OFFSHORING AND ITS IMPLICATIONS FOR THE INFORMATION SYSTEMS DISCIPLINE

Rudy Hirschheim
Louisiana State University
rudy@lsu.edu

Claudia Loebbecke
University of Cologne
claudia.loebbecke@uni-koeln.de

Mike Newman
Universty of Manchester and
University College, Agder
Msrysmn@fs1.acc.man.ac.uk

Josep Valor
IESE Business School
jvalor@iese.edu

Introduction

Outsourcing as a means of meeting organizational information technology needs is now a commonly accepted and growing practice, and one that is continually evolving (Dibbern et al. 2004). It has grown from the domain of IT embodying decisions such as where and how to source IT to a much wider set of business functions: logistics, accounting, human resources, medical, legal, risk assessment, and so forth. IT outsourcing (domestic and international) refers to the practice of using external agents to perform activities, to deliver products and/or services previously done by internal IT functions that are now transferred to third party vendors. This is not a new concept as it has been taking place since the 1950s with early facilities management arrangements and the contract supply of programmers.

Global offshore outsourcing (or simply *offshoring*) is a relatively new phenomenon, which became a workable mainstream strategy in the 1990s largely because digital information could be transported cheaply and efficiently, offering access to knowledge-worker skills often at reduced costs. IT offshoring refers to the migration of all or part of the development, maintenance and delivery of IT services to a vendor located in a country different from that of the client. In the West, offshoring typically involves the movement of these services to countries like India and China where wages are significantly lower.

Some offshoring arrangements involve the physical transport of personnel from the vendor country to the customer premises (known as body-shopping) on a time and materials basis. Other arrangements involve all or part of the work being done in the vendor country offering lower costs and access to personnel. These types of arrangements have sometimes led to joint venture arrangements or to foreign subsidiaries set up in the vendor country. There are two major types of work currently being outsourced, which we refer to as *information processing* and *information systems* related. Information processing activities relate primarily to transaction and data processing projects such as help desks and call centers and are sometimes referred to as teleworking services or IT-enabled services. Information systems services are concerned with software development activities: the analysis, design, implementation, and maintenance of information systems.

Today, Western firms of all sizes are rushing overseas to have their IT work performed by offshore vendors (Krishna et al. 2004; Sahay et al. 2003). Some argue this change is nothing more than the natural progression of first moving blue-collar work overseas followed by white-collar work (Friedman 2005; Sheshabalaya 2004). IT jobs are the most visible to us in the IS field, but the same is happening (or will happen) to other business functions/processes in professional areas such as accounting, tax, and medicine. Some hospitals, for example, are already outsourcing x-ray diagnosis to medical personnel in India.

Fundamentally, the logic of offshoring is simple: With labor costs in India about one-fifth of what they are in the United States and Europe, an abundance of IT staff with technical skills equal or better than those in the West, the argument for offshoring is compelling. But what are the implications of such offshoring for the IS discipline? How should we as a discipline respond? And should the response differ depending on what part of the globe you are? In this paper, we seek to analyze some of the arguments
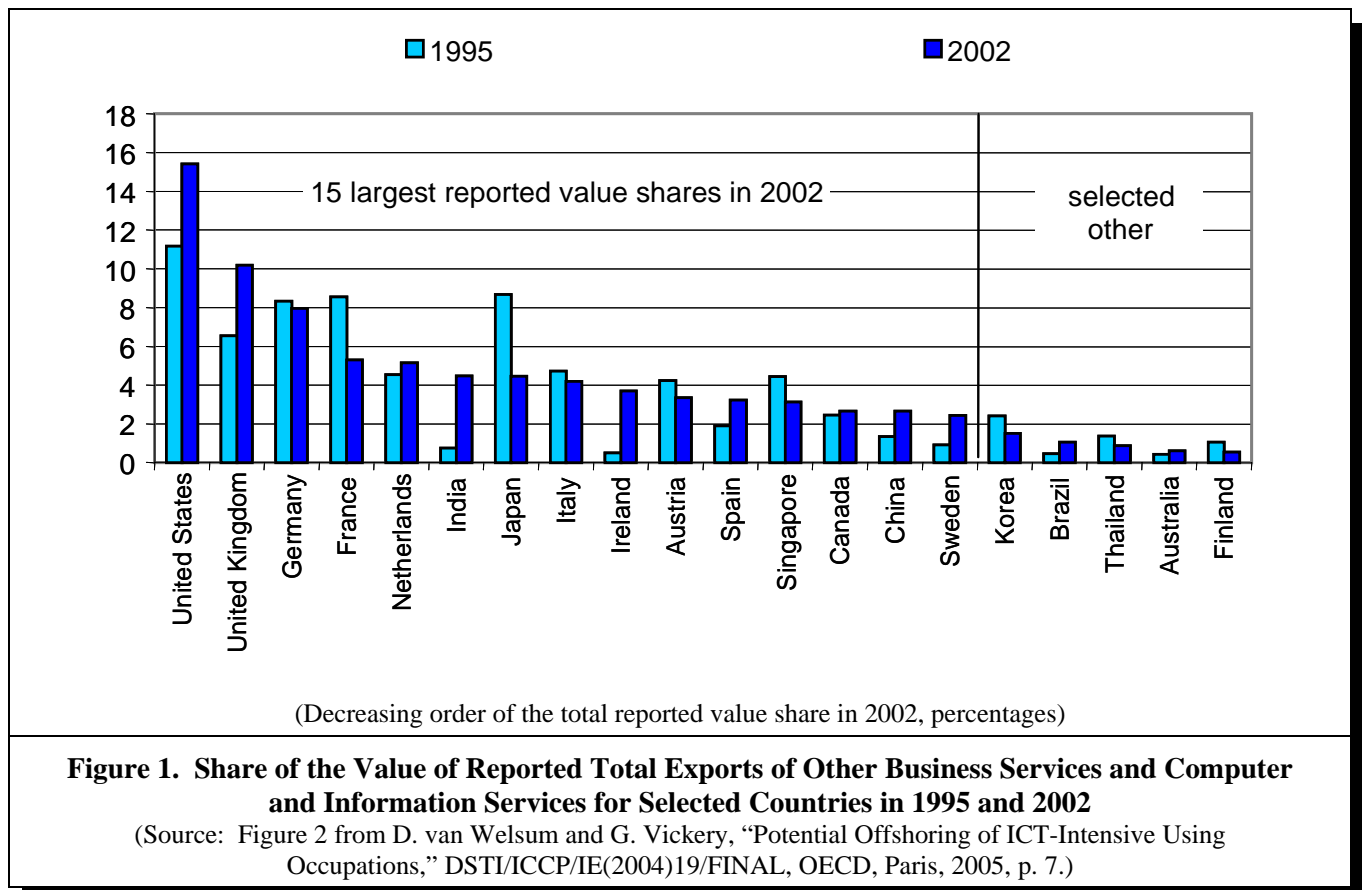
underlying the notion of offshoring and assess what the IS discipline can or should do to respond to the offshoring challenge. Hopefully, this paper can start a discussion as well as offering some critical reflection on the challenges facing our discipline. We start by presenting some evidence that attempts to unravel the extent of offshoring.

