

Offshore Systems Development: Factors Affecting Success

ABSTRACT

Today many companies contract with external vendors to perform systems development. One aspect of systems development contracting that has received particular attention of late is the use of companies based in foreign countries, particularly India. Proponents point to reduced costs as one of the primary benefits of this arrangement. However, little empirical evidence exists to indicate that offshore contracting delivers the expected value in terms of overall cost reductions. In addition to direct costs of the project, companies typically fail to consider other costs, both tangible and intangible, when investigating offshore outsourcing. These unanticipated costs may include transition costs, time and effort managing the vendor, legal and liability issues, lock-in, and personnel costs. While these costs may also exist in a domestic outsourcing arrangement, it is believed that these factors become more acute when encountered in the offshore arena. The purpose of this research is to investigate these factors and propose potential solutions to some of the issues encountered by companies faced with the prospect of offshoring systems development.

Keywords: Systems Development, Offshore Outsourcing

Introduction

In a competitive marketplace, companies will seek to reduce costs to better their competitive footing. One of the most costly areas to maintain in today's corporations is the Information Technology (IT) function (Barthelemy, 2001), a significant portion of which is systems development. With this in mind, companies may contract this function to another company in order to reduce costs. Outsourcing this function can tap strengths of the vendor that derive from large operations not possible for the single corporation.

Because the primary business of most vendors tend to be in areas other than system development, they can use more powerful equipment, leveraging their knowledge of trends and industry best practices, and furnish expertise in particular software and systems areas at a scale that benefits their client companies (Domberger et al., 2000). Vendors are able to achieve economies of scale allowing them to spread the costs of their hardware investment over numerous clients. This arrangement enables the client to utilize knowledge workers to perform a specific task outside of its main revenue generating function, allowing it to focus on their core competencies.¹

An additional option for organizations is international outsourcing, commonly called "offshoring." International outsourcing has been ongoing for over thirty years (Chandrasekaran and Ensing, 2004). Tata Consultancy Services (TCS) pioneered the India-based offshore development concept in the early 1970s with such client companies as General Electric, American Express, and Prudential Insurance. TCS' efforts lead the way for a burgeoning offshore systems development industry. Moreover, successes across companies in the financial services industry have allowed this model to gain wider acceptance within the U.S., with most global systems integrators having established development centers in India. In fact, India's offshoring sector is the world's largest and fastest growing and is dominated by IT services. Between 2007 and 2008, the number of people employed in the offshore systems development industry is expected to be between 1.45 and 1.55 million employees and account for 7 percent of India's GDP (Farrell et al., 2005).

¹ Throughout this paper, the company performing the outsourced work will be referred to as the vendor, whereas the U.S. domestic corporation offshoring the systems development activities will be referred to as the client or customer.

Unfortunately, for a number of reasons this model does not always generate the anticipated cost savings (Hirschheim and Lacity, 2000; Scheier, 1997). Reasons include transition costs, time and effort managing the vendor, legal and liability issues, and cultural issues, which may have a greater impact in an offshore arrangement.

With all of the above factors in mind, we will investigate many of the factors that can lead to increased overall costs of offshore systems development projects. Further, we propose potential methods of mitigating these cost challenges.

Factors Affecting the Costs of Offshoring

In addition to the explicit costs incurred by outsourcing a corporate function, additional costs exist that may not be considered prior to entering the engagement. These costs include transitioning operations and knowledge to the vendor, vendor management, legal and liability costs with a third party, lock-in, employee loss of confidence, cultural adaptation, and the quality of offshore personnel. Companies may encounter more challenges with these issues by offshoring this function. There are also factors that mitigate the costs of outsourcing, including access to required skill sets and organizational flexibility. These factors can mitigate costs irrespective of the location of the outsourced vendor. These are detailed in Figure 1.

While conventional wisdom indicates the cost of having systems development performed offshore is less expensive than domestically produced software, we suggest that these indirect costs may negate the financial benefit expected by contracting with the low-cost vendor. We begin by considering the explicit cost savings expected when companies offshore systems development activities, and continue by examining the additional costs mentioned previously. Finally, we discuss steps that may mitigate the costs of managing this function.



