
Information technology acquisition in the service sector

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Abstract: The objective of this research paper is to present and examine a conceptual model that helps realise the complexities of offshore outsourcing IT knowledge and service work. The model offers a simple yet potent way to recognise the intrinsic challenges that such strategies involve. The model compares well-established work in the manufacturing literature to present a sequential view of building organisational capability in offshore outsourcing in the IT service sector. The authors examined offshore sourcing decisions at three organisations through interviews with senior business executives in IT start-ups. A set of frameworks were developed to clarify sourcing options and aid managers in deciding which IT service functions to offshore outsource and which ones to retain in-house.

Keywords: offshoring outsourcing; knowledge-based process; decision-making.

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1 Introduction

Offshore IT outsourcing is the practice of contracting out all or part of a company's IT process and software development in a country other than where that company is headquartered and historically outside of where the product or service will be sold or consumed (Babar et al., 2007). In the past years, many organisations have practiced offshore outsourcing strategy hoping to reduce costs, become more efficient, focus on core competencies and attain a strategic advantage. However, differing to popular perception, numerous companies have had, at best, diverse results. According to the predictions of both Gartner and Boston Consulting Group, 50% of the offshoring contracts of North America companies signed between 2001 and 2004 would fail to meet expectations. Moreover, half the companies that transferred processes offshore failed to produce the financial benefits they expected (Lacity et al., 1996; Willcocks and Lacity, 1999; Ferguson, 2004a, 2004b). Although offshore labour costs as much as 90% lower than US averages (Garner, 2004), some companies have found that the overall costs of the offshored processes have surpassed prior in-house costs (Ferguson, 2004a, 2004b; Golden, 2004). Language, cultural and time zone differences are clear problems that obscure offshore business processes management. But more subtle challenges also exist (Yang and Wang, 2008). If the offshored business processes cannot be specifically defined and communicated, several time-consuming process change iterations may be needed to realise the necessary service quality level (Hilletoft and Hilletoft, 2008). This can be a problem for firms operating in dynamic service environments (Ferguson, 2004a, 2004b). Another common issue faced by firms inexperienced with offshoring is that too much time is consumed selecting vendors, while managerial and organisational competencies critical to the offshoring relationship are not evaluated (Davies, 2004). Businesses therefore do not make well thought decisions about offshoring methodically enough. Therefore, most companies do not spend time evaluating which processes they should offshore and which they should not (Barthelemy, 2001; Leiblein et al., 2002; Lacity et al., 1996). Without a standard methodology for distinguishing processes, most decision-makers find it hard to distinguish among core processes that they must control, vital processes that they might buy from best-in-class vendors and commodity processes that they can outsource. Successful outsourcing entails recognised processes to help determine:

- 1 what and why to outsource
- 2 how to locate the suppliers that align best with future plans
- 3 how to establish relationships and recognise contracts, execute the transition plan and evaluate results and take remedial actions as necessary (Carter and Yan, 2007).

The focus of this paper is to present an empirically validated outsourcing process model to answer the first question of 'what processes' to outsource.

The rapid growth and frequency of offshore work has unfortunately not been paralleled by theory-based studies that help us recognise the extent of the phenomenon. In this paper, we attempt to present a conceptual model of managing distributed creation and delivery of services through customer contact required and knowledge enclosed in offshoring processes. Model presents an easy yet potent way to conceptualise offshoring knowledge and service work and to identify intrinsic challenges that such strategies

involve. The model parallels well-established work in manufacturing literature to present a sequential view of building organisational capability in offshoring IT services.

The main questions of this paper are:

- 1 What are the offshore-outsource decision-making processes?
- 2 How does the level of knowledge enclosed and level of customer contact needed to develop the process affect the decision to offshore outsource?

To answer these questions, the paper presents three case studies to highlight the critical factors that affect selecting the offshore outsourced IT projects. The research paper is organised as follows. Section 2 reviews the literature and identifies factors that motivated our research in this area. Section 3 describes the research methodology and data collection. Section 4 reports the results of our analysis. And, Section 5 concludes the paper with a discussion of limitations of our research and possible future work.

2 Literature review

There has been an increasing use of non-internal technology development, both by outsourcing and strategic alliances (Narula, 2004). A survey of 51 firms that outsourced parts of their operations identifies that outsourcing can improve a firm's cost-efficiency (Jiang et al., 2006). A survey done in 2002 in Australia explored the outsourcing decision and found that cost savings and improving performance were on top of the list of reasons (Beaumont and Sohal, 2004). The transfer of ownership of a business process to a supplier is a vital and complex strategic decision and makes outsourcing a challenging process; prior research has also indicated that outsourcing decisions themselves and the management of outsourcing is not simple (Johnsen et al., 2006). Consequently, a survey showed that a fifth of outsourcing relationships failed within the first two years, a figure increasing to a half of relationships over a five-year period (Venables, 2005). We see different studies trying to elucidate the outsourcing process. A study examined relationships among local, organisational issues with sector and national level actions and outcomes in the outsourcing context. They targeted to evaluate risks and benefits in this way (Harland et al., 2005). Another paper examined the innovation-related risks that can arise from strategic outsourcing and considers trust, cooperation and network perspective for this analysis (Hoeht and Trott, 2006).

IT services contains a range of activities such as database administration, product development and customisation, calling centres, software development and maintenance, and help desk support. Software development consists of three kinds of activities:

- 1 services designed to produce improved functionality by developing new custom applications or changing or improving customised or packaged applications
- 2 activities that include the integration, detailed design, execution and management services to connect applications to each other and/or to existing IT infrastructure
- 3 deployment services provided to support the implementation of new applications (Sadlowski, 1998; Kargin et al., 2008).