Offshoring: A Phenomenon Hard to Measure

While offshoring is a hot topic in the media, in business schools and especially in IS departments, there is no clear measurement data of the phenomenon. To date, most evidence of offshoring is anecdotal and there are no official statistics measuring the extent of offshoring. This is complicated by important definitional and measurement problems. In the absence of official statistics on offshoring, it is necessary to look at indirect measures, such as trade in services and employment data. However, even such official indirect statistics are difficult to interpret and in many cases imperfect.

The current media focus is on the offshoring of jobs, but in- and outsourcing can also take place domestically, and domestic outsourcing is still very much larger than global outsourcing. Furthermore, offshoring and outsourcing have existed for many years in the manufacturing sector but are now increasingly taking place in the services sector as a result of increased tradability of services, resulting from trade liberalization and rapid technological developments, especially in IT, and the ability to codify and standardize routine IT services tasks. As a result, the production of many service activities becomes increasingly location independent.

An additional complication that affects the measures of the impact of offshoring is determining "when outsourcing stops being outsourcing" (i.e., when does it become just another intermediate purchase). No official data measures the extent of the offshoring and outsourcing phenomenon directly. *Trade* in services provides one possible proxy; other possibilities include *employment* data and a *skilled-based* approach.


(Decreasing order of the total reported value share in 2002, percentages)

Figure 1. Share of the Value of Reported Total Exports of Other Business Services and Computer and Information Services for Selected Countries in 1995 and 2002
(Source: Figure 2 from D. van Welsum and G. Vickery, "Potential Offshoring of ICT-Intensive Using Occupations," DSTI/ICCP/IE(2004)19/FINAL, OECD, Paris, 2005, p. 7.)

Measuring Offshoring via Trade Data

Using *trade data* means looking at countries' imports of services. If a country sources services activities internationally, this should result in a return flow of imports of services. Offshoring of services activities should result in a return flow of exports of services from the country receiving the international sourcing. The extent of international trade in IT and IT-enabled business process services (Figures 1 and 2) in international statistics is approximated by summing the IMF Balance of Payments categories "computer and information services" and "other business services."

However, data on computer and information services is not available for all countries. Moreover, the data are reported in current USD and will be affected by currency movements. Neither is it possible to tell what share of the exports results from international sourcing activities.

Some of the problems arise from trade data reporting difficulties, collection methods (company surveys rather than customs records), varying timelines of implementing Balance of Payments (BPM5) methodology and rules, the treatment of certain services categories, and the complexity of the structures and operations of multinational firms (OECD 2004b).

The reported total for all countries (see Figure 1) does not necessarily correspond to a world total. For some countries, such as India, it is not possible to break down the data to isolate other business services and computer and information services. As a consequence, for India, the category includes total services minus travel, transport, and government services (i.e., including construction, insurance, and financial services as well as other business services and computer and information services).
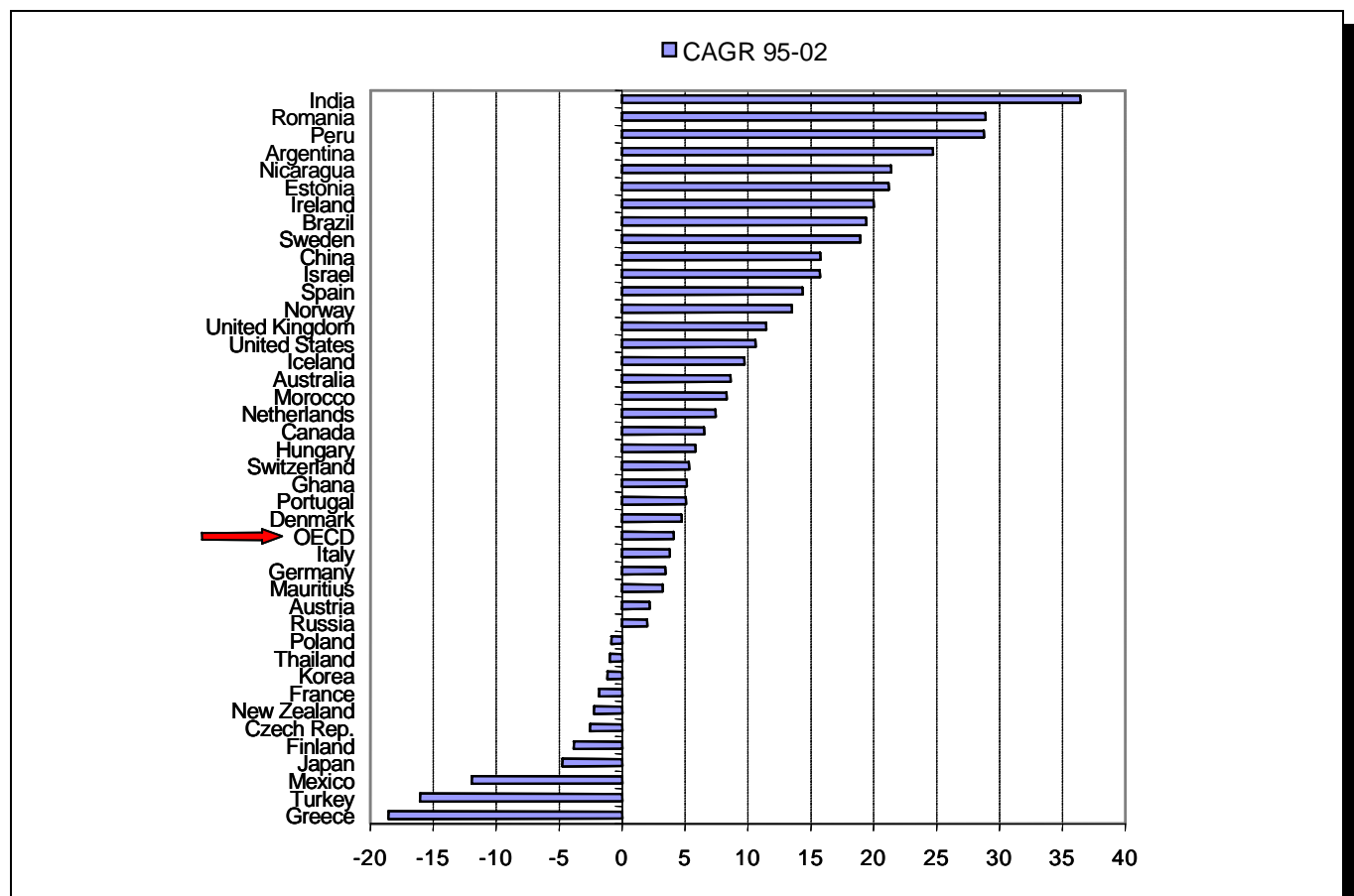
Figure 2. Growth of the Value of Exports of Other Business Services and Computer and Information Services for Selected Countries, 1995-2002

(Source: Figure 3 (Source: Figure 2 from D. van Welsum and G. Vickery, "Potential Offshoring of ICT-Intensive Using Occupations," DSTI/ICCP/IE(2004)19/FINAL, OECD, Paris, 2005, p. 8.)

