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Business Process Management Journal

Developing re-engineering towards integrated process management

Business process outsourcing and application service provision

Guest Editors: Wendy Currie and Vishanth Weerakkody

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Guest Editors
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Designing effective incentive-oriented contracts for application service provider hosting of ERP systems

Kweku-Muata Bryson and William E. Sullivan

Keywords Information systems, Suppliers, Manufacturing resource planning, Contracts

Information systems (IS) outsourcing has been viewed as an attractive option by many senior managers generally because of the belief that IS outsourcing vendors can achieve economies of scale and specialization because their only business is information processing. The challenge of implementing, operating and maintaining enterprise resource planning (ERP) systems and the outsourcing service offered by ERP vendors have made ERP outsourcing an attractive option for some organizations. However, although IS outsourcing is now a major industry, the outsourcing of ERP applications is still in its infancy. This paper explores ERP outsourcing in terms of the application service provider (ASP) approach where a third-party vendor hosts, manages and maintains various data and ERP applications on behalf of different clients. Critical to the management of the ERP outsourcing relationship is the outsourcing contract, which, if improperly or incompletely written, can have significant negative implications for the outsourcing firm. Contracts that encourage vendor performance and discourage under-performance are therefore clearly of interest to managers. Although many articles have appeared on outsourcing, the issue of incentive contracts for ERP outsourcing has not been adequately addressed by researchers, partly because of the infancy of this area. In this paper, an approach to analyze incentive schemes and structuring ERP outsourcing contracts for the mutual gain of the parties is presented.

Application service provision: origins and development

D.E. Sofiane Tebboune

Keywords Information systems, Suppliers, Outsourcing

For many years, IS outsourcing has been an important strategy researched by many academics and practitioners. The emergence of the application service provision (ASP) model has given a new dimension to outsourcing, but, at the same time, drawing much confusion as to whether it is a new model or just reshaped traditional outsourcing. The aim of this paper is to establish a discussion about linking these two phases in the development of information systems and technology (IS/IT) outsourcing: traditional IS outsourcing and ASP. The authors argue that the emergence of ASP is both evolutionary and revolutionary. Evolutionary in that it has its inspiration from traditional outsourcing, and revolutionary in that it exploits a revolutionary networking and communication media: the Internet. This paper investigates different aspects of each strategy (IS/IT outsourcing and ASP), then draws a model for relating them. The paper concludes by arguing that traditional IS/IT outsourcing assumptions could be used as a basis for studying the ASP environment; however, the need for further research on the new aspects of this model, and thus the formulation of new rules, remain of major importance.

A framework for global IS outsourcing by application service providers

Khalid S. Soliman

Keywords Service delivery, Decision making, Information systems, Outsourcing

The phenomenal growth of the Internet has persuaded many companies of its potential as a channel for outsourcing information systems applications. Application service providers (ASP) are firms that offer outsourcing application services to many organizations via the Internet. By contracting ASP, organizations are having information technology (IT) staff focusing their efforts on core competencies while, at the same time, capitalizing on the expertise of outsourcer. On the other hand, many ASP turn some of their projects to global outsourcer. The study develops a framework that identifies the critical factors influencing ASP' decision to outsource globally. These factors are product development costs, IT talent, product quality, communication technology, tax incentives, and cultural differences. The rest of the paper discusses the differences between different types of global outsourcing, explore the emerging trend and advantages of utilizing ASP, and recommend measures to ensure the success of projects to be developed globally. The framework developed in this paper represents a foundation for more rigorous empirical research to identify the

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significance of each influencing factor. The results can provide ASP managers with a road map that addresses issues of concern in global outsourcing.

A case analysis of business process outsourcing project failure profile and implementation problems in a large organisation of a developing nation

Abdulwahed Khalfan

Keywords Outsourcing, Developing countries, Public sector organizations, Risk analysis, Kuwait

As is the case for many developing economies, internationally published research on information systems (IS) practice in Kuwait is in short supply. The few reports of Kuwaiti IS/information technology (IT) practice highlighted in studies of Middle Eastern or Arab computing, have also largely discussed them in terms of these broader regional identities rather than their specific national context. Business process outsourcing (BPO) is becoming a widely-accepted management practice throughout the world. In recent years, outsourcing of information services has become a pervasive phenomenon. Increasingly, organisations rely on external service providers for IS/IT services. Kuwait has been used as an example of a developing country where the data collection for this study was done there. This study employed case study methodology because the author was interested in answers for "how" and "why" questions and because the study was partly exploratory. The primary data on IS/IT outsourcing practices, obtained for the first time in Kuwait, were collected by means of semi-structured interviews supported by organisational documentation. The case study discussed in this paper brought to the surface critical elements missing in the contract that led to the demise of the BPO project. Studying failure is preventive because it helps organisations reduce the probability of failure in the future. A central argument of this paper concerns the need to understand the complex cultural and political implications of outsourcing within a global context (perspectives), a policy that is becoming increasingly important. The case study findings are crucial as they provide a careful diagnosis of failed IT outsourcing project.

