple companies and multiple locations simultaneously. However, with the enormous proliferation of vendor sites in one area (such as Bangalore, India), this assumption may be faulty, thus requiring firms to operate their own backup sites elsewhere – a very expensive proposition that directly impacts both the economics of offshoring, and its associated risks (Twing, 2005).

The Effect on The Information Management Function of Assuming Responsibility for the Management of Offshoring

The responsibilities of the CIO and the information management function include strategic planning; operational planning and budgeting; information and communications technology infrastructure; maintaining and operating system software, enterprise software, and applications software; managing personnel and providing support for users. IT-related contract negotiation and monitoring are also part of the CIO's responsibilities.

Offshoring using a contract adds the unique dimensions of negotiating and monitoring a contract for services from an organization in another country with a different culture. If offshoring consists of establishing an offshore operation within the organization, many of the same issues also apply (Rottman and Lacity, 2004, 2006; Matloff, 2004).

Carmel and Agarwal (2002) describe how globally dispersed projects are more difficult to manage because of cultural differences, time zone differences, language skills differences, work-hour regulations, high employee turnover (in India,) visa difficulties, lack of domain knowledge at an offshore unit, and poor local telecommunications infrastructure.

The CIO and his or her staff must already understand local vendor responsibilities and relationships in order to routinely deal with contracts for hardware, software, and services. When offshoring, the CIO must understand a more complex contract that may reflect unique conditions and unique responses to the contract language.

Offshoring is carried on in many nations throughout the developed world. While many of the client issues in offshoring are independent of the specific countries, at this point, we shift to discussing U.S. client firms and focus on issues in terms of the American culture and educational system.

Offshoring contracts entered into by U.S. companies to replace internal personnel are generally with providers that can provide English-speaking personnel. This restricts options to the set of countries that have a sufficient supply of technically-trained, English-speaking workers. On the surface, the common language for the workers appears to eliminate communications difficulties. The common language means there can be communication on operational procedures and problems plus discussion of results and implications of supervision, monitoring, evaluation, and quality review. In many cases, communication works well, but there are many cultural differences that do not readily surface in business communication. There are hidden cultural assumptions that affect business decisions and interactions. For example, most Western companies establish organizations in which positions are filled based on merit, and there are regular performance and stewardship reports. In many countries, positions are filled with

relatives, and formal reports are used infrequently because the kinship relationship imposes stewardship responsibilities (Kobayashi-Hillary, 2005).

Differences based on cultures are not “right” or “wrong,” but executives negotiating contracts and monitoring performance must understand the differences as they apply to the contract and its services. Many assumptions from American experiences about employee responses to critical situations, errors, reprimands, and so forth may not fit the offshoring relationship. Krishna et al. (2004) and Daniels et al. (2004) provide a discussion of methods for dealing with cultural issues.

Another issue relates to the systems and databases used in providing services. These may belong to the client company. If quality or performance fails, the systems and databases must be moved to an alternate supplier. This introduces IS/IT management issues. Any outsourcing contract relationship must be monitored to detect whether the vendor will be able to, on demand, transfer back to the company all systems, applications, and files that would be required to perform the functions in the U.S. or elsewhere. This may involve backup centers outside the region, security checks on contractors, and additional quality assurance and testing.

The CIO may also be involved in responding to the political/economic issues of outsourcing because they may have an effect on other activities of the company. For instance, if the outsourcing company has contacts with local and state governments that may look unfavorably on offshoring because of perceived loss of local employment, the outsourcing company may come under political pressure. Responding to such pressure often becomes the task of IT management.

Overall, offshoring introduces problems and difficulties related to different cultures; different commercial rules (both informal and formal); and different expectations about quality, deadlines, overtime, completion criteria, and so forth. It requires the CIO and relevant staff to perform traditional management tasks in a new environment and to perform new tasks. Some significant responsibilities include:

- Monitoring an outsourcing contract that may have unique features. For example, there may be legal requirements that establish organization liabilities for workers well beyond those experienced in the U.S. and beyond those written into the offshoring contract.
- Managing accuracy and completion risks associated with offshoring. Developing, implementing, and monitoring systems and procedures to ensure the offshore location receives accurate data and instructions and accurate and returns complete results.
- Managing the database and application software risks. Receiving and storing updated databases along with up-to-date copies of all software and instructions to process transactions if the offshore unit fails to do so.
- Managing knowledge required for systems. This includes documentation of all procedures and backup training and periodic recovery exercises for company personnel. New organization arrangements may be employed to manage the risk and maintain appropriate knowledge in the organization. One method, termed cosourcing, is the sharing of a business function by internal staff and an external provider. It is described by Kaiser and Hawk [2004].
- Considering a distributed computing solution (Snow et al., 2006).

