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INFORMATION TECHNOLOGY OFFSHORING: PROSPECTS, CHALLENGES, EDUCATIONAL REQUIREMENTS, AND CURRICULUM IMPLICATIONS

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Abstract

Offshore provision of information systems/information technology-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 modifications of IS curricula in order to prepare graduates for the new environment.

The advantages of offshoring are those of outsourcing in general: allowing the organization to focus on its core activities and cost savings. The main dangers include loss of business intelligence and reliance on remote suppliers who may suffer a major failure. The loss of jobs due to offshoring also introduces political considerations.

Offshore operations are generally supervised by 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 information systems programs. The number of some jobs will shrink, but new positions with new responsibilities are likely to emerge. Training students to function in an environment of offshored operations will introduce new IS specializations and require adaptation of IS curricula; a framework for considering modifications is suggested.

Keywords: Advantages, culture, IS curriculum, offshoring, outsourcing, politics, risks, trends

Introduction

Senior scholars in the field of information systems have observed the rise and fall of many ideas, practices, technologies, and applications in the information systems function of organizations. A Senior Scholars Paper provides an opportunity for this experience to be applied to a current practice that appears to be important. This paper will examine the practice of outsourcing

various information technology activities to offshore providers of these services. The paper discusses information technology offshoring in terms of five major issues of importance to what we teach and research:

1. The economic and business logic for information technology offshoring
2. The dangers in offshoring information technology activities
3. The effect on the information management function of responsibility for supervision and management of offshoring
4. The effect of offshoring on information technology job opportunities in organizations
5. Changes to the curriculum in management of information systems to prepare future IS/IT managers to manage offshoring

The paper is not an in-depth survey of all of the issues and research relative to offshore outsourcing of IT activities; rather, it focuses first on the economic and management logic that suggests offshoring will increase in both importance and risk for those who manage the information systems and information technology infrastructures for an organization. The paper then applies the experience of the authors to 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 be reflected in the IS curriculum.

The Economic and Business Logic for Offshoring of IS/IT Activities

Offshoring is defined as the provision of organization activities from locations in other countries. This may be accomplished in two ways. The first is outsourcing of organization activities to service providers in other countries. In this case, the service provider hires, trains, supervises, and manages its personnel. The contract specifies services to be provided, time and quality measures, and so forth. The other alternative is for the organization to set up service operations in the other countries. The operations are managed as a remote service site. Workers are hired, trained, supervised, and managed by the organization rather than by an outside contractor.

The current high level of interest in offshoring is a logical extension of the outsourcing phenomenon that occurred in the 20th and early 21st centuries (Weber 2004). In that respect, offshoring is not a new phenomenon; it shares many of the underlying issues of outsourcing that are discussed by economists, information technology researchers, and others. The importance of offshoring as part of global strategy development 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 by offshore sourcing for back-office services. American Express has been offshoring to India a variety of back-office processing tasks 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 percent of U.S. firms are expected to use IT outsourcing in 2006 (AMR Research 2003) and European firms like Siemens have begun outsourcing to Eastern Europe and Asia. The sourcing issue is among the top five agenda items for IT executives (Vijayan 2004).

Of course, outsourcing is not limited to information technology. The most visible outsourcing is the transfer of manufacturing processes to other countries with 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.

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

The Basis for Outsourcing

IT outsourcing is based on a general philosophy that has been 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*, February 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 which requires the addition of the phrase "unless these activities are special" to it. In other words, if an activity is not a core competence but is a critical success factor—something that is necessary, but not sufficient, for the success of a firm—and if it is not generally available in the marketplace, it must be done in-house through the creation of new activities, capabilities or functions.

IS was a "special" activity in the early computer era. While computers and operation software were widely available, vendors who specialized in operating computer systems and in developing or providing specialized applications software were not as 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 its products. There are many IT service vendors in many nations. In effect, many IT activities are no longer special.

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 developed higher quality levels than the automakers, with their wide diversity of activities, could attain.