An enterprise layer-based approach to application service integration

Wilfried Lemahieu, Monique Snoeck and Cindy Michiels

Keywords Modelling, Business planning, Object-oriented methods

At present, many companies rely on third-party applications and application services for (part of) their information systems. When applications from different parties are used together, an integration problem arises. This paper describes an integration approach based on the construction of an enterprise layer. This approach is deliberately kept away from a document-based, flow-oriented approach, where business processes are hard coded into the application architecture. Interaction is based on the concurrent update of a shared underlying enterprise layer. At the same time, the application architecture becomes easily adaptable to re-engineered business processes.

Re-engineering business processes through application service providers: challenges, issues and complexities

Vishanth Weerakkody, Wendy L Currie and Yamaya Ekanayake

Keywords Information systems, Suppliers, Business planning, Worldwide web, United Kingdom

The quest for service excellence and competitive edge by firms result in the constant search for effective process and information systems management methods. The recent emergence of the application service provision (ASP) business model has promised firms remote-access to industry robust business processes and "best of breed" enterprise applications on a rental basis. This paper examines how the ASP business model facilitates business process and information systems improvements in firms through effective process management. This is pursued through a review of relevant literature and empirical evidence gathered from a case study-based investigation in six firms in the UK. By examining the features of remote application and business process outsourcing in the context of business process management, this paper outlines how firms can improve their business and IT performance. Findings from empirical evidence are used to substantiate the arguments and suggest areas for future research.

Guest editorial

About the Guest Editors *Wendy Currie is a Professor of Strategic Information Systems and Director of the Centre for Strategic Information Systems (CSIS), Department of Information Systems and Computing, Brunel University, UK. She currently holds three research grants from the EPSRC and ESRC for the study on application service provisioning (ASP) and Web services. Professor Currie has published several books and journal articles on Management and Strategy. She holds a PhD from Henley Management College and is an associate editor for the* MISQ Journal.

Vishanth Weerakkody is a Lecturer in the Department of Information Systems and Computing at Brunel University, UK. He holds an MSc in Business Systems Analysis and Design from City University in London and a PhD in Process Management and Information Systems from the University of Hertfordshire. Dr Weerakkody has published several journals and conference articles and held various IT positions in multinational organisations.

In the current age of globalisation, overall business integration and rapidly evolving trading environments; new technologies are constantly being introduced, as old ones become obsolete. While businesses are prone to continuous changes and rapid evolution (Clark *et al.*, 1995), technology today has become a strategic enabler and is no longer relegated to the task of automating processes and functions.

The increasing importance of IT to organizations over the years has led in many instances to seek viable IT solutions through in-house operations or from access to third party services. The latter emerged in the 1960s as a form known as "bureau service" where organizations sought third party services to rent processor time (Michell and Fitzgerald, 1997). This era was characterized by expensive and physically large computers. In order to avoid this capital investment, many organizations contracted with a data processing service bureau to operate the data processing function. This became known as facilities management (Owen and Aitchison, 1988).

The 1970s witnessed the beginning of the standard application package concept to the market and more standardization to wider levels of systems software. However, the increasing demand for IS applications and inadequate supply of IS personnel during the 1980s, encouraged managers to seek solutions through contract programming which was a form of outsourcing. While there was much support for vertical integration during this period (Porter, 1985), on site facilities management and complete outsourcing of IT systems was common. In simple terms, IT outsourcing involves the significant contribution of external vendors in the physical and/or human resources associated with the entire or specific component of the IT infrastructure in an organisation (Loh and Venkatraman, 1992).

The 1990s saw a productivity-paradox emerging with many firms facing ever-increasing costs associated, in particular, with client/server computing.

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During this period, outsourcing was seen as a mode for transferring the cost of IT investments to an external source (Hirschheim *et al.*, 2002).

At the same time (early 1990s), business process reengineering (BPR) emerged as the foremost technique for managing a cost-effective, efficient and competitive firm (Davenport, 1998; Hammer and Champy, 1993; Harrington, 1991). However, BPR introduced with it practical difficulties in reengineering legacy information systems in firms (Child *et al.*, 1994; Stickland, 1996; Weerakkody and Hinton, 1999). Further, many firms found that the success of IT outsourcing often depended on effective management of business processes. Companies which were able to manage and transform their business processes whilst outsourcing "non-core" processes were able to make significant efficiency gains. In recent years though, the issue of business processes management (BPM) has returned to center stage, most notably with new process management challenges arising from the boundary-less "e-economy".