Table 1. U.S. Projected Job Losses in Perspective (Source: Table 3 from (Source: Figure 2 from D. van Welsum and G. Vickery, "Potential Offshoring of ICT-Intensive Using Occupations," DSTI/ICCP/IE(2004)19/FINAL, OECD, Paris, 2005, p. 10.)		
Total Number of Jobs in the U.S. Economy: 140 million		
Jobs lost to date 300,000 – 995,000	*Projected job losses* 3.3 – 6 million	*Jobs at Risk* 14.1 million
Goldman Sachs: 300,000 – 500,000	Forrester Research: 3.3 million over 15 years[a]	U.C. Berkeley: 14.1 million
Business Week: 400,000 – 500,000	Goldman Sachs: 6 million over 10 years	
Economy.com: 995,000		

[a] Of these, 473,000 are expected to be in the IT sector.

Measuring Offshoring via Employment Data

Using *employment data* means looking at a country's increase/decrease of jobs. Table 1 outlines some of the figures covering impact on employment published by the media, investment banks, IT consultants, and universities. The large differences in the numbers given by different sources illustrate the difficulty of measuring the international sourcing phenomenon as well as its impact.

To put these numbers into perspective, according to the OECD some 15 million jobs disappear in the U.S. economy each year, with slightly more being created on average. While most other OECD economies experience relatively lower churning rates than the United States, it is still the case that even the largest projections of jobs "lost" to offshoring are still small in comparison to annual churning, and most job terminations are not related to offshoring (OECD 2004a).

Even though many IT jobs are being affected by offshoring, the occupational projections from the U.S. Bureau of Labor Statistics (BLS) show an increase in the number of U.S. IT professionals for the period 2002 to 2012, although their 10-year estimates have been revised downward from 2 years previously (see Figure 3). Other occupations that use IT intensively are projected to decline. While part of this decline may be the result of international sourcing, some occupations are likely to disappear anyway as they will increasingly become digitized and/or automated.

Measuring Offshoring via a Skilled-Based Approach

Another measuring approach consists of defining *IT-skilled employment* (those who use IT intensively in order to do their own work, both basic and advanced users, plus IT specialists), to calculate the share of such employment in total employment and distributing these across all sectors of the economy. The OECD carried out such an analysis for Europe, the United States, Australia, Canada, Japan, and Korea. No effort was made to harmonize occupational classifications across countries, but the same rationale and logic were applied to the individual countries' data (OECD 2004b; van Welsum and Vickery 2004).

According to that analysis, many services sectors, as well as certain manufacturing sectors, have a high percentage of IT-skilled employment, and this is true across countries. There are also some differences. For example, while wholesale trade is found to have a high share of IT-skilled employment in most countries, the results differ for retail trade, which is found to have a relatively lower share of IT-skilled employment for the EU15 than certain retail sectors in the United States.