2.1 Deciding which IT projects to offshore

The trend toward offshore IT and outsourcing has been growing progressively since the 1990s (Chidamber, 2003). IT-related tasks are highly interdependent by their nature (Cramton and Webber, 2005). Systems development, basic framework activities and the stipulation of software services are all knowledge concentrated tasks, characterised by sequential and reciprocal interdependence between individual team members (Robey et al., 2001; Harter and Slaughter, 2003). Offshore IT projects often involve globally separated teams, either native service providers, which offer services from local operations in different developing regions (Cladwell, 2004; Mirani, 2007) or foreign offshore suppliers, which are main players in offshore application development based mainly in developing countries (Carmel and Beulen, 2005). Such projects are classically labour intensive and significantly dependent on frequent, intense client-service provider interaction in which the service provider determinedly struggles to understand clients' business processes (Beulen et al., 2005).

Decision-makers who do not cautiously select which IT service activities to offshore might be the cause for the IT services offshore outsourcing projects to fail to produce the anticipated cost savings or other benefits (Barthelemy, 2001; Leiblein et al., 2002; Hanna and Daim, 2008).

2.2 Customer contact (first dimension)

The prospective operating efficiency of a service system is a function of the customer contact time and the service creation time as mentioned in the classic operations management model of disaggregating service (Chase, 1981; Chase and Tansik, 1983). In this model, those features of the service system that require a low degree of customer contact are assumed to have the highest potential for improvements in efficiency, whereas, those processes with a high degree of customer contact are restricted by labour intensive customisation. Operational effectiveness enhancements are, thus, reliant on the capability of the service system designer to separate (or decouple) high-customer-contact processes from low-customer-contact processes (Shostack, 1984). Therefore, those 'backside office' processes that do not need high-customer-contact need not be situated in close to the customer.

Other service operations models have built on (Chase, 1981) fundamental insight that customer contact constraints service efficiency. Schmenner (1986) provided a service process matrix that has been implemented as one of the prime service classification methods in operations (Verma, 2000). This study categorises services depending on their degree of customer contact, customisation and labour intensity. A comparable categorisation method clusters services by degree of customer contact and the strictness of flexibility of the service process (Wemmerlov, 1989). Apte and Mason (1995) adapted Schmenner's (1986) matrix to categorise the possible division of service processes with dimensions of customer contact required, information intensity and physical presence required. Moreover, Metters and Vargas (2000) classify strategies by an operational focus on service or cost – which is comparable to Schmenner's (1986) customer contact and customisation – and degree of decoupling – which is also comparable to Schmenner's labour intensity.

Tinnila and Vepsäläinen's (1995) service process analysis matrix categorises service processes by the type of channel – from and internal hierarchy to a market network – and

type of service – dependent relationships, customised delivery, regular contract and mass transaction. Adaptive and adjusted processes that entail close management alertness and control are frequently reserved inside the organisation hierarchy and are distinguished by high production costs, but low transaction costs. Fast routine processes maybe situated distantly for efficiency and low production costs, but then acquire transaction costs. Aron and Singh's (2003) concept of revenue distance pursue a comparable logic. Revenue distance is defined as the distance between the locus of revenue capture and the process that supports the capture of revenue. Critical processes, such as those providing an advantage in the marketplace should be located close to the customer, whilst the least vital processes are candidates for offshoring. As customer contact is their main focus, all of these schemes note that back office processes with least customer contact present the greatest potential for offshore outsourcing and efficiency enhancements. Certainly, any process entailing face-to-face contact are not at risk from offshoring, however, customer contact in the form of verbal or text-based electronic communication is usually not site reliant given modern technologies. Once back office processes have been recognised, candidates for offshoring must be assessed on the other dimension of the service process matrix of knowledge enclosed (Hanna and Daim, 2008).

2.3 Knowledge enclosed (second dimension)

The levels of knowledge involved in the process and the degree of customer contact offshore service providers have with customers are the main aspects affecting offshore decisions. Application development is a distinct service with high degrees of interaction among end-users and management of the service receiver because of high dynamics in the service delivery (Faraj and Sproull, 2000). Youngdahl and Ramaswamy (2007) focused on the nature of service and knowledge work to persuade the development of a categorisation of services around dimensions of knowledge enclosed and service contact as presented in Figure 1.

Figure 1 Knowledge enclosures and service contact

Knowledge enclosed in the service process	High	Backside-Office Core Solutions services	Frontage -Office Core Solutions Services
	Low	Backside-Office Operation Transaction Services	Frontage-Office Operational Transaction Services
		Low Contact	High Contact
Degree of Customer contact needed in the service development process			

Source: Youngdahl and Ramaswamy (2007); Chase (1978)

The first dimension is knowledge enclosed in the service process, the knowledge in part is tacit; the constituent of learning that cannot be erudite in repeatable routine that can be codified and transferred and part explicit, learning that is simply transferable. Therefore, knowledge enclosed offers an easy transaction process such as very routine coding. The second dimension is the level of customer contact needed, was defined by Chase (1978) as the degree of customer contact required in formation of the service, which will influence the degree to which service providers necessitate to be alarmed about language and culture (Youngdahl and Ramaswamy, 2007). Backside office services entailing low or no contact with customers present best applicants for a production-line approach in which employees execute well-defined tasks resulting in service standardisation and quality. The entire process is divided into routine tasks permitting restricted control and close direction. It also requires least worker skill and training time (Bowen, 1998). Backside office workers need to focus further on efficiency with less for service recovery. Frontage office services employees have high levels of customer contact, possessing the knowledge to make good decisions and to make real-time decisions in the interest of customers (Hart et al., 1990).