During the mid 1990s, technical developments in the form of the Internet were emerging with vendor promises of reducing the price of business computing (Currie *et al.*, 2003). The growth of the Internet formed the foundation for a new network-centric computing paradigm where firms could shift software applications from the desktop to the network and servers. As the 1990s came to a close, the convergence between telecommunications and computing was seen as a panacea to reduce the total cost of ownership (TCO) of business computing. In addition, the evolution of the Internet as a means of publishing to a dynamic, secure medium for sharing information and software applications would provide an efficient, cost-effective way previously not possible under traditional outsourcing models.

The application service provision (ASP) model emerged as part of a new paradigm for business computing during the late 1990s. By 2000, the acronym ASP was one of the most widely used in the business community. In short, the term ASP was used to denote the delivery of software-as-a-service, priced on a per-seat (user), per-month basis. Global interest in the Internet and network computing was leading to a rebirth of subscription-based software applications outsourcing. Since the deployment of Internet-based applications was seen as more cost-effective than client/server computing, interest in applications outsourcing gained momentum, particularly for those seeking new business development opportunities. Under the applications outsourcing model, customers enter a contract with an ASP to rent business-focused or vertical (industry-specific) applications, accessed via a Web browser; either over the Internet, virtual private network (VPN), or dedicated network.

Although in the past outsourcing was often seen as a practice used to offload the routine day-to-day operations of a firm to a third party to manage, the emergence of the ASP model added a new dimension to outsourcing. One of the attractive features of the ASP model is that it offers the chance for smaller firms that were hitherto unable to afford *best of breed* enterprise applications to benefit from the economies of scale characterising the ASP model (such as the availability of applications on a pay-per-use basis) (Miley, 2000).

While the ASP model focused on selling access to managed applications initially (1999-2001), it is currently moving to provide business services (Computer Business Review, 2001; IDC, 2002). This has encouraged some firms not only to outsource their application software to a remote vendor, but also to hand over the running of some of their routine-non-core business processes to service providers. This evolution is referred to as "business process outsourcing" (BPO), where entire business processes that are deemed to be "non-value-add functions" are outsourced and handled by a separate firm. BPO involves the assumption of responsibility by a service provider for a series of tasks that, performed together, achieve a specific business outcome (Cherry Tree and Co., 2001).

While the ASP business model promises firms remote-access to "best of breed" enterprise applications on a rental basis, BPO allows firms to benefit from industry robust, efficient and cost-effective business processes of leading service providers. Such a model will enable ASPs to offer a clearer return on investment, making them a more alluring prospect for potential customers. As a result, the service provision industry has seen an increase in demand for suppliers who are both ASP and BPO providers (Brown, 2001).

Over the last decade, with the emergence of BPR in the early 1990s and the ASP model in the late 1990s, BPO has grown in popularity and has been revitalised. In addition, advancements in information and communications technologies (ICTs), particularly those relating to the growth of the Internet, corporate extranets and intranets, have enabled business-to-business commerce. As such, the realisation of BPO has become a distinct possibility as the technical and communications infrastructure enables firms to outsource selected business processes to third parties. Further, enterprise systems in many firms are increasingly modular and able to interact with other internal and external applications, which have made the outsourcing of business processes such as human resources, financial accounting, and procurement a less complicated task. This is further facilitated by the emergence of the Web-services concept and Microsoft's.NET and Sun Microsystems J2EE platforms (Currie *et al.*, 2003).

In this special issue on BPO and ASP for the *Business Process Management Journal*, six research and practitioner papers are presented on a range of topics from ERP outsourcing to global outsourcing through ASP, and the impact of ASP and BPO on effective process management in firms. The paper by Bryson and Sullivan on "Designing effective incentive-oriented contracts for application service provider hosting of ERP systems" explores ERP outsourcing in terms of the ASP approach. They highlight the significance of contracts when outsourcing ERP systems using an ASP and present an approach to analyse incentive schemes and structure ERP outsourcing contracts. This is pursued through a transaction cost perspective for the analysis of ERP systems outsourcing decisions. The authors attempt to identify all significant risks associated with outsourcing core information processing functions and assign probabilities and dollar values for each risk.

The paper by Tebboune, "Application service provision: origins and development" aims to establish a discussion about linking two phases in the development of information systems and technology (IS/IT) outsourcing: traditional IS outsourcing and ASP. They argue that the emergence of ASP is both evolutionary and revolutionary. The paper investigates different aspects of each strategy (IS/IT outsourcing and ASP), and draws a discussion on linking them. The authors argue that traditional IS/IT outsourcing assumptions could be used as a basis for studying the ASP environment, but concede the need for further research to formulate new rules for the ASP model.

In his paper, "A framework for global IS outsourcing by application service providers", Soliman identifies the critical factors that influence ASPs to outsource globally. The author identifies factors such as product development costs, IT talent, product quality, communication technology, tax incentives, and cultural differences as influencing ASPs strategy to outsource globally. The paper discusses the differences among different types of global outsourcing, explores the emerging trend and advantages of utilizing ASP, and recommends measures to ensure the success of projects to be developed globally.