As many of the jobs that are potentially "offshorable" will be intensive users of IT, the IT-skilled employment approach can provide some useful initial insights and can subsequently be adapted for more in-depth analysis. The results from the IT-skilled employment approach indicate that, overall, less than 5 percent of total employment is classified as IT specialists, and between 20 and 25 percent as broadly IT-skilled intensive users (Figure 5). However, as this broad number includes the IT specialists group which, in turn, includes occupations such as cable layers, the category that can be defined as potentially offshorable might be expected to be somewhat lower. While this preliminary analysis suggests that around 20 percent of total employment may be affected by offshoring, with most of these being clustered in the services sector such as financial and insurance services and computer and information services, this does not mean that these jobs will actually move but merely that they could potentially move.
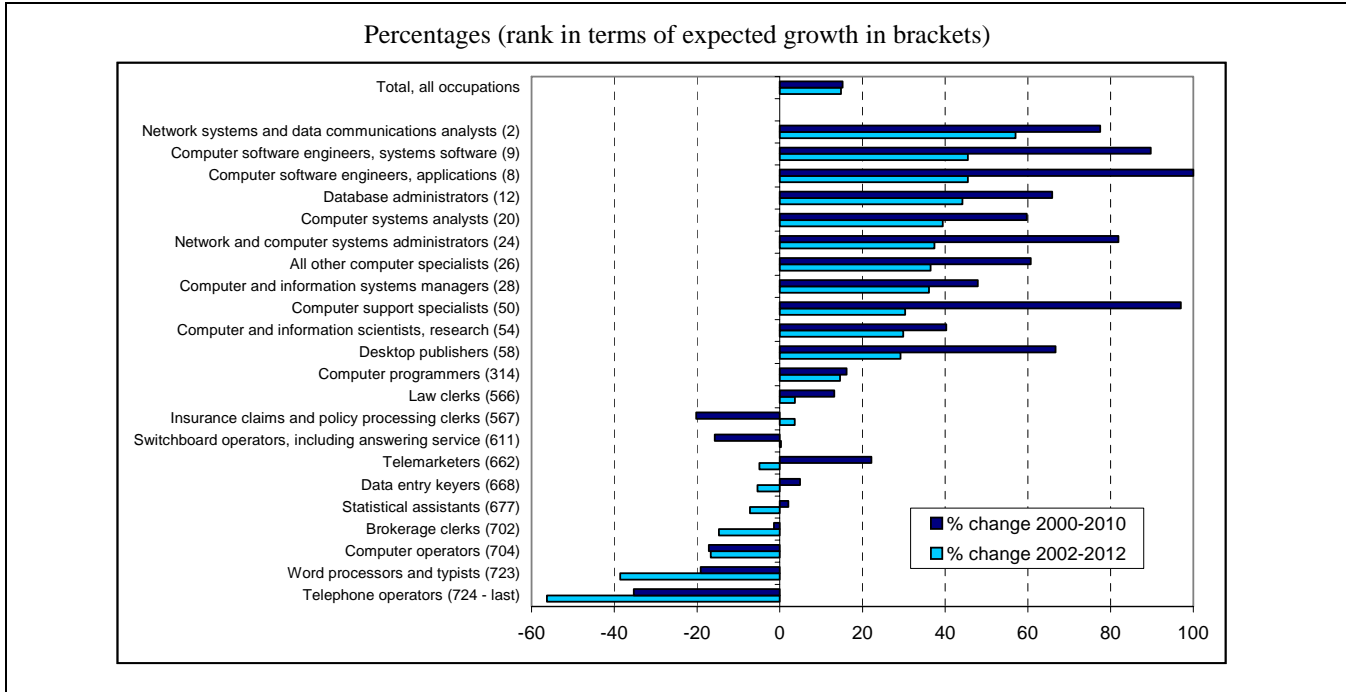
**Figure 3. Comparison of U.S. Bureau of Labor Statistics Occupational Employment Projections
for the U.S. 2000-2010 and 2002-2012, Selected Occupations**
(Source: Figure 4 from D. van Welsum and V. Vickery, "Potential Offshoring and ICT-Intensive
Using Occupations," Interim Report, OECD, Paris, 2005, p. 11)
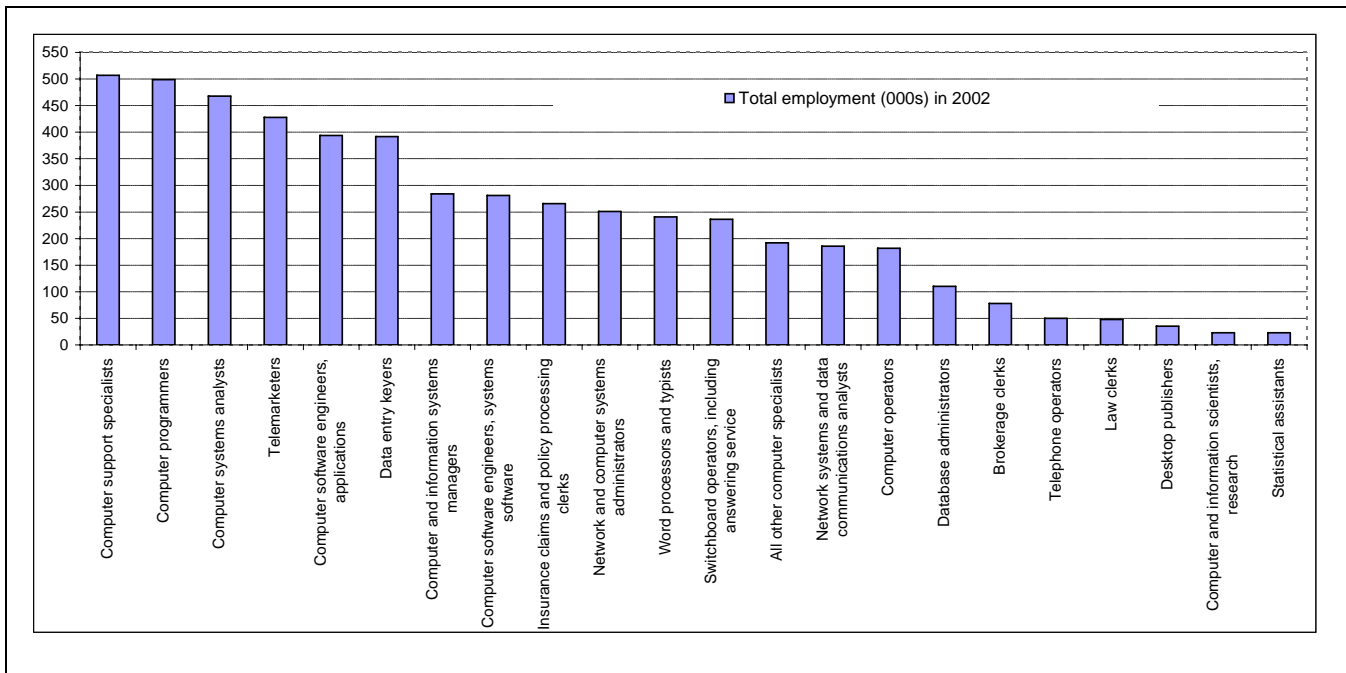
Figure 4. Employment in Selected Occupations in the U.S. in 2002
(Source: Figure 5 (Source: Figure 2 from D. van Welsum and G. Vickery, "Potential Offshoring of ICT-Intensive Using
Occupations," DSTI/ICCP/IE(2004)19/FINAL, OECD, Paris, 2005, p. 11.)
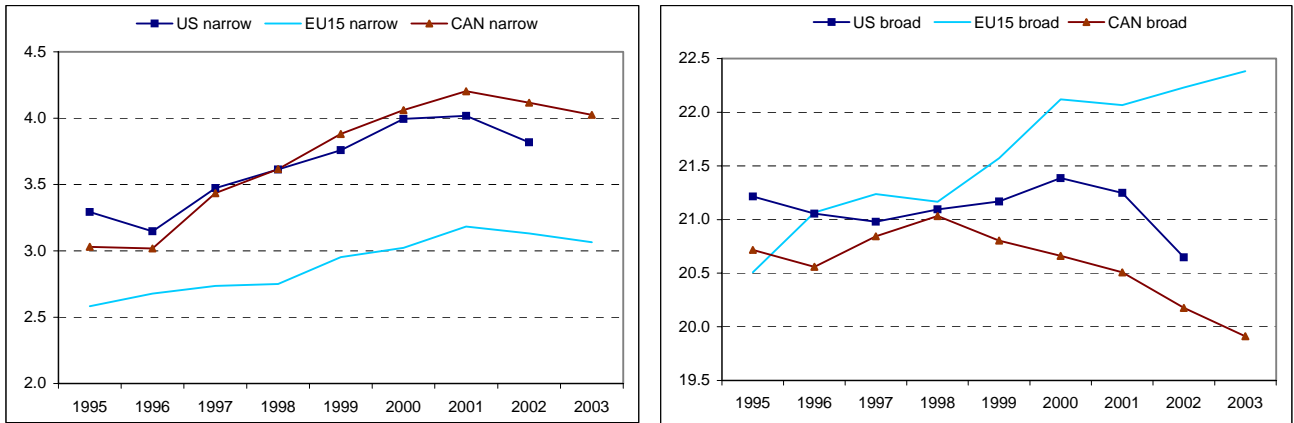
**Figure 5. The Share of IT-Skilled Employment in Total Employment for IT Specialists
and IT (Intensive) Users: U.S., EU15, and Canada, 1995-2003[a]**
(Source: Figure 1 from D. van Welsum and G. Vickery, "New Perspectives on ICT Skills and
Employment," DSTI/ICCP/IE(2004)10FINAL, OECD, Paris, 2005, p. 8.)

[a]The data include estimates where a full data set was not available. Due to classification changes, the number for the
United States in 2003 has not yet been included.

Additionally, it may be informative to look at the U.S. Department of Labor statistics which predict the number of U.S. jobs likely
to be offshored by 2015 to be over 3.3 million with total annual wages lost to be $136.4 billion (see Figures 6 and 7 and Table 2).

In sum, attempts to measure the impact of offshoring using trade, employment and/or skilled-based data have been problematic.
Clearly one could selectively choose and interpret the data to "support" whatever position one takes on offshoring. But this should
not be used as a reason to not study offshoring. Indeed, we believe it still makes sense to conceptually analyze offshoring in an
attempt to understand its potential impacts on the IS discipline. We next look briefly at the countries at the forefront of IT
offshoring.
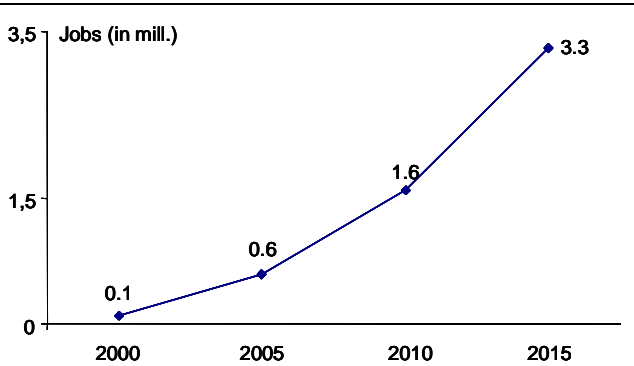
Figure 6. Number of U.S. Jobs Moving Offshore
(Source: U.S. Department of Labor)
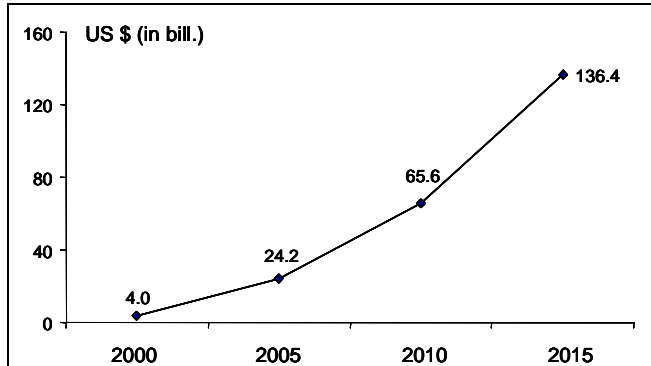
**Figure 7. Wages Associated with U.S. Jobs
Moving Offshore**
(Source: U.S. Department of Labor)