Figure 1: Cost of Offshore Systems Technology (COST) Model

Anticipated Cost Savings

One of the primary drivers of the offshoring of system development activities is cost savings (Ang and Cummings, 1997; Ang and Straub, 1998; Casale, 2001; Gopal et al., 2002; Loh and Venkatraman, 1992a, 1992b; Slaughter and Ang, 1996). In a survey of 252 corporate IT Managers in the United States, 44 percent identified cost savings as the primary reason most global companies outsource IT needs beyond their domestic borders (King 2003b). Moreover, software vendors in India operate at approximately the same margins and cost (Gopal et al., 2003). The main difference between domestic workers and those employed by offshore vendors is salary (King 2003a). For every \$100 spent on IT workers in the United States, approximately \$30 is spent on employees in Bangalore, India. Further, offshore vendors benefit from consolidating their infrastructure in their home environment and from favorable government policies, including tax subsidies and access to skilled manpower (Gopal et al., 2002). The support provided by India's well-established infrastructure leads to low start-up and operating costs (Nair and Prasad, 2004). With the cost structure of Indian vendors placing them on a similar competitive footing, factors such as past performance and reputation differentiate their services from one another (Banerjee and Duflo, 2000).

As previously indicated, the expected cost benefits of offshoring have not always materialized (Hirschheim and Lacity, 2000; Scheier, 1997) and the risks introduced by offshoring are often significant (Aubert et al., 1998, 1999; Earl, 1996). One study (Lacity and Willcocks, 1998) found that only 56 percent of offshore agreements realized the expected cost savings. A Gartner Dataquest Report indicated that about one in every three outsourcing contracts targeting cost reductions failed to meet expectations (Caldwell, 2002a, 2002b). While the literature indicates that the primary reason companies choose to have systems development work performed offshore is lower cost (Ang and Cummings, 1997; Ang and Straub, 1998; Casale, 2001; Gopal et al., 2002; Loh and Venkatraman, 1992a, 1992b; Slaughter and Ang, 1996), additional intangible costs cause this proposition to fall even further short of expectations. These include costs of transitioning to the vendor, transitioning from the vendor after outsourcing, and the costs of managing the vendor. Additionally, intangible costs such as legal and liability issues, client lockin, employee loss of confidence, cultural adaptation, and the quality of offshore personnel are difficult to quantify yet represent further corporate resources devoted to systems development.

Transition and Management Costs

Research by Scheier (1996) indicates that many companies enter into an outsourcing arrangement believing they understood all major costs. However, few businesses had considered the costs of transitioning to a new vendor. They further learned that these costs were not negligible – in some cases halving or canceling out the potential savings from outsourcing. One estimate identifies transition and management costs to be as much as 5- 7% of the value of an outsourcing contract. In some instances these additional costs make the benefit to the client vanish altogether (Scheier, 1996). Examples of transition costs would include: costs to maintain the internal staff while the vendor learns the system, staff effort spent assisting the vendor, disruption to the business caused with mentoring the vendor, and the vendor's inability to respond as quickly and appropriately as the internal staff. Ultimately, the more specific or complex the activity being outsourced, the more expensive will be transition costs (Barthelemy, 2001).

Legal and Liability Issues

When organizations choose to outsource positions, they need to be aware of the legal ramifications, their ability to control and monitor performance, and the impact on workplace attitudes. In a permanent work arrangement, the employer is liable to third parties for the employee's negligence and the employees are responsible to their employers and have a duty to protect trade secrets and confidential information (Arnett and Litecky, 1994). In the absence of an employment agreement, as may be the case with offshore workers, companies must take extra precautions to ensure that their information is handled in an appropriate manner by contractworkers. These pitfalls may be handled by non-disclosure agreements (NDAs) or other methods to ensure that proprietary information learned by the consultants is used only to benefit the organization, and not their competitors. When both the client and vendor are headquartered in the U.S., legal jurisdiction is easily determined. Dealing with foreign companies introduces potential legal pitfalls.