The Effect of Offshoring on IT Job Opportunities in Organizations

The information technology profession is inherently an evolving one. New realities make it difficult to define the boundaries of what is or is not within the IS domain (Whinston and Geng, 2004). Information technology graduates have had to continually “learn how to learn” and rapidly retool to stay current. This, in turn, has provided opportunities for IT graduates relative to other degree holders. For information technology professionals, self-training and continuous improvement has been the norm. In a fusion of learning and doing, many have kept themselves marketable.

The globalization of IT development and services has reaffirmed this evolving nature of the IT profession. Once again, the nature of work and the range of opportunities are being transformed. Mann (2003) suggests two key sources of continuing transformation: (1) continued investment by firms in hardware, software, and business-service applications and, (2) reorientation of business activities and processes to more effectively use information technology applications. She suggests that:

The globalization of software and IT services means that some IT jobs will be done abroad. But as more sectors of the economy and more businesses use the IT packages in the US, high-skill jobs to design and tailor IT packages will increase in the IT sector, and jobs demanding the skills to use these IT packages effectively will diffuse throughout the economy. Moreover, the now less expensive imported software and services can be knit together by people in the U.S. who are close to the customer and can combine and tailor these inputs to the specific needs of businesses here. (p.1)

The diffusion of IT to new sectors of the economy due to more affordable hardware, software, and service applications will significantly increase the demand for IT-proficient professionals in the next decade. The Bureau of Labor Statistics projects that, over that period, job growth for occupations requiring IT skills will be more than three times the rate of job growth in the overall economy (Mann, 2003). According to the *Occupation Outlook Handbook* of the Bureau of Labor Statistics, three of the top five occupations projected to grow fastest between 2000 and 2010 are IT-related occupations (e.g., computer software engineers, computer support specialists, and network and computer systems administrators).

We believe that the nature and structure of firms with respect to IT will change drastically in the future. Firms specializing in vending IT services will proliferate and grow. The IT departments of many industrial firms will shrink, and the remaining IT elements in non-IT firms will change dramatically.

Carmel and Agarwal (2002) argue that to meet their IT needs, firms must retain some core innovative development functions, such as strategic planning functions and the architectural blueprint of their overall IT portfolio. For technology firms, they believe that the core competency cannot be delegated offshore.

In most firms, software packages can be customized to meet needs on the same consultative basis that firms often used earlier in developing software in-house. This means that a much smaller proportion of the effort involves client-employed IT specialists, while a higher proportion lies in vendor “customization consultants” and an even higher proportion in the software developers of the vendor.

These trends also indicate that the future of IT employment in non-IT firms will lie primarily in three areas: software interfacing, contract management, and strategic planning and technology assessment (King, 2004; Nicholson and Sahay, 2004). Firms that outsource significant IT activities will not employ large numbers of systems analysts and programmers for basic organizational systems as they have done in the past. Instead, they will require dual-role employees who possess a combination of business knowledge and technical understanding that enables them to work with vendor consultants to customize and integrate software.

Such firms will require more sophisticated contract management capabilities, since the success of their outsourcing activities will importantly depend on the degree to which contracts and the performance levels that are expected of vendors are specified and monitored.

Since the impact of ever-changing information technology on the strategy and success of firms will continue to be profound, the monitoring and assessment of technology change, which is now sometimes downplayed when basic technology choices have been outsourced, will become of greater importance to firms. Thus, the IT department which historically involved large numbers of people; vast “glass houses” for computer operations; and interactions with many non-IS people in the organization through systems development projects, information centers, and help desks should shrink significantly in size. The smaller function will involve new specialists—dual-role integrators, contract managers, and technology strategists. These individuals who know enough about technology to work productively with outside vendors in developing and customizing software applications are likely to be located in, and report to, business functions such as marketing and human resources rather than to the IS function.