Today, virtually every auto company outsources parts, subassemblies, 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. The exploitation of international cost differentials has been termed *global arbitrage* (Sawhney 2002) as it is an extension of the classic economic arbitrage strategy.

IT has gone, 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 application developments. Computer operations, once done internally, were outsourced to vendors who could achieve high efficiencies through combining the computing of various clients on a limited set of hardware and software. Now, virtually any activity can be considered as a candidate since specialized firms offer software packages of the most sophisticated variety (e.g., ERP) as well as operational services.

The cost factor has been, and remains, one of the most critical practical arguments put forward by U.S. companies for offshoring. Inexpensive labor as the primary motivation for offshore production for the electronics industry was empirically examined by Moxon in 1975. The importance of production costs has also been suggested in information system studies (Ang and Straub 1998). Clearly, advancements in communication and computer technologies in recent years have made this argument ever more plausible, and offshoring opportunities ever more feasible. 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 (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 often increases. In fact, the quality gap is closing rapidly in a broader context. A survey of software projects by the Center for eBusiness at Massachusetts Institute of Technology found that projects developed in India had only 10 percent more bugs than comparable U.S. projects (Ante 2004). 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 Future of IT Outsourcing

The economic and business logic for offshoring suggests that 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 IT activities. This is interesting because the technological advantage of HR vendors is important to firms who outsource to them for HR services. The results are a lessening of internal demand on the IT function and the shrinking of the internal HR department as well as the internal IT department. At the same time, the external HR vendors create new IT opportunities.

The logic of economics suggests that outsourcing benefits everyone—job seekers, stockholders, client firms, vendors, etc.—in the long run. The cost advantages that are usually the basis for outsourcing and offshoring 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 the political system behaves irrationally, the outsourcing trend in IT is likely to continue.

Information technology researchers and others have extended their research agenda to include studies that involve outsourcing, its impact, and its management (Ang and Cummings 1997; Kotabe and Swan 1993; Lacity and Willcocks 1998). Studies of national and international economics suggest a diverse and positive impact on the economy due to outsourcing and the globalization of information technology (Levy 1995; Mann 2003; McLaren 2000). Although there are examples of negative effects of globalization, there are recognized positive effects. The success in consumer electronics by Japanese firms, for example, is frequently used to describe the positive consequences of offshore production of transistor radios, televisions, VCRs, semi-conductors, robots, and even high-definition color televisions (Yoon 1990).

The creation of outsource vendors such as EDS and CSC was considered by some to be the end of in-house IT staff (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 side 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 percent of the top-rated (level 5) software companies are located in India (Milligan 2004).

The Dangers in Offshoring Information Technology Activities

As described above, offshoring (both as a special case of outsourcing and as an organizational internal activity) has compelling economics. Executives considering offshoring IT activities are encouraged to do so by consultants and suppliers of offshore services. The logic of using lower cost, specialized offshore IT services is often supported by examples of offshoring in manufacturing. However, IT outsourcing is not identical to outsourcing of manufacturing, and there may be inherent costs and dangers that are not being considered. Two cases illustrate this point. The first is the loss of an important unrecognized intelligence activity when a simple customer service function is offshored. The second suggests that offshoring is creating the potential for business failures if vital functions cannot be retrieved quickly in the event of the failure of an offshore service provider.

Case 1: Offshoring technical assistance for products. A colleague purchased a small handheld device for calendaring, etc. The device did not work as specified, and after reading the user instructions (that were somewhat lacking in clarity) and not finding the answer, called the help line. The response was a customer service person in India. The person was polite and patiently went through a checklist that failed to resolve the issue. He indicated he would move the request to the next level and someone would call. The colleague surmised that the help function was organized so that he could call back and get to the next level immediately. He did so, and the problem was resolved by a very competent help person. From the standpoint of the customer, the fact that the help desk was in India versus the United States made no difference. But could this offshore help activity be detrimental to the long-run survival of the firm? If the help desk is used exclusively to respond to customer inquiries, a well-run help function run by a contractor in India is the same as the same function in-house in the United States. However, what if the help desk interaction with customers is the basis for more than identification of problems with the current equipment? The help interaction can identify ideas for product improvements, product manual editing, new uses, and innovations. Outsourcing the help

function may have eliminated a vital business intelligence activity. Many organizations recognize the need to interact with customers and insist that executives spend time observing customer use and interacting with customers. Outsourcing may make this intelligence gathering more difficult (and perhaps easy to ignore since it is done outside the organization.)