Table 2. Number of Jobs Moving Offshore by Job Category (Source: U.S. Department of Labor)			
	2000	**2005**	**2010**	**2015**
Management	0	37,477	117,835	288,281
Business	10,787	61,252	161,722	348,028
Computer	27,171	108,991	276,954	472,632
Architecture	3,498	32,302	83,237	184,347
Life Sciences	0	3,677	14,478	3,770
Legal	1,793	14,220	34,673	74,642
Art, Design	818	5,576	13,846	29,639
Sales	4,619	29,064	97,321	226,564
Office	53,987	295,034	791,034	1,659,310
Total	192,674	587,592	1,591,101	3,320,213

Software Development in Common Offshore Destinations

The success of India as an offshore location for a range of information technology services has encouraged other countries to enter the market and trade in their respective IT sectors (Sahey et al. 2003). These include the Philippines, China, Vietnam, Russia, and countries of the former Soviet Union. First tier countries, such as India, Ireland, and Israel, have reached relative maturity in the provision of offshore software services already.

India

India remains the unquestioned leader of Asian software development, registering average annual growth of more than 40 percent over recent years (Sahey et al. 2003). The first software products emerged from India in the mid-1970s but it was not until the 1980s when the software industry began to grow vigorously. The reasons for India emerging as a global venue for software services go beyond economic liberalization. A combination of English language skills, large numbers of skilled IT staff, and an excellent technical education system in the Indian institutes of technology (IIT), where selection and competition for places is fierce, mean that programmers are highly skilled and tend to be significantly cheaper than the United States. The English language is widely spoken and telecommunications have advanced rapidly over the last 10 years. The legal system is based on that of England and an IT law, passed in 2000, gives some reassurance that problems will be dealt with in an appropriate manner (although a recent and visible fraud case at an Indian call center has brought that into question somewhat (BBC News 2005)). A large number of Indian software companies are International Standards Organization (ISO) and Capability Maturity Model (CMM) accredited.

China

China represents a major emerging supplier of software services especially after entry to the World Trade Organization (Sahay et al. 2003). Development of China's software industry dates back to the 1980s and since the mid-1990s has expanded by an average of over 20 percent a year, higher than the global average. China's software industry grew by 30 percent in 1999 to $2.16 billion in revenue and the government plans to cultivate several large software companies. Predictions of growth of China's IT market are spectacular and China is perceived as a future threat to India in part due to the relatively advanced use of mobile phones and many more telephone connections. China has so far concentrated on the domestic market in contrast to India but Indian companies have started to take note of the development of the industry and potential future threat. For instance, India's TCS, Infosys, and Wipro, all major Indian software outsourcing companies, are considering or have already opened development centers on the Chinese mainland.

Some companies are already sourcing expertise from different countries beyond India and China. For instance Microsoft has offshore arrangements in India, Russia, and Israel. IBM's Javabeans project involved centers in Riga, Minsk, Beijing, Bangalore,

and North Carolina (Sahay et al. 2003). One North American manager with whom we spoke said that his strategy for business software applications would be to outsource them to Indian companies while scientific applications would be outsourced to Russia. He had also purchased Internet security applications from Israel and had back office data processing and call center processing done in the Philippines. According to Robinson and Kalakota (2004), the majority of the Fortune 500 firms are already engaged in sourcing software and services from India and other countries in outsourcing arrangements, joint ventures, and wholly owned subsidiaries.

Offshoring Barriers and Non-Barriers

Barriers to growth exist for global offshore outsourcing including relatively few English language speakers, lack of an understanding of Western business culture, and a poor reputation for intellectual property protection (tdctrade.com 2000).

Brainard and Litan (2004) point out that legal issues should be considered whenever and wherever global software outsourcing occurs. Accordingly, a central legal concern in global software outsourcing is intellectual property rights (IPR). On the one hand, outsourcing clients want to ensure that they retain ownership and control of their existing intellectual property and gain proper benefits in new software and any other new product to be created. On the other hand, outsourcing vendors will be concerned to protect their own IPR and will have an interest in being able to reuse code and other resources on other projects to save time and expense. Sahey et al. (2003) suggest that the customer should consider carefully how foreign law may affect the ownership of intellectual property. Clearly there are risks here for any outsourcing companies.

Opportunities also exist for Chinese firms in East Asian countries such as Japan, where Chinese programmers have the benefit of Japanese being taught as a second language in many schools. However, Chinese software companies have a vast domestic market on which to concentrate and so may not be as motivated as Indian companies to seek work abroad.

Another potential barrier is that of professionalization. If IS work—especially software development—was professionalized, it might impact the movement of IS work offshore. Although there is a growing commoditization of software (ERP, CRM, etc.), that is, systems that are purchased and implemented "out of the box," there is still high demand from business and governments for bespoke systems. Software production is still a high demand activity and this is expected to continue. But would IS professionalization change this?

The software development industry is not a true profession. This is a key point when trying to understand how software jobs are moved around the globe. Generally, there are no barriers to entry to the IT profession and, therefore, no monopoly of professional knowledge: it is a practitioner-based activity reliant on experience and expertise. Software standards (ISO, CMM) hint at professionalization but this is merely the way the software companies signal to the market that their products are of a high quality, not that individuals that make up those companies are part of a profession. Compare this with professions such as accountancy, medicine, and law, where there are major barriers to entry and self regulation is the norm (Newman and Westrup 2005).

Accountancy has often been held up as an archetypal example of a profession. Drawing on Larson's (1977) work, MacDonald (1995) identifies a professional project for accountancy that seeks to create a monopoly in the market for services based on their expertise and to obtain status in the social order. Thus, a profession needs to create arenas of jurisdiction, set out a means of producing appropriately qualified entrants to the profession, and create and maintain a monopolization of professional knowledge. However, although accounting may appear to have become a profession, it needs to maintain its position. In other words, it has to be active when it comes to new issues such as IT systems. As MacDonald comments "the condition of professional monopoly…is eternal vigilance" (p. 204). Expressed another way, a profession is a body with the authority given to it by the state, that controls and polices its area of expertise and, where appropriate, redraws its boundaries as needs develop over time.

Compare this to IS and software production and we see no comparable body authorized by the state that has a monopoly of knowledge and that can sanction entry. Software is a universal product that can be built anywhere in the world where IT and expertise reside. Combined with communication technology, we can see that (at least superficially) there are few barriers to offshoring activities.[1] So what does this mean for the discipline? Should it try to professionalize?

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[1]See Sahay et al. (2003) and Nicholson and Sahay (2001) for a discussion of cultural and other impediments to offshoring.

Offshoring and the Information Systems Discipline

While such discussions about offshoring are no doubt interesting, they do not immediately suggest what impact offshoring might have on the IS discipline. Indeed, few (but see Davis et al. 2004) seem to have given much consideration to what these implications for IS might be, especially given that the majority of the IS discipline has traditionally been housed in the West.