Khalfan continues in the theme of global outsourcing in his paper "A case analysis of business process outsourcing project failure profile and implementation problems in a large organisation of a developing nation". The author highlights the significance of needing to understand the complex cultural and political implications of outsourcing within a global context. He uses a case study to gather data on IS/IT outsourcing practices in a large firm, obtaining such information for the first time in Kuwait. Through this approach, the author identifies critical elements missing in the outsourcing contract that lead to the demise of a BPO project in the firm.

The paper by Lemahieu *et al.*, "An enterprise layer based approach to application service integration", examines the integration problem arising from the use of different applications from different vendors. In their paper, the authors describe an integration approach to managing applications based on the construction of an enterprise layer. They argue that this approach allows staying away from a document-based, flow-oriented "stove-pipe"-like system where information is vehicled from one application to another. The authors suggest that common information be stored into a shared object database that can be accessed through an event-handling layer. This approach, according to the authors, is then used to synchronise all information in third-party applications by means of co-ordination agents, allowing companies to remain more independent from their ASPs as they remain the owners of core company data.

The final paper, by Weerakkody and Currie, "Can ASPs improve the process management capabilities of firms?" examines how the ASP business model facilitates business process and information technology improvements in firms through effective process management. This is pursued through a review of relevant literature and empirical evidence gathered from a case study based investigation in six small to medium sized firms in the UK. By examining the features of remote application and BPO in the context of business process management, the paper outlines how firms can improve their business and IT performance. The authors use empirical evidence to substantiate their arguments and suggest areas for future research.

Wendy Currie and Vishanth Weerakkody
Guest Editors

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Designing effective incentive-oriented contracts for application service provider hosting of ERP systems

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Keywords *Information systems, Suppliers, Manufacturing resource planning, Contracts*

Abstract *Information systems (IS) outsourcing has been viewed as an attractive option by many senior managers generally because of the belief that IS outsourcing vendors can achieve economies of scale and specialization because their only business is information processing. The challenge of implementing, operating and maintaining enterprise resource planning (ERP) systems and the outsourcing service offered by ERP vendors have made ERP outsourcing an attractive option for some organizations. However, although IS outsourcing is now a major industry, the outsourcing of ERP applications is still in its infancy. This paper explores ERP outsourcing in terms of the application service provider (ASP) approach where a third-party vendor hosts, manages and maintains various data and ERP applications on behalf of different clients. Critical to the management of the ERP outsourcing relationship is the outsourcing contract, which, if improperly or incompletely written, can have significant negative implications for the outsourcing firm. Contracts that encourage vendor performance and discourage under-performance are therefore clearly of interest to managers. Although many articles have appeared on outsourcing, the issue of incentive contracts for ERP outsourcing has not been adequately addressed by researchers, partly because of the infancy of this area. In this paper, an approach to analyze incentive schemes and structuring ERP outsourcing contracts for the mutual gain of the parties is presented.*

Introduction

Competitive pressures in recent years have motivated executives in many organizations to outsource major IT functions in order to improve performance and enhance the reliability of their information systems (IS). IT outsourcing has grown rapidly over the past decade with more and more companies attempting to outsource IT functions so that they can focus on their core businesses. A more recent development in IT outsourcing is the advent of the application service provider (ASP), a third-party firm that hosts an application that is accessed and run by another firm for its own data processing purposes (Lacity *et al.*, 1995; Rutherford, 2000). This client or outsourcing firm may be the only one that uses the application or it may be that the firm shares the application with other IT customers who require similar business functionality. The

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advent of the ASP offers many unique opportunities for firms to outsource the maintenance and management of mission-critical applications to firms that have the training and experience to properly handle the many different aspects of information technology management. Ultimately, to be successful an ASP must provide a higher level of service than the customers could achieve themselves and the ASP must do this at a lower cost to the outsourcing firm (McKie, 1999).

Although IS outsourcing can appear very attractive initially, IS outsourcing decisions are inherently complex for many reasons. The first is that the introduction of an autonomous third party within the organization that manages a critical organizational resource is often a challenge that an organization cannot handle effectively. Additionally, in many cases, costs rise precipitously after the outsourcing firm has become committed to the relationship and has few viable alternatives. In the more traditional areas of IS outsourcing some attempts at outsourcing have been catastrophic failures (Due, 1992; Lacity and Hirschheim, 1993b; Rochester and Douglas, 1990, 1993), and some firms have been forced to terminate their contracts with vendors and reconstruct their data centers within their organization (Lacity and Hirschheim, 1993a, b; Reponen, 1993). One explanation that has been offered for the failure of IS outsourcing arrangements is the lack of analytical models and tools to evaluate the many different alternatives available to an organization (Alpar and Saharia, 1995; Chaundry *et al.*, 1992; Ngwenyama and Bryson, 1999; Reponen, 1993), although some researchers have recently proposed some analytical models (Bryson and Ngwenyama, 2000; Ngwenyama and Bryson, 1999). However, while those models were directed at the general IS outsourcing problem they did not address issues that are more specific to enterprise resource planning (ERP)/ASP outsourcing. In this paper, we will attempt to address this deficiency by providing a transaction cost perspective for the analysis of ERP systems outsourcing decisions. We hope to provide a set of tools to analyze systematically all the possible costs involved with outsourcing ERP systems and their attendant support functions. A key aspect of this process is to identify all significant risks associated with outsourcing core information processing functions, such as those addressed by ERP systems, and then assign probabilities and dollar values for each risk.