Additionally, there is the risk of nationalization by the foreign country. Storing corporate or customer data in a foreign country may be necessary for appropriate system development by the offshored vendor. Countries providing host to companies performing offshore systems development may not be as stable as the domestic government. In these instances, there may exist a risk of nationalization of assets by the host offshore country. In this instance, the knowledge capital of the customer has immediately become coopted and placed at risk. In terms of company plans and data this is significant, considering this in terms of customer data that is no longer controlled by the company to whom it has been entrusted, this becomes severe.

Vendor Contract

The actual benefits of outsourcing to a foreign vendor will depend on the ability of the organization to determine the consistency between its needs and the competencies available in the marketplace, selecting the appropriate vendor

and successfully managing the relationship, and the vendor's competencies and their complementariness to the client (Levina and Ross, 2003). In fact, it is these vendor competencies on which the client should focus to assist it in making the appropriate vendor selection. Additionally, effective outsourcing appears to require that the vendors have some freedom to apply these competencies. In other words, clients must carefully negotiate the service level agreement, but then give the vendor control over how the contract is fulfilled (Bendor-Samuel, 2002).

The type of contract arrangement chosen may also impact how the contract is fulfilled. Typically, one of two contractual methods are used in the IT services field: fixed price and time-and-materials. A fixed price arrangement includes a fixed fee for development of the software, negotiated before the start of the project (Gopal et al., 2003). Under a fixed-price contract, a major portion of the development risk is borne by the vendor. Under a time-and-materials contract, the vendor contracts out services at a certain rate. The client is responsible for monitoring progress on the project, and bears the cost of over-runs. In either arrangement, the best interest of both parties is served by shifting the risk burden to the other party for performance of the project.

The existing relationship between the vendor and the client may impact the type of arrangement negotiated, as well as the agreement (Gopal et al., 2003). As most Indian vendors are financially smaller than their clients, they bear a significant burden from a cancelled contract. As such, clients may use their bargaining power to negotiate a fixed-price contract, thereby removing the risk of a mispriced contract from their budget. On the other hand, vendors will prefer a time-and-materials engagement, ensuring that they receive payment for all efforts expended on the project. As a moderating factor, vendors may have an incentive to accept a fixed-price project, as more experienced clients are potential repeat customers. Uncertainties difficult to quantify in early contracts emerge with more clarity in future contracts, thereby reducing the risk of an underbid project.

Client Lock-In

The contract ultimately implemented depends on the relative bargaining power of the two parties. The number of prior projects successfully completed by the vendor increases its bargaining power and can lead to a lock-in effect.

Lock-in refers to a situation wherein a client cannot get out of a relationship except by incurring a loss (Aubert et al., 1998). Once locked in, the vendor may renege on service levels because the client cannot easily turn to another vendor. Alternatively, service debasement or cost escalation may occur. In the first instance, the client has to step in and perform some of the operations that should normally be conducted by the supplier, hence incurring direct costs. In the second instance, if the vendor is faced with increasing costs, the decision may be made to decrease the service level (Bahli and Rivard, 2003). Both of these instances cause additional costs to be incurred by the client, either directly or indirectly.

To counter this, organizations may employ a multi-vendor strategy (Porter, 1985). With this approach, the organization uses several competing vendors to ensure low-costs, high performance levels and acceptable service quality. Moreover, the ever present threat of losing business to the other supplier will induce the vendor to provide a higher level of performance and quality (Ngwenyama and Bryson, 1999). Additionally, larger clients are able to use multiple vendors simultaneously on different projects, allowing these vendors to concurrently develop competencies within the organization and make it easier to switch between vendors should an issue arise. By utilizing multiple vendors in the same organizational environment, they will develop environmental knowledge that can be more readily applied to a different project within the same organization.

The economies of scale required to compete in the offshore systems development environment is significant and as such leads to few players in this industry. Those that are able to successfully compete in this context are large. For example, the well-known players in the offshore systems development industry are Tata, WiPro, InfoSys, and Syntel with annual revenues of \$4.3 billion, \$3.5 billion, \$3.1 billion, and \$270 million, respectively. In this environment, it becomes difficult to employ a multi-vendor strategy with a small pool of available companies.