With decision-makers' focus on customer contact, backside office processes behind the scene present the highest potential for offshore outsourcing and efficiency improvements. Definitely, any software development processes entailing face-to-face contact is not a candidate for offshoring; however, with modern technologies, customer contact in the structure of verbal or text-based electronic communication is typically not location reliant (Stratman, 2007).

As the degree of enclosed knowledge increases, the intricacies of managing the process of offshoring such as delivery as well increase. Recognising the degree to which a process entails enclosed knowledge and customer contact is a vital first step in making a knowledgeable decision about offshoring. And it can be exploited by top management to sort out offshore processes to differentiate the distinctive opportunities and challenges of offshore software services (Youngdahl and Ramaswamy, 2007; Aron and Singh, 2005). Once backside office processes have been classified, candidates for offshoring must be evaluated. Uniformed processes employing workers with the least training are the easiest to transfer offshore. The operational knowledge related with these processes is codified and the learning curve will be short. However, highly customised processes entailing highly trained service professionals will be complicated to offshore (Stratman, 2007).

As the degree of enclosed knowledge increases, it presents operations enhancement from performing straightforward services to providing more complex solutions, which are developed when a service supplier can incorporate product and service and provide a uniquely developed service offerings (Johansson et al., 2003). The main challenges involved in offshoring high customer contact processes are around people management issues. Classically, these are the issues of organisational culture and the capacity to communicate best practices from main office to offshore site (Youngdahl and Ramaswamy, 2007). Application development is a distinct service with a high level of contact with end-users and management of the service receiver because of high dynamics in the service delivery. The requirements in application development are often subject to modification throughout the implementation of a project and thus, it necessitates a high degree of communication during the project (Faraj and Sproull, 2000).

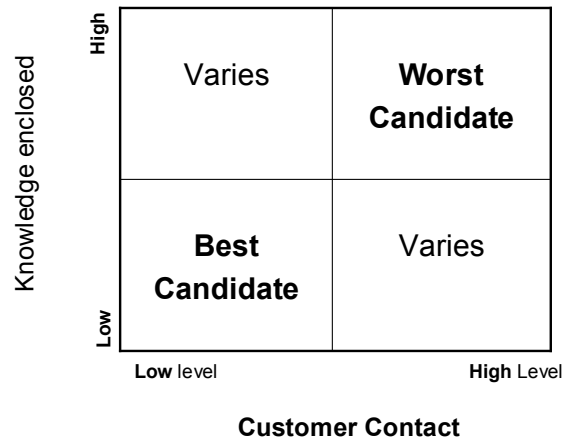
In summary, while the main driver of IT service offshoring is the low wage rates of service employees in foreign countries, not all service processes can or should be

offshored. Once the decision has been made to offshore outsource business activities, the challenge now for decision-makers is to comprehend their own requirements and to identify service providers whose qualifications and objectives are best associated with their meticulous needs.

2.4 Hypotheses

The major conclusion out of this literature review is that recognising the extent to which a process involved enclosed-knowledge and customer-contact is an important first step in making an educated decision about offshoring. And it can be utilised by decision-makers to sort out offshore processes to identify the typical opportunities and challenges of offshore IT services (Youngdahl and Ramaswamy, 2007; Aron and Singh, 2005) (Figure 2).

Figure 2 What projects to outsource



Hypothesis 1 IT processes that require low customer contact and low knowledge enclosed represent the best candidates for offshore outsourcing.

Hypothesis 2 IT Processes which require high customer contact and high knowledge enclosed are the worst candidates for offshore outsourcing.

3 Methodology

We used a case study approach as the foundation of our overall research strategy because a case study is a potent and flexible technique considered appropriate for investigative research both prospectively and retrospectively (Perry et al., 2004). Yin (2002a, 2002b) defines the case study as 'an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident'. Our research examines three cases following Yin's strategy for the design and implementation of several case studies (Glaser and Strauss, 1965).

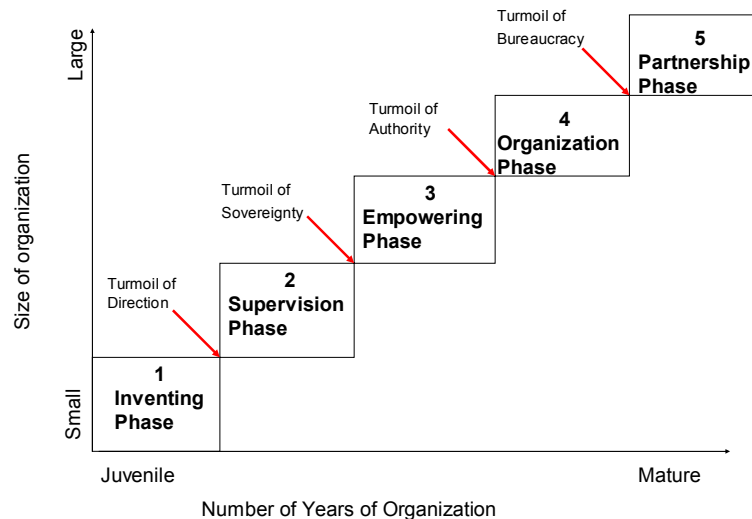
Our research was accomplished in three phases. In the first phase, we assessed the literature to comprehend the structure of the offshore sourcing and associated issues. We selected three start-up companies in the high-tech industry that are software developing companies that offshore outsource projects: Velsl, Directq, Mypr, the characteristics of companies interviewed are listed in Table 1.