Overview of the ERP/ASP outsourcing problem

While an outsourcing contract offers attractive opportunities, there is also the potential tremendous negative impact on the outsourcing firm in the event of vendor failure. Outsourcing an ERP application to an ASP involves taking a journey on a road in which the stakes are very high. It is therefore critically important that the outsourcer have an informed understanding of both itself and each potential vendor partner. In many cases, the reasons for failure do not matter nearly as much as the failure itself, which, in many cases, will call into question the continued viability of the outsourcing firm if workable data processing alternatives have not been developed and put into place (Bulkele, 1996; Markus and Tanis, n.d.).

The traditional approach to ERP system implementation is to hire a consulting firm that specializes in a particular ERP system. These are usually large firms with established practices or small firms that consist of former employees from the larger consulting firms. These consulting firms specialize in the complex processes of installing and configuring the ERP application to consider the particular processing requirements of the organization implementing the ERP system. Typically, the ERP installation and configuration process takes between six and 18 months, although some implementations drag on for several years. In these types of arrangements, the consulting firm is hired to get the client organization up and running with the new technology. However, the client organization plans to take over the day-to-day maintenance and operation of the application once it is properly installed and configured. In this scenario, the consulting firm is only hired intermittently once the application is successfully installed to assist with software customizations and software upgrades pursuant to a new release from the ERP vendor.

This is usually the plan. However, in reality, the ERP consulting firm almost never entirely goes away, as the client organization often becomes dependent on their expertise with the ERP software as well as their intimate knowledge of the organization's business processes (Koch, 1999).

This brings us to the outsourcing model discussed in this paper. The modification is that once the ERP system is successfully installed and configured, the consulting firm or another related organization will host the system remotely and be responsible for daily data back-ups and periodic upgrades to the software as the ERP vendor issues new releases. This arrangement is appealing in theory. However, as we discuss later, it can have unwanted and potentially dangerous consequences for the outsourcing organization.

Although most companies who implement an ERP system outsource the installation and configuration of the system to experienced consultants, some companies are currently going a step further and hiring consulting firms or ASPs to continue to host and maintain as well as upgrade their new ERP system once it is installed. The ASP model consists of an ERP vendor or an experienced technology hosting firm that will maintain an organization's applications and provide access to these applications on demand over the Internet or a virtual private network. The ASP company maintains the application, conducts regularly scheduled back-ups of client data, performs software upgrades as the ERP vendor releases new versions of their product and often provides help desk support, all for a fixed monthly fee. For many companies, this is an excellent way to control costs on an endeavor that has defied cost controls to date (Buckhout *et al.*, 1999).

The advent of the ASP model in the ERP marketplace has been slow but steady in its growth over the past few years (James and Wolf, 2000). There are several reasons for this growth. The first is the growth in use and acceptance of the Internet as a viable medium for conducting business. This growing acceptance has encouraged ERP vendors to Web-enable their applications. This, in turn, allows multiple clients to access the same installation over the Internet. The other recent development is the rapid evolution of middleware. Middleware allows organizations to standardize the messages that are sent between different applications, thus facilitating communication between disparate systems (James and Wolf, 2000).

As with most outsourcing arrangements, there is a broad continuum of possibilities for the potential scope of the outsourcing arrangement. Many ERP vendors offer preconfigured applications that are specially designed for firms in specific industries that are inherently very similar (e.g. dentists offices). These applications almost force the subscribing organizations to adopt the business processes that are established within the ERP application as it is configured on the host servers. However, there are other arrangements where the outsourcing organization is large enough to warrant its own ERP installation and custom configuration engagement. In this instance, the ERP application is hosted on a separate server or multiple application and database servers for the benefit of a single organization. Our discussion will account for either of these scenarios.

Smaller companies are often attracted to the ASP model for ERP systems because they cannot afford to buy a top-tier ERP system out of the box. However, they also do not want to install a smaller system that will not scale with their anticipated future growth and necessitate the installation of a new ERP system with all of its attendant configuration and data conversion challenges. The ASP model allows them to "pay as they grow" and manage their IT support costs with a contract that ensures that their ERP expenditures will never be more than a specified monthly fee (*Outsourcing Journal*, 1999).