For example, is there the possibility that external stakeholders and influences could undermine the economic base on which IS research and teaching depends? What would these external influences look like and how would they affect the discipline? Would the locus of the discipline shift from the West to the East? And if so, would the research directions change?

Hirschheim and Klein (2003) present a modest discussion of these points, but left open the question of whether the inexorable drive toward outsourcing and offshoring of IT might erode the very *raison d'etre* of the discipline, at least in the West, and if so, how the discipline might evolve in light of the changes that offshore outsourcing might force upon the IS academic community. To this end, we offer some thoughts on to how IS might prosper by shifting from the focus from programming to "higher-level" activities such as business process modeling and IT enabling of business processes.

Offshoring and the Information Systems Discipline: Shifting from Programming to Modeling

Increasingly, academics and practitioners claim and forecast that the real business and skill requirements related to IT jobs have moved away from traditional programming jobs to modeling business processes and business events (e.g., Feldman 2005; Heuser 2005).

IT jobs lost to offshoring by Western countries are following the path taken by other industries, textile and automobile parts being perhaps the most relevant. For jobs to be moved form one location to another (an indispensable but not sufficient condition for offshoring), they have to be separable from the process of which they are a part. Complete production lines can be offshored, like textiles or shoes. Components with perfectly defined interfaces, like tires, seats, and even more complex auto parts, can also be offshored. Besides this separability, a condition of required proximity is also relevant. Some tasks, even if simple, need to be performed on the premises or workers need to maintain intimate contact with colleagues or clients. Figure 8 presents these characteristics in a two-dimension matrix.

Those jobs that do not require proximity and can be easily interfaced with the rest of the process, like programming or chip design, can be offshored independently of the value added by labor. Obviously, for this to happen, suitable providers have to be present in the producing country.

Figure 8. Proximity-Complexity Matrix

Wage differences have often been blamed for these job losses. By putting the blame solely on the wage differences, one excludes potential differences in education. In some IT areas (programming and the like), skilled people are at least equally competent and possibly superior in countries like India and China. In that case one could have an impact in the West by improving the education systems and preparing more precisely for the jobs that exist—wherever they reside.

The complexity of the task is not a convincing argument for preventing offshoring. With time, the most complex of jobs can potentially be outsourced from Western countries. Education in countries like India, China, or the Philippines might not be sufficient today to prepare for high-end, specialized, middle and top management modeling and modeling-related jobs, but this may not be true for long. The lack of proper education in the East may hold true for very few years, but why should they not be able to prepare their students for these tasks? A short time ago, we did not accept that it was possible with respect to programming and basic service jobs; but after the overseas staff learned system design and programming, they learned to be polite on the telephone in several languages, and they learned to operate and maintain our Western systems in our banks, insurance companies, and the like.

The modeling of business processes, being particular to each company, currently requires being geographically close to the process. But this requirement is challenged in two ways: (1) operations can be moved away from the West, taking with them the modeling jobs, or (2) technologies will evolve that will allow distributed teams (Majchrzak et al. 2000) to carry out jobs that today require closeness. We should have learned enough to see that strategic and very high-level activities can also be distributed around the globe. Many companies are already centralizing important parts of their support operations in a single center. It isn't clear what would prevent them from moving to a subsidiary or an external provider in India. In the model of Figure 8, the boundaries of what processes are subject to close geographic constraints are changed as IT evolves. This leads us to ask if these are the modeling skills Western companies are looking for in their recruits.

Offshoring and Information Systems Jobs: What Skills do Companies in the West Want

For the purpose of this paper, we informally interviewed 11 recruiters from specialized Western firms in consulting and systems integration, as well as several user companies like banking, construction, and education.

In semi-structured interviews, the recruiters were asked what skills they were hiring and if they perceived a change in the last few years due to offshoring. We tried to separate the effects of offshoring from the known and obvious "dot com crash" that together with the conclusion of projects related to the Y2K problem and the Euro conversion have shrunk the IT job market worldwide.

We found two clearly defined sets of answers: those from service providers, like software providers and system integrators, and those from companies that buy these services (the user group).

The user group stated that

- They have been outsourcing many tasks and services for a long time (at least in the larger companies), so the impact of offshoring was relatively imperceptible to them. They rely on the contract with the provider, and since most of the work is performed off-premises anyway, offshoring has little or no impact on their hiring.

- Companies that could be classified as SMEs consider that the potential savings by offshoring do not compensate for the increased coordination costs and the uncertainties for dealing with a provider that can not be "seen closely."

- There is a tendency to retain analysis tasks. Most of the user companies claimed that the complexity and company-specificity of the processes to be analyzed had increased to the point that it paid to have in-house experts, so these tasks would not be offshored.

The service provider group saw the impact of offshoring as

- Minimal for most low-level hardware and network maintenance jobs that require immediacy. The best-suited candidates for these jobs come from technical colleges.

- Resulting in less need of programmers and developers in the West. We interviewed two European recruiters from multinational companies with software factories in India. They confirmed the obvious impression that they are sending large amounts of well-defined work to these factories and, therefore, need fewer programmers at home.

- Coupled with the previous point, there is an increasing need for modeler-programmers that can go to a company, understand a process, and build a prototype (SAP, for example) in a few days, to be evolved into a production system. This is consistent with dynamic systems development methodologies that are less suitable to decompose into parts that can be sent to India.

- Increasingly, they are hiring project managers and coordinators, people with management skills able to follow the development of modules in different parts of the globe and paste them together in a coherent fashion. Command of the business lexicon and being able to relate easily with clients and managers in different countries is essential; being a technical expert is less relevant.

So what does this mean for IS education?

Offshoring and Information Systems Education

Information Systems Enrolment

Because of the public perception that many IT jobs have been offshored, student demand for IS education appears to be waning. Konrad (2005), for example, notes that recent computer science graduates aren't even looking for jobs in IT anymore since they believe that there are no IT jobs left in the United States. Worse, citing a recent Gartner Group report, she suggests that 15 percent of the IT workers will drop out of the profession by 2010, and that the world-wide demand for systems developers will shrink by 30 percent during the same period. This has led to a dramatic decline in enrolment in computer science and information systems programs in North America. In a survey of Ph.D.-granting computer science departments in the United States, the Computer Research Association found that the number of new undergraduate majors dropped 18 percent in 2003 (Frauenheim and Yamamoto 2004). Datz (2004) reported the drop in undergraduate computer science and computer engineering programs to be 23 percent from 2002 to 2003. More worrying was the recent report (Vegso 2005) on computer science numbers, which noted that the percentage of incoming undergraduate students in U.S. universities who indicated they would major in computer science declined by over 60 percent between 2000 and 2004, and is now approximately 70 percent lower than it was in its peak during the 1982 to 1983 time period. Similar declines have also been anecdotally noted in the IS field, resulting in a reduced demand for IS faculty (Frolick et al. 2005). Certainly, part of the decline in enrolment in these programs can be ascribed to media "sound bites," which seem to suggest that there will be no jobs left in the areas of computer science and information systems (Lopez 2004). However, in contrast to this, data from the Bureau of Labor Statistics indicates that the demand for IT workers will *exceed* the supply (Pollack 2004), requiring recruitment of workers from other countries—thus creating a potential and ironic self-fulfilling prophecy. This is exacerbated by the fact that good overseas students (from countries like India and China which in the past came to the United States to study and then stayed on) are increasingly staying away because of the post 9/11 immigration restrictions.