Case 2: Offshoring disaster causing an organization to fail. This is hypothetical, but such a happening in some organization is very likely. It is most likely if the organization is a financial institution, but it could be any organization that locks its “jewels” in a remote location without the ability to unlock and retrieve them on short notice. There are organization processes and procedures that depend on information technology applications and related databases. Organization personnel, no matter how well trained, cannot function without the technology supporting the systems. They cannot respond to requests-for-proposals, make sales proposals, promise deliveries, initiate delivery of products and services, bill for services, follow-up on complaints, and so forth. Can this happen? The risk is an extension of an existing risk from failure of major business systems based on IT. For example, although the full story has not been told, the recent financial news was clear in identifying a failure of a major information system module as the reason for a shortfall in profits by HP, an organization with significant technical capability.

An extension of the problem of failure in a particular offshore service provider or system is that of major disasters arising from political upheaval or war in an offshore host country. Businesses prefer, of course, to operate overseas in countries that appear politically stable. However, because wages tend to be lower the less stable a country, organizations are often tempted to operate in unstable environments. While the risks may be containable in low tech operations such as textile manufacturing, they may be too high to tolerate in less stable regimes.

The political stability risks associated with offshoring may be significant. For instance, Jeffrey 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. A recent article (Austin 2004) indicates a growing awareness of the difficulties inherent in offshoring. It points out that hidden structural, cultural, legal, and financial risks and costs are often overlooked.

There is risk in deskilling the organization. The interest in knowledge management has been driven in part by the recognition that vital knowledge for organization survival and success is not documented in systems and procedures but is in the heads of key personnel. If these personnel depart, the knowledge goes with them. This is important because many of the systems and procedures of an organization (and most of them depend on IT) represent unique resources that give the organization its competitive advantage. Transferring the systems to an offshore provider and releasing personnel with both explicit and tacit knowledge of the systems puts in motion great risks in the event of failures of the offshore systems or providers.

The counterargument to deskilling risk is that this does not apply if commodity activities are the only ones considered for outsourcing (King 2004; Quinn and Hilmer 1994). 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 and 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 (Hancox and Hackney 2000; McLellan et al. 1995).

These issues suggest that there may be a lack of recognition by many executives of the importance of the organization systems and the data resources that interact with them. The lack of understanding of systems in organizations may represent a failure of the business education curriculum. The consequences may be executive-level personnel who don't understand systems and cannot implement or repair them. This is illustrated by a young executive who has demonstrated ability in managing integration activities for a financial services company that has acquired companies that had incompatible operations, systems, and procedures (including computer systems). She remarked that the very bright MBAs in the organization could do all sorts of analysis but didn't understand the systems for operating the organization and dealing with suppliers and customers. They couldn't manage simple projects that depended upon an understanding of operations.

There is a greater danger in offshoring information technology activities than in offshoring manufacturing activities. In manufacturing, the product is designed by organization personnel and only the manufacturing is outsourced. The manufacturing company provides specifications, quality control procedures, inspections, etc. for the company doing the actual manufacturing.

The company that designs and outsources the manufacturing 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. Contrast this to IT outsourcing where the processes being outsourced may be poorly understood and poorly documented. Experience with offshore software development and maintenance suggests that it works well when requirements are clearly and completely specified and works poorly when requirements emerge as development proceeds. Presumably an organization may develop an ability to outsource and offshore IT functions but, in the meantime, the risk from failure may be significant.