Institutional System Knowledge and Employee Loss of Confidence

A major concern among companies is what to do with the displaced staff, or possibly even losing those team members with significant organizational knowledge (Domberger, 1998), especially during critical knowledge

transfer periods. Permanent employees represent one of the most vital resources to the organization. Their organizational and system knowledge may be difficult, if not impossible, to replace. During any type of transition, it is important to allocate appropriate time to allow the institutional knowledge held by the organization's workers to be transferred to the vendor, and allow them to be as productive as possible. However, institutional knowledge gained over many years of work is difficult to transition in a short period of time. In these instances, the vendor is required to "relearn" the system in order to be productive. For example, analysts and developers with many years of experience supporting a system understand the history behind the system, process flows, data flows, and how the system interacts with other systems around it. This knowledge is rarely well documented yet is stored as "institutional knowledge" by the staff. Knowledge that has been acquired over years of experience becomes difficult to effectively and fully transition over a period of weeks or months to a new vendor. This represents one of the potential disadvantages of "re-staffing" IS activities. This situation becomes more acute considering additional difficulties in transitioning work to offshore locations.

There may also be a loss of confidence experienced by Full Time Employees (FTEs) in the organization by the presence of contract workers (Slaughter and Ang, 1996). Loss of confidence may be due to the expanded job descriptions placed upon permanent workers by management and the sense of inequity they feel. These feelings may increase as the presence of contract workers creates a higher intention to displace FTEs. As the turnover rate increases, organizations may rely more on the contract workers to fill the void. This situation may lead to a significant exodus of knowledge from the organization and lowered productivity.

This knowledge drain may impact future development efforts as the lack of organizational legacy knowledge may impede future development efforts. In this instance, the vendor would be required to "relearn" the systems they will be enhancing or developing. This would have a detrimental effect on the efficiency and effectiveness of the organization, as extra time must be devoted to bringing the vendor up to speed.

Cultural Adaptation

The research of Krishna, Suhay and Walsham (2004) demonstrates that particular societies tend to have distinct ways of working that can prove problematic when attempting cross-border collaboration. Numerous detailed accounts of such problems have been published (Matloff, 2004). For example, even though English is the official language of India, many professionals do not speak it well enough to interact with U.S. clients and personnel (Farrell et al., 2005). In fact, even HR managers in software and IT Services firms rank language difficulties as one of the top three handicaps of job applicants. This becomes especially prolific during critical project periods such as Requirements Gathering, or Design and Architecture. Any items missed in the communication process early on can have a devastating effect later in the project.

Additionally, thought and behavior patterns that are commonplace in the local environment of the vendor may be quite alien and incomprehensible to the client companies (King 2003). These cultural differences affect the way that individuals interact with supervisors, perceive the importance of group harmony, respond to gender issues, and handle quality-of-life concerns. The client managers in charge of offshore projects must learn to adapt their managerial style to incorporate these cultural variations, in effect requiring the client to change to suit the vendor

Offshore Personnel

One of the challenges faced by companies looking overseas for development resources may be a lack of adequately trained professionals. Nidomolu and Goodman (1993) state that a lack of trained software engineers is a major problem for most software companies, and this is particularly so in the Indian context. This lack of trained personnel may lead to companies using less experienced personnel, hoping to mentor them with more experienced professionals. This leads to the current Indian business model - to staff projects with young, inexperienced programmers in order to minimize costs, with the requisite quality penalty. These are examples of issues that may not be readily apparent to the client, but become dangerously apparent as the project progresses, or falls behind target.

The quality of programmers or project personnel has been shown to have a positive effect on project performance (Gopal et al., 2003). This question was also studied by Krishnan, et al. (2000) and Guinan (1998), who determined that the quality of programmers or project personnel has a positive effect on project performance. This highlights the fact that companies need to be wary when trusting their critical projects impacting core business functions, to outside entities. Project delays may cause a ripple effect within their organization, significantly impacting their core operations. Additionally, projects that appear to be on schedule may in fact be dangerously behind due to quality measures not being met. The additional rework required once delivery occurs may be such to prevent system deployment, negating any expected cost benefits from foreign outsourcing.

While offshoring systems development activities may lead to additional unanticipated costs as those mentioned above, there are additional factors in the outsourcing relationship that can mitigate these costs.