Conversely, larger companies are beginning to recognize the truth in Mary Lacity's admonition that: "Just because IT activity is business-critical or even strategic, it does not mean that all its elements have to be kept in house" (Lacity *et al.*, 1995). Even though they often have extensive financial resources, transaction processing is not a strategic advantage and many ASPs can provide the same service for much less money than internal resources.

In addition, the performance metrics by which ASPs are judged are changing. The new performance metrics are morphing from simple highly-quantitative technology/infrastructure metrics such as uptime, bandwidth and security to more business-oriented metrics such as cost savings, cycle-time reduction, and supply chain efficiency (Paul, 2000). This reflects the growing concern with business performance rather than technical mastery. Although technical mastery is an important prerequisite, it is not useful, if it does not translate into business advantage.

The first issue to examine in any ERP outsourcing decision is for the outsourcer to evaluate its motive and purpose for entering into an outsourcing contract and the associated opportunities and risks. Reasons for entering into an outsourcing agreement include:

- the quest for more efficient operations;
- relieving themselves of the burden of trying to recruit and retain expensive IT personnel to maintain applications that they do not know how to manage;
- managing their cash flows more effectively by having a predetermined monthly cost for their IT expenditures;
- the firm wants to outsource their IT functions so that they can focus on their core business functions.

While any of these motivations are valid for entering into an outsourcing contract, each of these reasons will shape an outsourcer's behavior in very different ways. They will also have an impact on an outsourcer's cost structure and how they evaluate risk within the constraints of an outsourcing contract.

The next issue to examine in any ERP outsourcing decision is to evaluate the ASP's motives and capabilities, and opportunities. Why does the ASP want to do business with a particular outsourcer? What can they hope to achieve and what makes one engagement more attractive to an ASP than another? There are many reasons that an ASP would want to provide ERP outsourcing services to a particular organization. These include:

- opening new lines of business;
- the opportunity to use a well-known company as a reference;
- the opportunity to gain market-share in a certain industry;
- the company is financially weak and desperate for business.

Each of these reasons will cause the ASP to behave very differently both in their negotiations with the outsourcing firm and once the contract has been signed, including how they staff the engagement, how they treat subsequent negotiations with the client, why they are likely to shirk under the contract.

Once a contract has been signed with an outsourcing vendor, the main concerns of the outsourcing firm become maintaining the service levels established in the contract. Shirking by the ASP is a real problem that must be addressed both before a contract is signed as well as after. There are several reasons that an ASP would shirk their commitments under an outsourcing contract. These include:

- the success of their outsourcing business;
- the ASP declares bankruptcy;

- the ASP's site is attacked and vandalized;
- the ASP's facilities are damaged or destroyed by a natural disaster (Clemons, 2000).

Each of these reasons bears closer examination.

An ASP might shirk because they signed a contract with an outsourcing organization when they were just beginning their operations and they were much more aggressive in their quest for business. However, as the ASP grows and becomes more successful and they have engagements with higher margins, they may be tempted to shirk in any number of ways to reduce the cost associated with a particular engagement in order to bring the margins associated with that engagement in line with their other, more profitable, engagements. Shirking and opportunistic bargaining are usually a function of changes in the balance of power between the outsourcer and the vendor (Clemons, 2000).

If the ASP suffers financial hardship or declares bankruptcy, the impacts on an outsourcing arrangement can be catastrophic. The vendor may not only shirk in his responsibilities relating to the project, but also he may not perform on the contract at all. In these situations, a disaster recovery plan is mandatory. Financial hardship or bankruptcy is a major risk for many ASPs. The Gartner Group estimates that as many as 60 percent of current ASPs will go out of business by the end of 2001 (Terdiman, 2000).

There are several other instances when an ASP may not be able to perform on a contract. These are when their physical facilities are compromised or damaged due to human intervention or criminal activity or in the event of a natural disaster. In either event, back-up data processing resources should be in place to ensure the continued viability of the outsourcing firm.

A framework for the ERP outsourcing decision

The discussion of the previous section suggests a framework for the ERP outsourcing decision. We offer a methodology that draws from insights provided by Aubert *et al.* (1998) stating that there are three basic risk factors in outsourcing.

(1) Analysis of the outsourcer's business.
(2) Analysis of the vendor's business.
(3) Outsourcing alternatives analysis.

We should make it clear that our current model applies to an ASP that installs and configures the application in addition to hosting and maintaining the application. In the following discussion of our model, we use the terms "ASP" and "vendor" interchangeably.