Software vendors will also change in the future. Kolawa (2004) believes that the same forces that have impacted other areas will influence how and where software is developed. Software outsourcing will develop a focus beyond cost savings. This will lead to specialization and “vertical fragmentation”—organizations that specialize in software modules that are delivered to non-IT firms for applications integration. Kolawa, CEO of Parasoft Corporation, described the situation:

Software suffers from a “Not Invented Here” mentality. That is, developers think that one company can make an entire application in one place. This type of thinking is widespread among software engineers and is indicative of an immature industry—where engineers dictate how a business is run, rather than management. This leads to low productivity, low quality, and viruses and bugs because no one is focusing on their core competency. (p. B-2)

As software firms begin to become more specialized, they will improve productivity and quality just as specialized auto parts suppliers did. Software “bugs” will be less frequent. This will create a need for highly specialized software engineers in vendor firms.

Changes to the Curriculum in Management of Information Systems To Prepare Future IS/IT Managers to Manage Offshoring

Information system programs at business, management, and information schools, for the most part, strive for a balance between theory and application. The outsourcing phenomenon has created a wider diffusion of IT jobs throughout the U.S. economy but may not require a fundamental change in skill sets. Offshore production has reduced the cost of hardware, which in turn has increased demand for software and information services. The next wave of productivity growth is expected to come from the globalization of IT services (Mann, 2003). For the U.S. economy, an international value chain should increasingly produce less expensive software and services, making information technology more affordable overall. That, in turn, creates opportunities for individuals to custom-tailor information services to the specific needs of businesses.

The previous discussion of the offshoring phenomenon points to the fact that IS/IT curricula may have to change in several directions simultaneously. On the one hand, the ability to coordinate the products of several different software vendors implies considerable technological sophistication. On the other hand, working with offshore vendors will require greater sensitivity to, and understanding of, cultural differences between the countries involved. Furthermore, managing outsourcing and outsourcing contracts will become a major skill need. Thus, it will not be easy to devise a curriculum answering all these needs within the limited number of courses generally available

We will not presume to prescribe the details of such a curriculum here. Rather, we will focus on the “new roles” and the traditional roles that will become of increasing importance in the offshoring environment.

There will be greater skill needs in a number of areas:

- Relationship and contract management
- Risk assessment and management
- Technology assessment and monitoring
- Systems implementation and integration
- Business Process Redesign
- Integrated business and IS planning
- Mission-critical systems development and testing
- Security
- IS personnel development

Relationship and Contract Management

Effective relationship management has been frequently shown to be related to outsourcing success. Many firms who thought that they could offshore through a contract and then do little to monitor and manage the client-vendor relationship have been surprised with negative results from this style of outsourcing. Studies, in fact, have found that firms ignore such transaction costs to their peril (Ang and Straub, 1998). In such instances, executives did not pay much attention to communications and coordination processes and their associated costs. For success in IS offshoring, managers must pay close attention to everything about the client-vendor relationship,

from the criteria for selecting a vendor, to the details of the outsourcing contract, to the frequent monitoring of progress, to the level of control exerted over the vendor, to the level of trust that is developed in the client-vendor relationship. None of these things can be ignored or taken lightly, since all have been shown to be critical success factors for effective outsourcing.

Risk Assessment and Management

Risk assessment and management will become a greater focus in vendor selection and in continuing relationship management. The risks that are involved in performing critical functions in third-world countries have not been fully recognized by most firms who have begun offshoring. Everything from political risk, to risks of natural disasters, to the risks associated with marginal infrastructures needs to be taken into account and monitored. After all, India almost became involved in a nuclear confrontation only a few years ago, and while international communications from India have improved dramatically, local communications and transportation infrastructures are often marginal. This leads to greater risk, especially when unplanned activities must be performed. Often, companies address this risk through the use of "backup" sites, but this involves a new layer of complexity in the overall management process.

Technology Assessment and Monitoring

In an outsourcing/offshoring environment, a technology and vendor assessment capability must be maintained, or developed, by the outsourcing client since the vendor's objectives with regard to technology are not always consistent with those of the client. In many situations, vendors wish to consolidate the work of many clients on their own legacy technology to achieve economies of scale and high returns. This may not always well serve specific clients, even if it meets their initial cost goals, since some clients might benefit greatly from greater accuracy, reduced cycle time or a greater security level than is initially offered by the vendor.