Access to Required Skill Sets

Krishna, Sahay, and Walsham, (2004) argue that companies outsource to obtain access to wider labor markets. Looking to global markets allows a wider field of view. Maintaining IS expertise in-house opens a company to the challenges of the permanent work arrangement in IT, such as skill deterioration of their workers and specific skill shortages (Martin, 1991; Yourdon, 1992). Relying on retraining a permanent workforce may be cost prohibitive and due to the rapidly evolving nature of the IT field, by the time a company invests and trains its IS staff, the technology and skill sets may be obsolete (Slaughter and Ang, 1996). Contracting these services to external vendors provides the organization with access to knowledge workers that have already mastered the required functions, are familiar with the organizational challenges faced by the company, and allows new and innovative solutions to be applied to business problems. This comes from the development of the vendor's core IS specialties and having encountered these same challenges faced by the organization on other consulting engagements. IT vendors tend to be more familiar with best practices and have applied them to similar situations that are being encountered by the

organization. This would allow them to more efficiently and effectively provide solutions to the problems being faced by the client.

Outsourcing can also help address labor shortages of critical IT skills (Slaughter and Ang, 1996). For example, if five firms require a scarce IT skill and each firm chooses to hire a worker with this skill set, it would require five workers. However, if this firm chooses to *outsource* this need, then less than five workers may be required by these companies to address their needs. This is due to the “worker sharing” that could take place by using only as much of the resource as is required. The outsource vendor then has the responsibility of balancing the workload of the individual in this “worker-sharing” arrangement.

Organizational Flexibility

Companies can use their level of organizational flexibility to decide whether to outsource systems development work or train their existing employees to perform these tasks. Organizational flexibility has been defined as the degree in which a business unit is adaptable in administrative relations and the authority vested in situational expertise (Barrett et al, 2005). Clients with a competency in outsourcing have an additional tool with which to approach systems development projects. If a systems need arises that is unable to be filled by the inhouse IS staff, the company can use an external vendor to perform this function, thereby expanding the development resources of the organization.

Slaughter and Ang (1996) found that companies choose to outsource as the costs and disadvantages of the permanent work arrangement become prohibitive due to increasing technological and environmental turbulence. Due to the rapid evolution of the IT environment, systems development work can be characterized by skills deterioration and skill shortages (Martin, 1991; Yourdon, 1992). Significant corporate resources may be required to continuously train their employees on the latest technologies and ensure they maintain the appropriate skill sets to perform their jobs adequately. Not only does this require companies to devote scarce corporate resources to these

endeavors, it requires them to accurately predict the skill sets they will need in the coming years. Any misstep that incorrectly judges future skill needs will represent wasted effort by the company.

Outsourcing provides companies with the increased flexibility to adapt to a changing market environment, allows companies to focus on their core business, and to more economically manage the dynamics of the IS skills market. Contradictory to this, Levina and Ross (2003) discovered that outsourcing often provides efficiency at the cost of flexibility. With the future prosperity of an organization depending upon the quality of its information services, (Lee et al., 2003) the overarching objective of managing information services should be to maximize flexibility and enable it to pursue different options as the circumstances change. As the scope and complexity of the IT field change, companies are less inclined to shoulder the burden of in-house development, as outsourcing allows them to better leverage their resources and focus on core business functions to increase IT's value to the corporate mission. In turn, this leaves the IT function to those most familiar with the industry.

Seeking offshore workers to fill a potential skill void of the organization allows them wider breadth and access to a larger pool of potential talent. This, in turn, increases the flexibility of the organization allowing them to better adapt to a changing environment.

Discussion

The IT function plays an important role in modern companies, interacting and supporting all other areas of the business. A significant portion of the IT function is systems development, which entails enhancing or creating applications that provide business value and supports the revenue generating functions of the company. The two primary means of performing this role include in-house development of systems with full-time employees, or outsourcing of this activity – potentially beyond domestic borders. Once the decision has been made to outsource this activity, the organization must decide on a vendor to perform the required systems development. In the decision process, many organizations find companies operating in India attractive because they tend to offer systems development at the lowest cost. Unfortunately, companies often fail to realize that the contract costs quoted by these

vendors do not necessarily represent the full expense that will be incurred by the organization in the systems development process. The additional costs can include transition costs, the cost of vendor management, legal and liability costs, lock-in costs, and the costs associated with issues of cultural adaptation.