Table 1 Characteristics of the three software companies interviewed

<i>Company</i>	<i>Velsl</i>	<i>Directq</i>	<i>Mypr</i>
Outsourced to	Indian	Indian	Pakistan
Type	Offshore outsourcing	Offshore outsourcing	Offshore outsourcing
No. of employees	50–70	70–100	35–50
Cost savings	Yes	Yes	Yes
Managers interviewed and (approximate years of experience)	General mgr (14) Technical mgr (10) Product mgr (14)	General mgr (10) Technical mgr (7)	Project mgr (9) Technical mgr (1) Product mgr (17)
Operation outsourced	Mixed technologies, core and non-core	Non-core technology	Core technology

We studied the process of offshore sourcing in each company through 60- to 100-min semi-structured interviews (Yin, 2002a, 2002b; Glaser and Strauss, 1965). All interviews were performed by using a guiding questionnaire, deployed from our initial literature review and research questions (shown in the Appendix).

Figure 3 Greiner model of organisational evolution and revolution (see online version for colours)



Source: Greiner (1972, 1998)

The chosen companies characterise the young and still forming generation. However, the managers interviewed have between seven to 17 years of experience in offshore outsourcing and they wanted to start their own businesses based on this experience. The

small sized companies also imply great opportunities for organisational growth, adaptation and development (Pries-Heje et al., 2005). Greiner's (1972, 1998) evolutionary model in Figure 3 shows the five stages of organisational progress and change. The company starts with the inventing phase. Creators of the company are typically entrepreneurs. Communications between the people in the organisation are casual and long working hours are typical. The reaction from the market is instantaneous, as is the response from management. As the company grows in extent and matures, it reaches its first crisis of 'direction crisis'. Then, communication becomes more formal, a hierarchy is built with the organisation and the top management set guidelines of the organisation with official systems for organisation (Greiner, 1972, 1998). In this research, we focus on the first phase of 'inventing phase' and the managers (owners) interviewed had long experience in the IT offshore outsourcing process with long list of lessons learned from their previous experiences. Future research will be on organisations in different life phases.

4 Analysis and results

To attain further insight into why the decision was made to offshore outsource IT service processes, the participants were asked to identify the leading reasons for outsourcing a project as shown in Table 2. For all eight participants, cost effectiveness identified in terms of access to cheap labour was the key determinant of outsourcing a project. Three out of eight participants identified personal relations and trust between the outsourcing and the vendor as another determinant of outsourcing a project – Velsl owner/manager has a personal relationship for many years with the vendor and they trust each other. Seven out of eight participants had extensive prior experience with major outsourcing companies; therefore, they have a good understanding about the potential challenges of offshore outsourcing. One out of eight interviewees had no prior experience with outsourcing and hence, was in the initial decision-making stage for outsourcing his specific project. All eight of our interviewees identified that level of knowledge-enclosed and level of customer-contact required as crucial for project success.

Table 2 Leading reasons for outsourcing a project

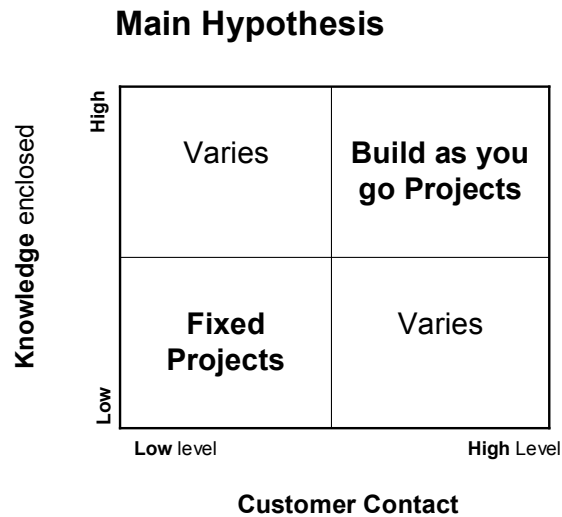
<i>Main factors leading to offshore outsourcing</i>	<i>Frequency of answers</i>
Cost effectiveness of outsourced IT projects	High frequency – 8 of 8
Personal relations/trust	(Moderate) 3/8
Personal previous experience with outsourcing	(High) 7/8
Level of knowledge involved and level customer contact needed	(High) 8/8 (consistent with our hypothesis)

4.1 Project type

In regard to the question of how a participant identifies success or failure, experts identified two types of projects, 'build as you go project' enclose high knowledge and high customer contact needed and have high risk to fail, while 'fixed project' enclose low levels of knowledge and customer contact and have high chances to succeed. This response verified our hypothesis as 'build as you go' projects were the worst candidates

for outsourcing because there was lack of clarity and higher level of management and communication was required to constantly guide the project. On the other hand, ‘fixed projects’ were the best candidates due to clear identification of requirement ahead of time as shown in Figure 4.

Figure 4 Main hypothesis



- Fixed-projects (fixed time, clear requirements, fixed cost): These projects were identified by our experts as having low level of knowledge enclosed and requiring low level of contact with customers. Their requirements are identified and fixed; project schedule and cost are already identified and no changes are expected.
- Build-as-you-go projects: Their requirements are not clear and not identified. Each step has to be cleared out and accepted by customer and these kinds of projects usually enclose tacit knowledge and need continuous contact with the customer and the engineers. Such projects are typically labour intensive and critically dependent on frequent, intense client-service provider interaction in which the service provider persistently strives to understand clients’ business processes.