Information Systems Curriculum Issues

Currently, from the IS educator's standpoint, there is not much emphasis on changing educational programs due to offshoring. We believe the field needs to stress the importance of modeling activities but these demand substantial industry knowledge. Will it be appropriate to teach such modeling as an abstract subject? Can even the best IS professor have the process knowledge in any given industry that will be required? Will it be harder to learn the industry or company specific insights, or to learn the modeling approaches and techniques? How important are the specifics of each business in order to be able to perform adequate modeling?

The key question is, what in the IS education toolkit provides skills that the students cannot get either offshore or in other departments? If one considers the modeling of business processes to be critical, who is best qualified to teach this? Is the finance professor or the IS professor better suited to prepare the student for modeling a bank's processes? This leads us to suggest that the more customer-facing activities (e.g., business analysis) would act as a bridging function, one where IS educators would have an advantage. We will elaborate on this point next.

How Should the Information Systems Discipline Respond?

Perhaps the reason why most of the academic IS field seems unconcerned by offshoring has to do with fact that it is driven by the external (practitioner) community rather than the internal (academic) community and not driven by intellectual insights, but long-term economic trends.[2] If so, this would be consistent with traditional academic IS in that the academic field has historically paid little attention to the external community and its needs. However, there are challenges to this approach because our resources and future depend largely on these external communities. If we have no students and no demand for our product, what kind of discipline will we have?[3]

Our analysis so far shows that a great deal of IT knowledge is commoditized and there is no monopoly of such knowledge. So what does this mean for the discipline of IS? Even if the move toward the offshoring of IT work turns out to be inexorable, we do not see this as necessarily spelling the demise of the discipline (in the West), as long as the discipline evolves to take account of this new reality. The simple fact is the old world order where the key products and processes of the discipline (innovation, knowledge creation, knowledge dissemination, skill set development, etc.) are the sole province of the West is largely over. As IT jobs move East, countries like India and China are likely to become dominant IS forces in the future, both in teaching and presumably research. And if teaching has to take place where jobs are located, and research has historically been funded through the teaching of students, then India and China could lead the way in the future. This will no doubt create new sources of wealth for places like India, China, Vietnam, and the Philippines, and presumably lead to their overall economic, political, and social advancement.

If the IS field recognizes the fact that most coding, support, infrastructure and operations jobs will be offshored to the East,[4] there is still a key area where IS can prosper in the West, that is, in the IT enablement of organization/business processes or business process modeling as we noted earlier. These are the so-called customer-facing jobs. Indeed, it is hard to imagine, given the movement of coding and support jobs offshore, that this would not lead to even more emphasis being placed on getting the requirements right. After all, the offshore developers can only code the requirements they are given, which means that people with customer-facing skills (e.g., business analysts/process modelers) will be more critical than ever before. This appears to be a fruitful avenue on which IS academics in the West can focus as it might help differentiate Western IS from that which develops in the East, at least in the short term. In the longer term, there is no reason to believe this function might not also find its way to the East. To be sure, there are those who suggest there really is little if any difference in what IS students in the East and West study, and thus ultimately what functions and tasks they can and cannot perform. But at least in the short term, it appears that most organizations in the West will likely rely on local talent to undertake such IT process enablement.

Of course, this begs the question as to whether the notion of business process modeling is an overlooked IS core competence or whether other functional units couldn't also perform this function, as we noted earlier. To us, this is—or should be—an IS core competence. Consider that in the past, information systems development involved the studying of existing business processes, identifying new opportunities and/or restructuring the processes, and then building systems that would support the rationalized new business processes/model. In the past, the restructuring often turned out to be minor because of political and other reasons, which anchored the new system firmly to the old way of doing things. Many of the so-called business process reengineering exercises suffered this fate. The reengineering efforts simply did not accomplish the hoped for changes. However, this has begun to change, and in fairly dramatic fashion. One need only look at enterprise resource planning systems (ERP) and related approaches that have reversed the old systems development model. New software modules embracing industry best practices are implemented, allowing organizations to change their business processes. Usually both organizational process and structure

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[2]As a side point, the risk of offshoring has been present whenever labor costs have played a significant role in the total cost of a product or service. Especially in the manufacturing sector, offshoring is so widely applied that we have accepted it more or less as fact and no longer call it offshoring. The impact of these location changes in engineering studies has not brought havoc to western universities and departments.

[3]The same concern has been voiced in the rigor versus relevance debate that has received considerable attention (Benbasat and Zmud 1999; Davenport and Markus 1999; Hirschheim and Klein 2003, Keen 1991; Lee 1999; see also the March 2001 Special Issue on Relevancy of *Communications of the AIS*).

[4]Even if these jobs are outsourced/offshored, would it not still be necessary for students to have some knowledge of these areas so that they may interface with the vendors and manage these activities? How can one manage something that one knows little about? Indeed, it can be argued that students need more technology knowledge, not less. This also suggests that the key will be to instill an attitude and desire for life-long learning and to ensure that the discipline possesses the capability to support this. Technology and the need to teach technology skills are not going away. It is simply inconceivable to have a society in which technology skills are not valued or perceived as unnecessary.

redefinitions need to be prepared and then adopted for this alignment with best practices to take place. IS seems particularly well suited to perform this modeling function, since the field has studied information systems development (and its associated methods and tools) for decades and business process redesign is a logical extension of the earlier emphasis on methods of information requirements analysis, information systems design, and implementation. It seems logical for Western IS academics to focus their attention on this key core competence.

IS as a discipline will have to evolve. For the West, the focus could be primarily on process modeling and the IT enablement of these processes as well as the implementation of the system when it is complete. The actual coding and maintenance of the modules can be "commodified" and take place in the East. So what we see is a growing division of labor between the West and East, at least in the short term.[5] A yet to be determined issue is where will IS research be located? As much IS training moves to the East, presumably the growth of IS faculty in these countries will spur new research. This in turn is likely to reduce the funding base for IS research in the West to match its reduced faculty ranks. Not only have the organizations that have gone to offshore locations established their own research and development centers there (which often operate at higher quality assurance ratings than their centers in the home country; see Mohnot 2003), they have also sponsored research at leading educational institutions in these countries. For example, Intel is funding research at the Indian Institute of Technology in Chennai to discover appropriate applications and usage models for wireless Internet in rural environments. IBM's India Research Laboratory has set up a technology center at the Indian Institute of Technology in Delhi that focuses on advanced IT applications in the areas of bio-informatics, grid computing, and knowledge management. Similarly, the Indian Institute of Technology in Kharagpur is doing collaborative research with multinationals like Motorola, HP, Oracle, and GE Capital. The same is also happening in China, although they are not quite as far along (*Time* 2005).