The Effect on the Information Management Function of Responsibility for Supervision and 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, system software, enterprise software, applications, personnel, support for users, and so forth. If activities such as the telecommunications network are outsourced, contract negotiation and vendor monitoring are also part of the CIO's responsibilities. Offshoring by a contract adds unique dimensions of negotiating a contract for services and monitoring performance by an organization in another country with a different culture. It may require a specialized project management office. If offshoring consists of establishing an offshore operation within the organization, many of the unique issues still apply.

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

Offshoring contracts entered into by United States companies to replace internal personnel are generally with suppliers that can provide English-speaking personnel. This restricts 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 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. In Asia, the cultural norm is to not disagree with superiors even if the result is a misunderstanding, as in the case of a worker agreeing to a deadline that is not possible. Because of cultural differences, incentives that work well in North America may not work well in Asia

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 an American experience about employee responses to critical situations, errors, reprimands, etc. may not fit the offshoring relationship. For a recent discussion of methods for dealing with cultural problems see Krishna et al. (2004).

Systems and databases used in providing services from offshore belong to the 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 existence of difficulties by the vendor in being able to, on demand, transfer back to the company all systems, applications, and files that would be required to perform the functions in the United States 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 with responding to political and economic issues of outsourcing because they may have an effect on other activities of the company if the company has contracts with organizations such as local and state governments that may look unfavorably on offshoring because of loss of local employment.

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 tasks in a new environment and to perform new tasks. Some significant responsibilities include

- Develop a plan for offshore outsourcing as part of the strategic plan for information systems. The plan includes a method for obtaining offshore services, the governance model to be applied, management of exchange risks, political risks, and performance risks, and so forth.
- Define requirements for offshore software projects and offshore services. Define criteria for evaluating performance and working with offshore vendors for each project.
- Monitor an outsourcing contract that has unique offshoring features. For example, there may be legal requirements that establish organization liabilities for workers well beyond those experienced in the United States and beyond those written into the offshoring contract.
- Manage unique accuracy and completion risks associated with offshoring. Develop, implement, and monitor systems and procedures to ensure the offshore location receives accurate data and instructions and that accurate and complete results are returned.
- Manage 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 offshoring unit fails.
- Manage 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 described by Kaiser and Hawk (2004).

The Effect of Offshoring on Information Technology 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, provided opportunities for new 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, they 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 United States, 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 United States who are close to the customer and can combine and tailor these inputs to the specific needs of businesses here.

It is suggested that 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 the next decade, job growth for occupations requiring IT skills will be more than three times the rate of job growth in the overall economy. According to the *Occupation Outlook Handbook* of the Bureau of Labor Statistics, 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).

It is important that adjustments are made to IT-business curricula for graduates to benefit from the changing IT environment. The December 2003 issue of *CIO Magazine* featured an article by Overby that included comments by Dough Busch (CIO of Intel), Larry Pickett (CIO of Purdue Pharma), and Nancy Markle (president of the Society for Information Management) among others that are relevant to IT. In summary,

1. IT jobs will be lost to offshore companies.
2. U.S. IT staffing levels will never return to their previous highs. (There is an apparent contradiction here with the Bureau of Labor Statistics data quoted above. This is probably explained by the trend by organizations to downsize their IS/IT functions while IS/IT service providers expand employment at a rate that more than compensates for this.)
3. IT work that remains will be more important to the business.
4. Firms will continue to offshore application development, legacy maintenance, call center operations, and the like.
5. U.S. companies will keep work that requires close contact with the business such as strategy development, business process improvement, and actual application of IT in the business.
6. IT will become a core competency and economic engine in emerging economies, and these emerging economies will complement the U.S. IT industry.
7. U.S. IT executives look beyond the possible short-term offshore savings to the long-term impact on the nation's ability to remain innovative.
8. The higher-level IT positions that remain will require new skills.
9. U.S. IT degree programs should move more toward broader business education.
10. The IT graduate of the future has to be a good technologist but also be a savvy businessperson, a hybrid and versatile person.
11. Issues of infrastructure, security, communication, and project management are important to onshore jobs
12. There is a need to protect intellectual capital, especially when IT is integrated in business processes.