4.2 Hypothesis supported

Highly knowledge enclosed projects require high customer contact. Managing and transferring the explicit and tacit knowledge is a challenge for them. These projects were referred as ‘build-as-you-go’ projects by our experts. This IT service process is less likely to be offshore outsourced because it requires micro managing for the project to succeed. One approach to dealing with the high level of knowledge enclosed projects is to sustain hand-on control through using out-tasking rather than complete business process outsourcing as a type of control. This decreases some of the savings and represents a hybrid between market and hierarchy. This type was used extensively by Directq Co., which was out-tasking specific activities where the person worked along side internal employees almost like an employee of the outsourcing firm. When the project is big in size and required high level of implicit knowledge and high level of customer contact

Velsl Co. and Mypr Co., managers used the out-tasking processes approach, but maintained overall management and knowledge of the work. Thus, the organisations procuring higher ratio of reliant labour has the supplier execute most of the work under the supervision of organisations' employees. This permits the organisation to have supervision of the processes and frequent inspection, thereby preserving the tacit knowledge. Takeishi (2002) refers to this approach as 'partitioning knowledge'.

Experts stated that the design of next-generation core technology would be most appropriate for in-house control. For programming of application software, the organisation would like to maintain some control and knowledge so it is not dependent on the supplier. Out-tasking and partitioning knowledge might be a good option because the firm maintains management of the process and some of the knowledge, while permitting the supplier to execute much of the actual code development. Because the organisation is involved in the day-to-day activity, it can also observe and evaluate progress closely.

The case participants approved that front office service solutions that require high levels of customer contact and involve high level of knowledge enclosed will necessitate greater levels of hands-on management from home office than other processes. While back office processes that necessitate limited or no customer contact but typically entail high level of knowledge of process itself, still demands continuous awareness of manager who needs to control them. The need for control usually is related to the fact that these processes likely entail some proprietary knowledge. However, some of the back office enclosed knowledge can be separated into group of routines such as database management. These back office processes can be learned by the offshore outsourcing supplier and this opens the door for possible cost savings.

4.3 Managerial implications

When managers were asked about their concern over investing in developing supplier's employees and then loosing the knowledge through employee turnover or changing suppliers, the case participants did not convey concern. There was a general belief that they were not sharing anything proprietary that includes their firms' strategy or competitiveness. The pressure to decrease costs was so enormous that there was a concord that they could afford the cost of maintaining new employees.

4.4 Lesson learned

To emphasise the importance of awareness of knowledge-based processes, Mypr Co. manager shared his lesson learned from his previous work experience as project manager with big offshore outsource IT service company, we will call it Prev. Company. Prev. Company did not become concerned about outsourcing some of its programming processes because it believed that it had excellent contracts in place to protect its ownership and intellectual property. However, when it decided that it wanted to change suppliers due to price and service issues, it recognised that it was very reliant on a particular programming supplier. Over time, Prev. Company had lost its in-house knowledge to comprehend the program code and even the knowledge to develop a clear statement of work to efficiently re-bid the process. This was a major lesson learned for Mypr Co., manager/owner in setting the company policies so that it does not simply outsource complete and complex programming tasks, but remains involved in the

development of non-routine software code. Management should always be dynamically involved in the management and control of outsourced activities by partitioning knowledge and tasks – so that the vendors do not own an entire process.

Velsl Co. managers shared their lesson learned from previous experience with Software Co., which became dependent on a supplier by not fully recognising the risk of loss of tacit knowledge. Software Co. managers began outsourcing its IT support services very cautiously, with an objective of outsourcing only simple activities, such as maintenance and some very basic coding. Over time, one of its highly qualified suppliers, with satisfactory service, started to complain that it was having difficulty with employee job satisfaction and turnover because its employees were not challenged. The employees were educated professionals who wanted more challenging tasks. Software Co. management provided the supplier more basic coding work, which eventually developed into complex work. After Software Co. became very dependent on the supplier, the supplier began to act opportunistically by increasing prices and decrease its service quality level. Software Co. had a very hard time changing suppliers, because the supplier had developed some important software, which Software Co. did not understand. Our experts' key lesson learned was they would not allow themselves to rely on a supplier and they should possess their own core processes that entail high level of knowledge involved. Such tasks would either be out-tasked with active hands-on management by Velsl employees, or such tasks would not be outsourced.

All eight experts agreed that distant service processes become difficult to manage as the level of customisation of the service process increases. This opinion parallels the transaction cost theory (TCT) concept of asset specificity, in which process customisation increases the transaction risk and therefore, cost. Mypr experts stated that processes that can be disaggregated from that requiring direct face-to-face customer contact have the possibility to take advantage of offshore wage rate savings; however, the process characteristics may influence the overall costs of coordinating offshore processes. If these coordination costs exceed the savings that offshoring can offer through efficiencies from specialised labour market, then the processes remain in-house and no offshoring will take place. Mypr experts provided definition of cost to assess the financial gain from outsourcing as:

Total cost = cost of wages/salaries
 + time (time expected to finish the job in-house compared to off-shoring)
 + communication (customer contact) + culture difference
 + maintenance of tacit and operational knowledge + contract costs
 + risk management cost + enforcement intellectual property rights
 + corruption + transaction cost.

With this comprehensive approach to total cost, experts used the following formula to determine if outsourcing offshoring is a good decision.

If,
 Cost of offshore - outsource IT service process < cost of in - house =>
 offshore outsource
 But if,
 Cost of offshore - outsource IT service process > cost of in - house =>
 do not offshore outsource

This concurs with the TCT, which provides theoretical framework to understand outsourcing decisions by firms. According to TCT, transaction costs can erode the cost advantage of using vendors (Coase, 1937). Williamson (1981) identifies asset specificity, uncertainty and frequency of contracting as critical factors that determine transaction costs.