Based on the extant literature and the personal experiences of the author, we offer a number of methods that address many of the cost challenges presented by offshore outsourcing and may help to mitigate their impact. These suggestions fall into one of three categories: information, incentives, and institutional factors. Figure 2 displays factors impacting the success of offshoring to be discussed below.



Figure 2: Factors Affecting Success

Information

The issue of information focuses on situational awareness and obtaining as much information as possible to make the best decision and mitigate risk. In other words, organizations must perform “due diligence” before selecting a vendor—similar to the activities a company must perform before an acquisition or merger. This process requires a thorough evaluation of the potential vendor—its capabilities, strengths and weaknesses, vendor knowledge as it relates to the project, an assessment of previous projects performed by the vendor (including assessments by its

previous clients) and a review of the vendor personnel to be assigned to the project. Additionally, the company must be aware of its own capabilities, strengths, and weaknesses with respect to outsourcing.

Many companies enter the offshoring arena without fully understanding the challenges and costs associated with this arrangement. Prior to making the decision to offshore, the company must understand the benefits to be obtained by performing systems development internationally and why another foreign organization is better able to develop the required business systems. Potential reasons could include knowledge of the global IT marketplace, best practices, and technological availability. In this instance offshoring would be the best choice. Another reason might be the industry knowledge of the vendor. Having worked in the client's industry and discovered best practices from across the world, the vendor may be able to provide thought leadership as a value-added function. If another organization understands the industry better than the client, outsourcing or offshoring this function will not result in a successful venture. The knowledge capital possessed by an offshore vendor may be greater as they have experience in global markets,

Additionally, the client must be provided full information of the team who will be developing their systems. As hiring direct employees will require a review process to ensure the appropriate fit between the needs of the organization and the skills of the employee, companies will want to ensure the offshore team will have the skill sets required by the company to perform their tasks appropriately. To obtain this objective, the organization must develop (or acquire) and use valid selection techniques to ensure the required fit between the prospective outsourcing team members and the company. This task can be made more difficult due to the distance separating and potential language and cultural challenges affecting both parties. However, it is important to review candidate skill sets to ensure an appropriate fit and that they will integrate well with the client.

Incentives

The next task is to align the interests of the client and the vendor. A common method to accomplish this is to provide incentive or penalty clauses in the vendor contract. Examples would include quantifiable performance

measures that specify incentives should the measure be met. On the other side, a penalty clause could be included specifying measures should quality or time deliverables not be met. The authors suggest that although these measures help align the goals of both the client and the vendor, they may not be implemented. One common objection is that an incentive structure places additional liability on the company should the vendor meet the specified performance objectives of the contract. This view seems somewhat dubious as experience indicates that project overruns will be charged to the client as unanticipated expenses.

Institutional Factors

The final measure focuses on client characteristics and the intermingling of two organizations. When dealing with a foreign vendor, traditional behavior patterns in the local environment may seem foreign to the vendor and potentially affect communication and understanding. In these instances, experience working with different cultures will enable companies to develop a better working relationship. Many Indian vendors have clients in diverse markets across the globe and have developed additional knowledge about these different environments.

In offshoring the development of systems, knowledge transfer takes on an important role. Once development of the system is complete, it will be up to the client to support, maintain and enhance the system over its useful life. Appropriate transfer of system documentation and knowledge is required for effective maintenance of the system by the client. This adds to the institutional knowledge and increases the value of the vendor by providing additional insight into industry best practices.

One potential issue raised in offshoring systems development work is the displacement of current staff. Handled appropriately, this activity provides the opportunity for client staff to move into another area. Such movement may enhance their skill sets, provide new challenges, or improve their career opportunities. Offshoring mundane systems development activities frees up internal staff to perform higher-level systems analysis and architecture functions.

Conclusion

Offshoring systems development activities may prove a beneficial endeavor if handled appropriately. This approach to systems development can provide additional value to the corporation by lowering the overall cost of the function, enhancing opportunities for internal staff, and bringing additional knowledge into the organization.