The monitoring of technological advances may, in fact, be performed outside the organization. But the CIO and other IS executives must be certain that they are aware of these developments, if only because it will enable them to anticipate technological changes that a vendor may be about to consider. The need to independently keep abreast of technology becomes apparent to every CIO shortly after he or she outsources operational computing systems. The outer office is no longer filled with vendor salespeople because the outsourcing client is no longer a potential customer for entire categories of hardware and software. Only on recognizing that the outer office is no longer full, do many IS executives realize how much imported technological information they formally obtained from salespeople. Those "pests waiting for an appointment" (as one IS executive put it) suddenly are recognized for their value, and the IS manager realizes that he/she must do something to replace those old sources of information concerning technology. So, the client must independently assess evolving technology in order to maintain an awareness of potential service-level improvements that may become feasible through technological advances.

The client must continuously be aware of the offerings and capabilities of other offshore vendors as well. Even if a firm is involved in a long-term contract, this is necessary. It also illustrates why negotiations and the terms of the contract are so important. No client should allow himself or itself to be truly "locked into" a long-term contract in which

the vendor can attempt to provide, on a continuing basis, service levels that are less than others routinely offer. Contracts must provide for the continuous benchmarking of service levels against other providers.

Systems Implementation and Integration

Systems implementation and integration is another area in which competence must be maintained and enhanced by an IT department that is going out of the programming and systems development "business," (which will increasingly be the norm). Increasingly, software will be developed by vendors, purchased by clients and then customized and integrated with other internal systems. These implementation and integration processes may be aided by external consultants, but they often cannot be effectively done by outsiders; an internal capability that reflects a deep understanding of the business, its operations, goals, and priorities, is required. This extends to the software testing arena since externally-developed software, which can be mission-critical for the client firm, must be thoroughly tested on an independent basis.

Even when external consultants are used in these roles, the goal of the client must be to have its own personnel learn the skills that are necessary to perform these tasks with increasingly lesser levels of outside help.

Business Process Redesign

Business processes cannot be effectively redesigned at a distance; direct contact between analysts and employees who are involved in operating the processes is required. Therefore, while many offshoring contracts relate to business processes, the analysis and modeling skills that are required must reside in the organization's internal IS function.

Integrated Business and IS Planning

Strategic IS planning is the link between the business strategy and the mission, strategy, goals, and architectures for IS in the organization. As such, this planning process requires in-depth understanding of the firm. It should (almost) never be outsourced or offshored.

IS strategic planning has been integrated into strategic business planning in many firms. This activity will need to be maintained, as no firm can ignore the potential role of IT in its future business strategy. When outsourcing takes place, top managers tend to presume that IT's role in the business is lessened, and they may give less attention to it. IT people must understand business strategy and IT's role in it (even when large segments of traditional IT have been outsourced) and keep these issues in the mix of those treated in strategic business planning.

Mission-Critical Systems Development and Testing

The development and testing of mission-critical software/systems must usually be retained in-house, since this is where one's informational core competence resides. Most organizations have trade secrets and/or critical key processes embedded in their software and systems that they would not wish to be made available to outsiders. The testing of software is typically performed by the developer, but in the case of offshored development, clients often wish to perform their own post-delivery testing.

Security

Sharing critical processes and software with vendors may increase the security risk to some degree. Of course, most vendors apply elaborate security systems and procedures. Indeed, in some cases, consultants have found that vendor security is better than client security. Nonetheless, the ultimate responsibility for the security of data, especially customer data, lies with the client, so the necessary skills must be available in-house to assure adequate security.

IS Personnel Development

IS employee development programs involving the IS jobs that are kept in-house as well as the "IS interface" jobs in the marketing, production, finance, and other departments should also be retained in-house. Such programs may involve on-the-job training and/or job relations through IS and business functional job assignments. In that way, career progression plans can be developed involving the set of IS functions that are retained.

To summarize, outsourcing/offshoring must be treated as a major and central IS paradigm. It can no longer be thought of as an interesting appendage to basic IS.

Second, the specific skills necessary for performing the activities that will remain in the IS portfolio – relationship and contract management, risk assessment and management, technology assessment and monitoring, systems implementation and integration, business process redesign, integrated business and IS planning, mission-critical systems development and testing, security, and IS personnel development must be given central focus in curricula. These are typically not major foci of today's curricula.