Directq managers shared their lesson learned. To enhance monitoring and control in software development projects, management had to keep an activity in-house at least partially. Of course, the longer the process has been outsourced, the more difficult it was to maintain the tacit and operational knowledge. Thus, firms need to invest enough to address many of the risks and tacit knowledge issues. It is significant for firms to include these risk management costs in their economic analysis of whether to outsource. This concurs with recent studies – whenever a firm outsource IT services it should expect to have significant potential for overpayment and under servicing (Ellram et al., 2008; Amaral et al., 2004, 2006).

5 Conclusions, limitations and future research

Although the case studies investigated represent a limited sample, our research shows distinct and recurring patterns of critical factors that can influence offshore sourcing relationships. There are several findings that can be a key group of guidelines for those who are trying to decide on outsourcing plans. The model presented in this paper offers potent tool for understanding the challenges of offshoring. The significance of the model is that it explains strategic roles for offshoring of service and knowledge processes. Frequently, the issues surrounding offshoring have been presented simply in terms of cost reduction, work force repositioning, cultural and language problems. The model focuses on the key differences between various types of offshoring to better comprehend alternatives for providing distributed front office and back office service delivery.

System development and the provision of IT services are all knowledge intensive jobs as reported in preceding research. Organisations that are considering offshore IT outsourcing must know that the type of knowledge outsourced and the degree of customer contact needed is an important first step in making educated decision about offshoring and can be utilised by top management to sort offshore processes to recognise the distinctive opportunities and challenges of all alternatives of offshore IT services. This recommendation is also in line with the previous research.

Conceptually, the two dimensional analysis of knowledge enclosed and customer contact can be used to classify offshore processes to understand the unique opportunities and challenges faced by the type of offshore service operation. Experts approved our hypothesis and identified knowledge and customer contact levels as key components of the decision to outsource offshore projects. The offshoring of IT services is clearly trending upward. And this business practice is likely to be an important part of service operations management for the predictable future. Therefore, more studies are needed to gain deeper insights in this phenomenon and understand the challenges of offshore IT services.

This paper builds upon the initial work by Hanna and Daim (2007, 2008). The hypotheses proposed in those studies and in this paper can be extended to more organisations based on ‘theoretical sampling’ in which a number of cases represent polar

extremes of scope of sourcing decisions. Moreover, the firms globalise for several reasons such as to diversify supply sources, to increase sales, to acquire resources and to minimise competitive risk. The relatively recent trend of offshore sourcing of intellectual labour, rather than manufacturing capacity or natural resources, is one of the more recent outcomes of globalisation. Thus, analysing the firm behaviour in the globalising environment might be a good future study.

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References

- Amaral, J., Billington, C. and Tsay, A. (2004) 'Outsourcing production without losing control', *Supply Chain Management Review*, November–December, pp.44–52.
- Amaral, J., Billington, C. and Tsay, A. (2006) 'Safeguarding the promise of production outsourcing', *Interfaces*, Vol. 36, No. 30, pp.220–233.
- Apte, U.M. and Mason, R.O. (1995) 'Global disaggregation of information-intensive services', *Management Science*, Vol. 41, No. 7, pp.1250–1262.
- Aron, R. and Singh, J. (2003) 'IT enabled strategic outsourcing: knowledge intensive firms, information work and the extended organizational form', Wharton School working paper, available at <http://knowledge.wharton.upenn.edu/papers/1071.pdf>.
- Aron, R. and Singh, J. (2005) 'Getting offshoring right', *Harvard Business Review*, December, Vol. 83, No. 12, pp.135–154.
- Babar, M., Verner, J. and Nguyen, P.T. (2007) 'Establishing and maintaining trust in software outsourcing relationships: an empirical investigation', *Journal of Systems and Software*, Vol. 80, No. 9, pp.1438–1449.
- Barthelemy, J. (2001) 'The hidden costs of IT outsourcing', *MIT Sloan Management Review*, Vol. 42, No. 30, pp.60–70.
- Beaumont, N. and Sohal, A. (2004) 'Outsourcing in Australia', *International Journal of Operations & Production Management*, Vol. 24, pp.688–700.
- Beulen, E., Fenema, P.V. and Currie, W. (2005) 'From application outsourcing to infrastructure management', *European Management Journal*, Vol. 23, No. 2, pp.133–144.
- Bowen, D. (1998) 'Lean service: in defense of a production-line approach', *International Journal of Service Industry Management*, Vol. 9, No. 3, pp.207–225.
- Carmel, E. and Beulen, E. (2005) 'Governance in offshore outsourcing relationships', in *Offshore Outsourcing of Information Technology Work*, Cambridge University Press, Cambridge, UK.
- Carter, J.R. and Yan, T. (2007) 'The procurement function's role in strategic outsourcing from a process perspective', *International Journal Procurement Management*, Vol. 1, Nos. 1–2, pp.210–226.
- Chase, R. (1978) 'Where does the customer fit into service operation?', *Harvard Business Review*, Vol. 56, pp.137–142.
- Chase, R.B. (1981) 'The customer contact approach to services: theoretical bases and practical extensions', *Operations Research*, Vol. 29, No. 4, pp.698–706.
- Chase, R.B. and Tansik, A. (1983) 'The customer contact model for organization design', *Management Science*, Vol. 29, No. 9, pp.1037–1050.