Of course, as research moves from the West to the East, it might change its character. If so, how will such research fit with the research that remains in the West? If the differences between the research in the West and the East surpass the differences that exist between North American and European IS research, this is likely to fuel a new identity and legitimation debate. At this time, it is hard to know if and to what extent the IS issues studied in the East will be different from those considered core in the West, although there is some reason to believe it might not be as different as some think. For example, since a large number of IS researchers/academics in India have received their doctorates in the United States or Europe, the current wave of research that is going on in India appears to be in line with what is going on in the West as can be seen by the numerous international collaborations.[6] Another reason for the similarity of teaching and research interests could be the establishment of Association for Information Systems (AIS) divisions in Asia. It is clear that there is an increased participation by researchers from Indian institutions, such as the institutes of technology and management at AMCIS, ICIS, ECIS and IFIP TC8 events.

Last, but not least, is the issue of adjusting courses and degrees to the new realities. It could be of critical importance for Western universities to step up to the challenge and prepare their IS graduates for working in the new IT-enabled global economy both onshore and offshore (Ferguson 2004). This would be an environment that is clearly different from the one we have enjoyed until now, but nevertheless one the field could relish if it anticipates the likely changes and grasps the opportunities offered. Some IS academics have stepped up to the challenge and offered recommendations. King (2004), for instance, suggests that the IS curriculum should be revamped so as to focus on three core areas: software interfacing, contract management, and strategic technology assessment. Davis et al. (2004) contend that the IS curriculum should be revised to include offshoring management as a key component, and that new specializations should be added to the curriculum, that is, offshore infrastructure management, offshore systems development management, offshore operations management, and offshore outsourcing management. A number of IS faculty (e.g., Mary Lacity, Beena George among others) and institutions (such as University of Arizona and MIT) have developed outsourcing courses to help undergraduate and graduate business students understand the myriad issues surrounding outsourcing and offshoring.

Revising IS programs so as to be more attuned to the changing global nature of the discipline and the new realities of offshoring would make our students more relevant and employable, and could help reverse the trend of declining enrollments in the United States. Additionally, by preparing our students for the offshoring world, we would in effect be taking the lead. This might be something the field could build upon and use in teaching students from other disciplines about the nature of offshoring (which presumably will affect them in whatever business functional area they are majoring). In essence, just as IT outsourcing was the precursor to business process outsourcing, IT offshoring is the precursor to business process offshoring. The field has an

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[5]As was already suggested, however, there is no reason to believe that this can be sustained in the longer term as offshore companies move up the value chain and actually execute many of the activities on the value chain themselves. See also the discussion in Gopal et al. (2002).

[6]Of course the Indian diaspora no doubt has much to do with this fact.

ostensible "first mover" advantage upon which it can readily capitalize. We should capitalize on our early adopter status and apply our learning in other disciplines.

In addition, the AIS has taken a leadership role in helping to spearhead a change in IS education. Recognizing the need to promote courses that reflect the new social and technical trends in IS globally, the AIS sponsored a competition to recognize courses in the area of software development innovations and offshore outsourcing (Markus 2005). Such efforts, which recognize and encourage the creation of courses and changes in curricula, need to be applauded and extended.[7] Another role that AIS could play is in helping to establish virtual research centers, allowing researchers from countries like India and China to enter into collaborative ventures with their counterparts in the West. As an example, a number of IS colleagues in the West are in the process of setting up collaborative virtual outsourcing/offshoring research centers with some Indian and Australian colleagues. More of this sort of collaborative effort could prove highly useful for the discipline.

Conclusions

Offshoring is a relatively recent development in the globalization of the IT sector but is nothing new in the manufacturing sector. It has arisen in response to the need to cut costs and fill skills shortages, and competition has created a self-reinforcing dynamic. Once a few firms shifted to lower-cost locations and moved the cost/quality frontier, others had to follow. How long this dynamic will be maintained will depend on the availability of skills and relative wage advantage as well as other costs. As activities are being moved offshore, relative wages will adjust and potentially slow down the offshoring process. The extent to which activities can be moved offshore will also depend on the supply of skilled labor overseas, as well as the potential for undertaking service activities at a distance.

We believe there are six offshoring scenarios, some of which are more likely than others.

- *Intensification of offshoring and the widening of offshoring activities to include other digital services* (e.g., accounting, medicine, tax). This is very likely in the short to medium term. As elements of professional knowledge are codified and digitized, these too will be vulnerable to offshoring as Western corporations seek to lower labor costs and find alternative sources of labor. Core professional knowledge will become a contested area.

- *Professionalization of IT work in the West*. This would raise barriers to entry and would require sanctioning by the state. This we see as very unlikely and would be too late anyway. Major restructuring would be needed along with alliances between governments. We see some local attempts at professionalization in societies like the British Computer Society, but their impact is very limited.

- *Government intervention/union demands for protectionism*. This seems less likely in the United States but possible in Western Europe. If it occurs, we think it is more likely to occur in the medium term. Unionization of IT workers in the West is patchy at best and nonexistent in the East. In the UK, there have been recent calls from labor unions for the government to act over the hemorrhaging of call-center jobs to India, for example, but little has been changed as a consequence.

- *Wages offshore rise and are, at the margin, noncompetitive*. Offshoring becomes a marginal activity. This is probably unlikely in the short to medium term. If it did happen, there will probably be a substitution effect: as one supplying country becomes uncompetitive, another will advance to fill the space.

- *Shortages of IT personnel arise in the West caused by a lack of enrollment in Western IT educational programs*. If, as predicted, there will be a shortage of IT staff in the West in the medium term, we could be in the ironic position where corporations have to recruit large numbers of staff from India and China to fill vacancies.

- *Major incidents (IPR scandals, fraud, crises) occur in large offshoring ventures, causing alarm and curtailing offshoring activities until a balance ensues*. Incidents like these are likely, but may not have major effects if the economics continue to be favorable. More likely to occur is a realistic appraisal by Western corporations of the wider costs of offshoring (cultural

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[7]In the case of offshore outsourcing, Beena George's course syllabus, from the University of St. Thomas, won the 2004 Award for Excellence in Innovation in Information Systems Education granted by AIS (**http://www.aisnet.org/award/awards.asp**).

and communication issues, for example). A broader cost-benefit appraisal may tip the balance against offshoring or offshoring may become a selective, cherry picking activity. This we think is a more likely scenario.

Regardless of which of theses scenarios or combination of them becomes reality, from the IS discipline perspective, the field has to come to grips with the fact that offshoring is not a passing fad and that this has significant implications for the discipline. Many of the entry level jobs our IS graduates used to get are gone, and are unlikely to return. Our own research and a recent CIO article (Pastore 2005) suggest that most non-IT companies simply are not hiring any entry level IS staff. If they do hire staff, they are hiring people with 5 plus years experience whom they hire away from IT consulting firms. Corporations that are hiring IS students want them to be more business analysts/modelers and not programmers. We need to prepare our IS graduates for these customer-facing jobs. These jobs require individuals with people skills, knowledge of the business, and ability to help organizations find and refine business processes that IT will enable. This puts project management skills front and center. IT staff will have to be able to manage projects involving business unit employees, IT staff from the business unit, staff from corporate IT, consultants, short and long term contractors, domestic outsourcing vendors, offshore outsourcing vendors, IT vendor sales people, and others too numerous to mention. The people skills they will need are broader than simply communication and negotiation skills; they will involve understanding the different cultures, value systems, and goals of this vast array of team members. Our curricula will have to change to meet this challenging environment. Welcome to the challenge!

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