Outsourcer's business analysis phase

Definition of performance levels

(1) The outsourcer should define the performance levels for the relevant IS function that is to be outsourced. Factors relevant to the definition of these levels include the components of information quality (e.g. response time, accuracy of data, ease of access, reliability, number of simultaneous users, quality of end-user support) and end-user information processing costs. Since ERP systems generally incorporate virtually all business functions in their operation, the IS functions that support these business process functions should be included in the analysis. In addition, metrics should be developed for these business processes so that they can be used to evaluate the performance of the ASP once the new systems are up and running.

(2) Once the service levels have been defined, the outsourcer should estimate the value of each performance level in each period based on the overall business objectives. Pairwise comparisons (complete or incomplete) involving a group of evaluators could be used to provide estimates of the relative values of the performance levels.

(3) The set of performance levels that are attractive to the outsourcer with respect to each period should be identified.

Identification of risks and risk prevention/resolution strategies. Risks are associated with any business strategy and so it is important to identify both risks and their costs, and associated risk prevention (RP)/resolution strategies and their costs (Table I). Therefore, for each performance level:

(1) *Identify all associated risk items*. For each risk item, estimate its likelihood of occurrence, and its severity of the impact. These risk items should include both the business process risks and the relevant IS functions that support these business functions. The most important thing to keep in mind during this analysis is that business processes and IS functions interact with each other in often unpredictable ways. Therefore, Table I includes both IS function failures and business process failures as risks to be considered. Many organizations that are working with an ASP confine their performance metrics to strictly technical metrics that are easily quantified. However, as mentioned earlier, the business process metrics are equally, if not more, important to the overall ROI proposition for the outsourcing firm. It is crucial for any outsourcing firm to gain a clear understanding of the capabilities and limitations of their ASP before they enter into a long-term agreement to ensure that they both get the most out of the relationship and avoid the problem of unreasonable expectations.

(2) *Identify the critical set of risk items* (i.e. those whose severity of the impact exceeds some threshold).

Risk item	Risk prevention/resolution action
Software failure (e.g. SAP apparel sector module)	Do nothing Hot site for parallel processing Back-up data maintained on customer site that can be retrieved and installed on site in the event of an emergency
Software unavailability (e.g. data warehousing software does not provide for the storage of detailed-level historical data)	Do nothing Write an in-house solution that will bridge the gap between current and desired functionality Hire consultants to build the new functionality Work with the software vendor to develop the necessary functionality.
Technical skills unavailable at affordable cost	Do nothing Train current employees who are vested in company's pension plan Train college students and "bond" them to work with company for at least three years Hire cheaper consultants and pay for them to train and sign agreements to work for a specified period of time
Inadequate fit between organizational and ERP system definition of process	Do nothing Customize the ERP software Build an internal solution that will interface with the ERP system to provide the desired functionality
Internet overload slows response time from the application and database servers	Do nothing Consider the installation or leasing of high-speed lines Set up a secondary processing site in a different geographical location that will allow them to switch to a faster site during slow Internet service times
Earthquakes or other natural disaster delays or knocks out Internet service.	Do nothing Set up a secondary processing location that will allow uninterrupted service Set up a secondary processing location on site that will ensure constant access to the application
Inadequate end-user readiness	Do nothing Create an intermediate organizational layer that acts as an interface between end-users and ERP system Provide remedial ERP training for employees who need it

Table I.
Example of general ERP risk items and RP/resolution strategies

(3) For each risk item in the critical set of risk items, identify a set of risk prevention/resolution action alternatives and the corresponding cost. It is possible that a given RP/resolution action (RA) could apply to multiple risk items.

(4) For each risk item/risk action pair, estimate the degree of effectiveness of the RP/RA on the risk item.

(5) Eliminate those RP/RA whose estimated degree of effectiveness is below some specified threshold.

The key aspects of this analysis in ERP outsourcing is the assumption that the outsourcing organization has a strong cost accounting capability and understands what each business function is currently costing them to perform. There is a process of continual measurement once the ERP system is installed and configured, these cost metrics will have to be reassessed to determine how cost patterns have changed as well as where the organization is more efficient as well as where the organization is less efficient. The big challenge with an ERP installation is that the business process changes are often considerable and the impacts may be subtle and not easy to predict before completion of the project. Finally, it should be reiterated that the outsourcing strategy of the outsourcing firm will have a tremendous impact on the nature of the outsourcing relationship and the expectations placed on the ASP. If the outsourcing firm uses a consulting firm to install and configure the ERP application modules and then has another firm to host the application and act as the ASP, then they may be limited to expect only technical support such as regular back-ups and software upgrades. If, on the other hand, the outsourcing firm hires the same firm to install and configure the software as well as host the software once it is operational, they may also hold the firm responsible for the efficiency and effectiveness of the business processes performed within the software application.

Vendor business analysis phase

Business strategy analysis

(1) Conduct analysis of vendor's business in order to determine the impact of vendor's overall business strategy in each period t of the contract.

(2) Attempt to identify vendor's likely motivation for entering into relationship with the outsourcer.