- Chidamber, S. (2003) 'An analysis of Vietnam's ICT and software services sector', *Electronic Journal on Information Systems in Developing Countries*, available at <http://www.ejisdc.org>.
- Cladwell, B. (2004) 'Market focus: offshore infrastructure outsourcing,' *Worldwide*, Research Report Gartner, G00124694, November.
- Coase, R.E. (1937) 'The nature of the firm', *Economica*, Vol. 4, pp.386–405.
- Cramton, C. and Webber, S. (2005) 'Relationships among geographic dispersion, team processes and effectiveness in software development work teams', *Journal of Business Research*, Vol. 58, No. 6, pp.758–765.
- Davies, P. (2004) *What's this India Business?: Offshoring, Outsourcing and the Global Services Revolution*, Brealey, London.
- Ellram, L., Tate, W. and Billington, C. (2008) 'Offshore outsourcing of professional services', *Journal of Operations Management*, Vol. 26, No. 2, pp.148–163.
- Faraj, S. and Sproull, L. (2000) 'Coordinating expertise in software development teams', *Management Science*, Vol. 46, No. 12, pp.1154–1568.
- Ferguson, E. (2004a) 'Impact of offshore outsourcing on CS/IS curricula', *Journal of Computing Science in Colleges*, Vol. 19, No. 4, pp.68–77.
- Ferguson, R.B. (2004b) 'Bringing it home again: hidden offshoring costs frustrate IT', *eWeek*, Vol. 21, No. 36, p.9.
- Garner, C.A. (2004) 'Offshoring in the service sector: economic impact and policy issues,' *Economic Review – Federal Reserve Bank of Kansas City*, Vol. 98, No. 3, pp.5–37.
- Glaser, B. and Strauss, A. (1965) 'Discovery of substantive theory', *American Behavioral Scientist*, Sage Publications, Vol. 8, pp.5–12.
- Golden, A. (2004) 'Companies unhappy with results of 50% of IT deals', *Supply Management*, Vol. 9, No. 11, p.10.
- Greiner, L. (1972) 'Evolution and revolution as organizations grow', *Harvard Business Review*, Vol. 50, No. 4, pp.37–46.
- Greiner, L. (1998) 'Evolution and revolution as organizations grow', *Harvard Business Review*, Vol. 76, No. 3, pp.55–64.
- Hanna, R. and Daim, T.U. (2007) 'Decision-making in the service business: a sector comparison of information technology acquisition', *International Journal of Innovation and Technology Management*, Vol. 4, No. 1, pp.41–58.
- Hanna, R. and Daim, T.U. (2008) 'Managing offshore outsourcing in the software industry', *Technology Analysis and Strategic Management*, in press.
- Harland, C., Knight, L., Lamming, R. and Walker, H. (2005) 'Outsourcing: assessing the risks and benefits for organisations, sectors and nations', *International Journal of Operations & Production Management*, Vol. 25, pp.831–850.
- Hart, C., Heskett, J. and Sasser, W. (1990) 'The profitable art of service recovery', *Harvard Business Review*, Vol. 68, No. 40, pp.148–156.
- Harter, D. and Slaughter, S.A. (2003) 'Quality improvement and infrastructure activity costs in software development: a longitudinal analysis', *Management Science*, Vol. 49, No. 6, pp.784–800.
- Hilletofth, P. and Hilletofth, O. (2008) 'Supply chain management in fashion and textile industry', *International Journal of Services Sciences*, Vol. 1, No. 2, pp.127–147.
- Hoecht, A. and Trott, P. (2006) 'Innovation risks of strategic outsourcing', *Technovation*, Vol. 26, pp.672–681.
- Jiang, B., Frazier, G.V. and Prater, E.L. (2006) 'Outsourcing effects on firms' operational performance', *International Journal of Operations & Production Management*, Vol. 26, pp.1280–1300.
- Johansson, J., Krishnamurthy, C. and Schlissberg, H. (2003) 'Solving the solution problem', *McKinsey Quarterly*, Vol. 3, pp.116–125.