This means that IS students will need to understand negotiation techniques, contract law, and change management. They will need to develop the "softer" skills involved in partnering and developing trust between partners. Strategic skills such as understanding the benefits that may be expected from various kinds of possible "strategic alliances" with vendors will become essential. Vendor selection, which has not been central to IS, will become of greater importance.

All of the key strategic concepts— core competency, critical success factors, internal markets, etc. – which have been little known to IS students, must become familiar to them and to IS professionals through revised curricula and training.

The focus for systems implementation and integration will need to shift from an internal orientation to one that addresses working in joint consultant-client teams. For instance, the typical ERP implementation project, in which joint teams work, often for several years, to customize and implement a vendor-supplied system to meet a firm's unique needs, is a good prototype for a process that will become increasingly common for various types of vendor-supplied systems. Thus, inter-firm implementation processes will need to be more fully developed and studied (Ko et al., 2005).

Even though integrated CRM-ERP-SCM systems (customer relationship management, enterprise resource planning, and supply chain management) will increasingly become the core organizational enterprise systems, it will be many years before most firms have substantially converted to such systems, so the evaluation of vendor-supplied software,

software testing, and the integration of software with legacy systems will be a continuing need.

Another critical need will be developing an understanding of relevant foreign cultures. For instance, the Indian culture is quite unique. Although the caste system has been officially outlawed, its vestiges remain strong. Of course, large Indian outsourcing vendors are much less traditional and more Westernized than some vendors in other countries, but there are still traditional cultural practices that permeate all aspects and levels of Indian society. In many vendor nations, businesses and government agencies operate routinely on bribery, hiring of relatives, unaccountability of relatives, and other-than-merit-based promotions. Anyone who routinely deals with foreign vendors must recognize these, and many other aspects of the national culture of the vendor in order to understand the proposals of, and responses given by, the employees of foreign vendors.

Most of these areas involve skills that go well beyond the traditional domain of IS education. But, since overall IS success will be more and more dependent on these skills, IS education must adapt and change.

In some sense, we in IS are quite well suited to changing in these ways since IS educators are not people who are used to teaching from the same yellowed notes each year. But, the changes that are now required are more substantial than those with which we are familiar. They involve more than just updating methods to deal with evolving technologies.

Most IS faculty are not themselves well versed in some of the required areas – contract law, for instance. Many have not traditionally focused on the “soft-side” skills that are involved in contract negotiation, contract management, and client-vendor relationship management.

This means that there will need to be a period of “retraining” that might rival that which took place in the late 70s and early 80s when so many faculty who were not formally trained in IT availed themselves of the opportunity to develop skills in the new “hot” growth area of IS. Whether this needs to be done formally, as was done then, through joint teaching of IS courses with non-IS faculty who have these complementary skills, or in other ways is not clear. But, it needs to be done.

Conclusions

The offshoring phenomenon is based on classic economic principles and so is likely to continue to expand rapidly for the foreseeable future. It has two modes – the hiring of outsourcing suppliers overseas and the transfer overseas of facilities that are still managed by the user organization.

The logic behind offshoring is twofold. On the one hand, it is a version of the outsourcing trend of recent years, which posits that organizations should focus on their core competencies while contracting other necessary activities to specialists in those activities. On the other hand, it is based on the classic strategy of economic arbitrage – the exploitation of price differences in order to profit from them.

There has been considerable discussion in the literature of problems that arise in outsourcing, and these also apply to offshore outsourcing; many of them also apply to management of offshore facilities. These problems include structural, cultural, legal, and financial risks and costs. In the context of IT offshoring, additional problems may arise; these include loss of intelligence when customer relation activities are outsourced and the possibility of major offshore disasters. These problems may be exacerbated by the fact that IT activities are now so closely interwoven with organizational activities in general that it may be difficult to determine which activities indeed lie outside the organizational core. Because of the specific issues involved in offshoring IT activities, it seems necessary both to include elements of offshoring management in the general IS curriculum and to develop specializations relating to offshoring. New curricular specializations suggested are: "Offshore Infrastructure Management," "Offshore System Development Management," "Offshore Operations Management," and "Offshore Outsourcing Management." In terms of general IS training and offshoring in particular, it seems that the major changes required are greater emphasis on integrating technologies and systems and a greater awareness of cultural issues and the ability to deal with them.

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