The benefits to be obtained from this approach need to be balanced with the additional risks that may be encountered. Lower up-front costs initially anticipated may prove to represent a small part of project costs if the engagement is handled incorrectly. In this instance, the anticipated benefits and cost savings from offshoring may be overwhelmed by additional unanticipated costs.

The overall cost and its benefit to the organization will be a product of the organization's ability to mitigate potential unanticipated cost factors and the additional risk inherent in this arrangement.

REFERENCES

- Ang, S. and Cummings, L. Strategic Response to Institutional Influences on Information Systems Outsourcing. *Organizational Science* (8:3), May – June 1997, pp. 235–256.
- Ang, S. and Straub, D. Production and Transaction Economies and IT Outsourcing: A Study of the U.S. Banking Industry. *MIS Quarterly* (22:4), December 1998, pp. 535–552.
- Arnett, K. and Litecky, C. Career Path Development for the Most Wanted Skills in the MIS Job Market. *Journal of Systems Management*. (45:2), February 1994, pp. 6–10.
- Aubert, B.A., Dussault, S., Patry, M., and Rivard, M. “Managing the Risk of IT Outsourcing,” in *Proceedings of the Thirty-Second Hawaii International Conference on System Sciences*, IEEE Computer Press, Los Alamitos, CA, 1999, pp. 7068–7079.
- Aubert, B.A., Patry, M., and Rivard, M. “Assessing the Risk of IT Outsourcing,” in *Proceedings of the Thirty-First Hawaii International Conference on System Sciences*, IEEE Computer Press, Los Alamitos, CA, 1998, pp. 685 – 693.
- Bahli, B. and Rivard, S. The Information Technology Outsourcing Risk: A Transaction Cost and Agency Theory-Based Perspective. *Journal of Information Technology* (18:3), September 2003, pp. 211-221 .
- Barrett, H., Balloun, J., and Weinstein, A. Success Factors for Organizational Performance: Comparing Business Services, Health Care, and Education, *Advanced Management Journal*, (70:4), Autumn 2005, pp. 16-28.
- Barthelemy, J. The Hidden Costs of IT Outsourcing. *MIT Sloan Management Review* (42:3), Spring 2001, pp. 60 – 69.
- Banerjee, A. and Duflo, E. Reputation Effects and the Limits of Contracting: A Study of the Indian Software Industry. *Quarterly Journal of Economics* (115:3), August 2000, pp. 989–1017.
- Bendor-Samuel, P. “CIO Radio Interview,” 2002 (http://www2.cio.com/radio/cio/cat.pl?interview=peter_bendor02_01_June).
- Caldwell, B. “2001 Trends in IT Outsourcing Delivery, Solutions Development, Marketing, Sales and Alliances,” Gartner Dataquest Report, Stamford, CT, January 22, 2002a.
- Caldwell, B. “Outsourcing Cost Reduction Creates Paradox: How to Still Make a Profit,” Gartner Dataquest Report, Stamford, CT, April 12, 2002b.
- Casale, F. “IT Index 2001,” The Outsourcing Institute / Sunguard eSourcing Report, April 15, 2001 (available online at <http://www.outsourcing.com/>).
- Chandrasekaran, N. and Ensing, G. ODC: A Global IT Services Delivery Model. *Communications of the ACM* (47:5), May 2004, pp. 47-49.
- Domberger, S. and Fernandez, P. and Fiebig, D. Modeling the Price, Performance and Contract Characteristics of IT Outsourcing. *Journal of Information Technology* (15:2), June 2000, pp. 107–118.
- Domberger, S. (1998) *The Contracting Organization: A Strategic Guide to Outsourcing* (Oxford University Press, Oxford).
- Earl, M. The Risks of Outsourcing IT. *Sloan Management Review* (37:3), Spring 1996, pp. 26–32.
- Farrell, D., Kaka, N., and Stürze, S. Ensuring India’s Offshoring Future. *The McKinsey Quarterly* (2005 Special Edition: Fulfilling India’s Promise) (27:3), pp. 331–364.