Building on these general conclusions, we believe that the nature and structure of firms with respect to IT will change drastically. Firms specializing in vending IT services will proliferate and grow. There will be more consulting firms that assist companies in selecting offshore vendors and in managing the relationship. The IT departments of industrial firms will shrink. The remaining IT elements in non-IT firms will change dramatically.

Software packages can be customized to meet the needs of individual firms 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 technology assessment (King 2004). Firms that outsource significant IT activities will not employ large numbers of systems analysts and programmers 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 specify requirements and work with vendors to develop, 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. Currently, 76 percent of the clients of the top 10 IT outsourcing vendors have not had prior experience in managing outsourcing relationships (Violino and Caldwell 1998).

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, once involving 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 contract significantly in size and primarily 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 in 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.

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 schools, for the most part, continued to strive for a balance between theory and application. The outsourcing phenomenon created a wider diffusion of IT jobs throughout the U.S. economy but did not require a fundamental change in skill sets. Offshore production reduced the cost of hardware and that in turn increased demand for software and information services. The next wave of productivity growth is expected to come from 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 the direction in which IS/IT curricula will have to change. In fact, they may have to change in several competing 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 of these needs within the limited number of courses generally available.

A fundamental discussion of the nature of curricula for outsourcing and for IS in general is beyond the scope of this paper. However, we suggest that principles, issues, methods, and case studies concerning offshoring will need to become part of the general IS curricula. In addition, it is possible to think in terms of specializations in IT outsourcing management. Below we suggest some possible course offerings for offshoring specializations and indicate some courses that might be included in such specializations. These courses are taken from the MSIS 2000 curriculum and the table also suggests the courses in the general IS curriculum that may need to be changed.

MSIS 2000 (Gorgone et al. 2000) suggests 16 IS specialization areas and a core of courses for each. Adopting this model, we address here four possible specializations in offshoring: Offshore Infrastructure Management, Offshore System Development Management, Offshore Operations Management, and Offshore Outsourcing Management. We assume that the foundations of these specialized curricula would be the same as for all the specializations in MSIS 2000. MSIS 2000 is surprisingly prescient in terms of course listings; all the courses suggested here are from the list of courses in that curriculum model. It may not be necessary to add any courses, but there will be changes in emphasis or new modules in some of the courses. Contracting for offshore development needs to be included, either as major modules or as a separate course. The curricula suggested here are exhibited in Table 1.

Table 1. Offshore Curriculum Specializations

	Offshore Infrastructure Management	Offshore System Development & Integration Management	Offshore Operations Management	Offshore Outsourcing Management
Advanced Change Management			X	
Advanced Design Methodologies		X		
Advanced Project Management		X		X
Business Processes			X	
Consumer Relationship Marketing	X		X	
Data Warehousing			X	
Database Administration	X			
Database Systems Planning	X			
Electronic Commerce			X	X
Emerging Technologies and Technology Forecasting	X			
ERP Systems		X		
Global Cultural Implications for IS	X	X	X	X
Globalization				X
Internet, Intranets, and Extranets	X	X		
IS Security		X	X	
Management of Computer Personnel			X	
Management of Telecommunications	X			
Operations			X	X
Outsourcing				X
System Integration		X		
Telecommunications Technology	X			
Transborder EDI and Data Flows				X
Workflow and Collaborative Work		X	X	
	Offshore Infrastructure Management	Offshore System Development & Integration Management	Offshore Operations Management	Offshore Outsourcing Management

The number of courses associated with the specializations varies from 7 for Offshore Outsourcing Management to 10 for Offshore Operations Management. This is clearly more, in all cases, than can be accommodated in most programs and each program will have to decide which courses are most important. Alternatively, one might think in terms of sub-specializations in some areas.

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 or the transfer of facilities overseas 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. Thus, offshoring of IT activities arbitrages wage differentials in the provision of outsourcing services by offshore contractors or by creating company operations in offshore locations.

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 offshore management of own 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 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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