- Johnsen, R.E., Johnsen, T. and Arab, R.A. (2006) 'Coping with outsourcing: an interaction and network perspective', *Problems & Perspectives in Management*, Vol. 2, pp.78–85.
- Kargin, B., Basoglu, N. and Daim, T.U. (2008) 'Factors affecting the adoption of mobile services', *International Journal of Services Science*, accepted for publication.
- Lacity, M., Willcocks, L. and Feeny, D. (1996) 'The value of selective IT sourcing,' *MIT Sloan Management Review*, Vol. 37, No. 3, pp.13–18.
- Leiblein, M., Reuer, J.J. and Dalsace, F. (2002) 'Do make or buy decision matter?', *Strategic Management Journal*, Vol. 23, No. 9, pp.817–826.
- Metters, R. and Vargas, V. (2000) 'A typology of de-coupling strategies in mixed services', *Journal of Operations Management*, Vol. 18, pp.663–682.
- Mirani, R. (2007) 'Procedural coordination and offshored software tasks: lessons from two case studies', *Information & Management*, Vol. 44, No. 2, pp.216–230.
- Narula, R. (2004) 'R&D collaboration by SMEs: new opportunities and limitations in the face of globalization', *Technovation*, Vol. 24, No. 2, pp.153–161.
- Perry, D.E., Sim, S.E. and Easterbrook, S.M. (2004) 'Case studies for software engineers', *Proceedings of the 26th International Conference on Software Engineering*, 23–28 May, London, England, pp.736–738.
- Pries-Heje, J., Baskerville, R. and Hansen, G.I. (2005) 'Strategy models for enabling offshore outsourcing: Russian short-cycle-time software development', *Information Technology for Development*, Vol. 11, No. 1, pp.5–30.
- Robey, D., Welke, R. and Turk, D. (2001) 'Traditional, iterative and component-based development: a social analysis of software development paradigms', *Information Technology and Management*, Vol. 2, No. 1, pp.53–70.
- Sadlowski, M. (1998) 'Worldwide services: market definitions', Dataquest, research report, SVCS-EU-GU-9801.
- Schmenner, R.W. (1986) 'How can service business survive and prosper?', *Sloan Management Review*, Spring, pp.21–32.
- Shostack, G.L. (1984) 'Designing services that deliver', *Harvard Business Review*, Vol. 62, No. 1, pp.133–139.
- Stratman, J. (2007) 'Facilitating offshoring with enterprise technologies: reducing operational friction in the governance and production of services', *Journal of Operations Management*, corrected proof, 4/3/2007.
- Takeishi, A. (2002) 'Knowledge partitioning in the interfirm division of labor: the case of automotive product development', *Organization Science*, Vol. 13, No. 3, pp.321–338.
- Tinnila, M. and Vepsäläinen, A.P.J. (1995) 'A model for strategic repositioning of service processes', *International Journal of Service Industry Management*, Vol. 6, No. 4, pp.57–80.
- Venables, M. (2005) 'The truth hits home', *Manufacturing Engineer*, Vol. 84, pp.8–9.
- Verma, R. (2000) 'An empirical analysis of management challenges in service factories, service shops, mass services and professional services', *International Journal of Service Industry Management*, Vol. 11, pp.8–20.
- Wemmerlov, U. (1989) 'A taxonomy for service processes and its implications for system design', *International Journal of Service Industry Management*, Vol. 1, No. 3, pp.20–40.
- Willcocks, L.P. and Lacity, M. (1999) 'IT outsourcing in insurance services: risk creative contracting and business advantage', *Information Systems Journal*, Vol. 9, No. 3, pp.163–180.
- Williamson, O.E. (1981) 'The economics of organization: the transaction cost approach', *American Journal of Sociology*, Vol. 87, No. 3, pp.548–577.
- Yang, H. and Wang, Y. (2008) 'The modified theory of planned behavior applied to e-government service acceptance', *International Journal of Services Sciences*, Vol. 1, No. 2, pp.115–126.

- Yin, R. (2002a) *Application of Case Study Research*, Sage Publications Inc., Beverly Hills, CA.
Yin, R. (2002b) *Case Study Research*, Sage Publications Inc., Beverly Hills, CA.
Youngdahl, W. and Ramaswamy, K. (2007) 'Offshoring knowledge and service work', *Journal of Operations Management*, corrected proof.

Appendix: Research questions

Background

Ok. Here is the first question for background

- 1 Your name is _____, correct?
- 2 Would like to keep it anonymous?
- 3 What is your exact title?
- 4 How long have you worked with your organisation?
- 5 How long have you worked in this field?
- 6 Please briefly describe your roles and responsibilities at your organisation?
- 7 Tell me a little about the organisation your work for
 - Prompt for function, size (e.g., number of employees), regional distribution (e.g., one location or more?, in one area or more?)

About the department and outsourcing

- 8 Does your department outsource projects?
If they ask 'what exactly do you mean by outsourcing?'
'Outsourcing is the practice of contracting out all or part of a company's IT process and software development in a country other than where that company is headquartered and historically outside of where the product or service will be sold or consumed.'
- 9 What type of projects?
 - Prompt for topics if respondent did not answer software, customer support, telephone centers.
- 10 Approximately, how many projects your department outsourced?
- 11 Approximately, how many projects were considered successful?
 - On what basis did you consider projects successful (provide some choices of respondent did not come with clear answer – such as financial return – customer satisfaction, on time).
- 12 Approximately, how many projects were considered failure?

- On what basis did you consider projects failure (provide some choices of respondent did not come with clear answer – such as financial return – customer satisfaction, on time).
- 13 Approximately, how many projects have you been involved in outsourcing?
- Prompt for how was the choice was made – the process and people involved.
 - Prompt for whether influences or parties external to the department were involved in the decision.
- 14 What are the main characteristics for the projects to be considered for outsourcing?
- Do you consider the ‘degree of customer contact needed’ for implementing the project? Please explain.
- 15 Do you consider the degree of the knowledge embedded in the project to be outsourced? [Explain if respondent did not understand the question. The knowledge in part is tacit; the element of learning that cannot be captured in repeatable routines that can be codified and transferred and part explicit, learning that is easily transferable. IT service tasks are highly interdependent by their nature. For example, systems development, basic framework activities and the stipulation of software services are all knowledge intensive tasks, characterised by sequential and reciprocal interdependence between individual team members.]

At this point interviewer will show the respondent – Figure 1 mentioned above.

- 16 Please locate on this matrix your outsourced projects which were considered successful.

- 17 Please locate on this matrix your outsourced projects which were considered failure.

In case the respondent mentioned highly embedded knowledge projects that were successfully outsourced, the following questions will be presented.

- 18 For the highly knowledge embedded projects – how did you manage transferring the explicit knowledge? [writing reports, sharing information, documenting procedures]
- 19 How did you manage transferring the tacit knowledge? Please explain (will provide the following prompt questions after he/she provide full explanations).

Management practices to insure knowledge transfer

- 20 What managerial practices do you use, specifically, when outsourcing highly enclosed knowledge projects to insure knowledge transfer?
- Prompt – would you use story telling to explain situations and tacit knowledge?
 - Do you set face-to-face meetings to enforce trust and encourage transferring tacit knowledge among teams?
 - Other practices
- 21 Do you offer training sessions on culture and communication differences for team members and team leaders? If yes, please explain.

Finally:

- 22 Is there anything else that you would suggest to change or improve the quality of this research?
- 23 Any other comments or suggestions?

Thank you very much for your time and your answers. It will be a big help to the study.