- Gopal, A., Mukhopadhyay, T. and Krishnan, M. The Role of Software Process and Communication in Offshore Software Development. *Communications of the ACM* (45:4ve), April 2002, pp. 193-200.
- Gopal, A., Sivaramakrishnan, K., Krishnan, M., Mukhopadhyay, T. Contracts in OffShore Software Development: An Empirical Analysis. *Management Science* (49:12) December 2003, pp. 1671–1683.
- Guinan, P., Coopriider, J., and Faraj, S. Enabling Software Development Team Performance During Requirements Definition: A Behavioral Versus Technical Approach. *Information Systems Research* (9:2), June 1998, pp. 101–125.
- Hirschheim, R. and Lacity, M. The Myths and Realities of Information Technology Insourcing. *Communications of the ACM* (43:2), February 2000, pp. 99–107.
- King, J. (2003a). “IT’s Global Itinerary: Offshore Outsourcing is Inevitable,” *Computerworld*, September 15. (available online at <http://www.computerworld.com/managementtopics/outsourcing/story/0,10801,84861,00.html>)
- King, J. (2003b). “The Best of Both Shores,” *Computerworld*, April 21. (available online at <http://www.computerworld.com/managementtopics/outsourcing/story/0,10801,80440,00.html>)
- Krishna, S., Sahay, S. and Walsham, G. Managing Cross-Cultural Issues in Global Software Outsourcing. *Communications of the ACM* (47:4), April 2004, pp. 62-66.
- Krishnan, M.S., Kriebel, C.H., Kekre, S., Mukhopadhyay, T. An Empirical Analysis of Productivity and Quality in Software Products. *Management Science* (46:6), pp. 745–759.
- Lacity, M. and Willcocks, L. An Empirical Investigation of Information Technology Sourcing Practices: Lessons From Experience. *MIS Quarterly*, (22:3), September 1998, pp. 363–408.
- Lee, J., Huynh, M., Chi-Wai Kwok, R. and Pi, S.. IT Outsourcing Evolution – Past, Present and Future. *Communications of the ACM* (46:5), May 2003, pp. 84–89.
- Levina, N. and Ross, J. From the Vendor’s Perspective: Exploring the Value Proposition in Information Technology Outsourcing. *MIS Quarterly* (27:3), September 2003, pp. 331–364.
- Loh, L. and Venkatraman, N. Determinants of Information Technology Outsourcing: A Cross-Sectional Analysis. *Journal of Management Information Systems* (9:1), Summer 1992a, pp. 7–24.
- Loh, L. and Venkatraman, N. Diffusion of Information Technology Outsourcing: Influence Sources and the Kodak Effect. *Information Systems Research* (3:4), December 1992b, pp. 334-378.
- Martin, J. Reskilling the IT Professional. *Software Magazine* (12:14), 1991, pp. 139–140.
- Matloff, N. Globalization and the American IT Worker. *Communications of the ACM* (47:11), November 2004, pp. 27-29.
- Nair, K. Prasad, P. OffShore Outsourcing: A SWOT Analysis of the State of India. *Information Systems Management* (21:3), Summer 2004, pp. 34– 40.
- Ngwenyama, O. and Bryson, N. Making the Information Systems Outsourcing Decision: A Transaction Cost Approach to Analyzing Outsourcing Decision Problems. *European Journal of Operational Research*. (115), 1999, pp. 351–367.
- Nidomolu, S. R. and Goodman, S. Computing in India: An Asian Elephant Learning to Dance. *Communications of the ACM* (36:6), June 1993, pp. 15–22.

- Porter, M. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance* (The Free Press, New York).
- Scheier, R. Businesses Outsourcing More, But Less Thrilled with Results. *Computerworld*, July 21, 1997. (available online at <http://www.computerworld.com/news/1997/story/0,11280,7029,00.html>).
- Scheier, R. Outsourcing's Fine Print. *Computerworld*, August 19, 1996. (available online at <http://www.computerworld.com/news/1996/story/0,11280,1807,00.html>).
- Slaughter, S. and Ang, S. Employment Outsourcing in Information Systems. *Communications of the ACM* (39:7), July 1996, pp. 47–54.
- Yourdon, E. *Decline and Fall of the American Programmer*, Yourdon Press Computing Series, Prentis Hall, Englewood Cliffs, NJ, 1992.