Estimate the costs of each performance level. For each performance level k and each time period t:

(1) Estimate the highest ($c_{k\,\mathrm{U},t}$), lowest (i.e. $c_{k\,\mathrm{L},t}$), and most likely (i.e. $c_{k\mathrm{M},t}$) cost to the given vendor. This is similar to the approach used in PERT for eliciting the time of each activity. Some of the information relevant to the determination of these estimates could be obtained from the bids of various vendors. The outsourcer could present various performance level scenarios to prospective vendors and request estimates of corresponding costs, and also what additional vendor activities and IT resources would be needed to make the transition between different performance levels. In the proposal the vendor may estimate his/her cost for performing at level k in period t at $c_{k,t}$. Although the cost to the vendor for performing the activity at the quality level of the given cell may be a range, we will assume that the vendor will use the lowest cost, since all costs in the given range result in the same value to the outsourcer.

Identify the vendor-related risk items of each performance level

(1) Identify the critical set of risk items which consist of general ERP risk items and the vendor-specific risk items that are likely to apply and for which the severity of impact exceeds some threshold. These include settings the ASP can make while configuring the system during implementation that can adversely affect the operation of the system from a business process perspective as well as ways that the vendor may fail to provide adequate or accurate IS functional support.

(2) Identify the set of RP/RA that would apply to the critical set of risk items, and for each RP/RA estimate the cost to the vendor (Table II).

(3) Identify the performance level that would result from the occurrence of various combinations of risk items where the probability of occurrence of the combination exceeds some specified threshold.

Table II.
Examples of vendor-related risk items

Risk item	Risk prevention/resolution action
Failure to upgrade IT infrastructure results in inferior service	Write a clause in the contract that states that there will never be more than a certain number of clients accessing the servers, disk packs and networks that the outsourcer's applications are supported upon Specify detailed, quantifiable and measurable service levels that must be maintained. Then monitor these service levels Specify CPU and/or network utilization percentages. When these percentages are met or exceeded, then the infrastructure must be upgraded within a specified time period
Postpone software/hardware upgrades to save cash	Do nothing Specify the time after a new software release when the software must be upgraded
Inexperienced consultants assigned to project	Demand right of refusal on all consultants assigned to your project Interview all consultants assigned to your engagement
Suffers hardships and declares bankruptcy	Set-up a daily back-up server that resides on site Design, develop, and implement a back-up or hot site parallel processing capability Develop relationships with other ASPs that can provide the same service quickly with data that you already have. Prepare to change vendors well in advance of the need to change vendors
Over-commits in the attempt to increase his/her revenues and as a result provides inferior service	Establish quantifiable service levels and monitor service continuously Predetermine acceptable service levels and provide for penalties to be assessed against the vendor if performance falls below accepted minimums

Outsourcing alternatives analysis phase. Once the information of the two previous phases has been collected and analyzed, the main aspects of outsourcing analysis can be conducted. Various approaches can be used for this analysis, but we will use an extension of the transaction cost approach proposed by Bryson and Ngwenyama (2000) and Ngwenyama and Bryson (1999).

Description of the analysis of outsourcing alternatives procedure. The approach proposed by Bryson and Ngwenyama (2000) had three major steps:

(1) *Generate expected profit values*. For each performance level, values for the outsourcer's expected profit and the ASP's expected profit are automatically generated for various situations (e.g. vendor does not want the outsourcer to switch to another vendor at the end of period *t*, vendor is unconcerned whether the outsourcer switches to another vendor at the end of period *t*).

(2) *Trade-off analysis*. Using the data generated in the previous step, the outsourcer conducts a tradeoff analysis to determine the performance level and vendor probability of profitability that would be most advantageous to the outsourcer and still sufficiently attractive to the vendor. At the end of this step, the outsourcer would have made at least a tentative decision on the desired performance level, and also of ASP probability of profitability for the scenario when vendor cost is uncertain.

(3) *Specify incentive contract*. The reward component, penalty component and payment rules of the incentive contract would be automatically generated based on the choice of outsourcer in the previous step.

Overview of transaction cost model. The basic concepts of our transaction cost model is that total cost of IS outsourcing can be divided as follows:

- The cost of the information processing service, which can be estimated from the market.
- Set-up/contracting cost that includes search related cost to find a vendor, negotiation fees, legal fees, and other labor charges incurred to institutionalize the relationship.
- The cost of monitoring and coordinating the activities of the vendor(s) that includes labor and equipment.
- Switching cost, that is, the cost to change ASPs in situations of under-performance or failure.

While previously this has been looked at in terms of an indefinite horizon game (Bryson and Ngwenyama, 2000; Ngwenyama and Bryson, 1999), for this paper we will consider the situation when the contract covers a set of time periods, and the vendor's attitude and ability to the contract may vary in the different periods. The vendor's ability in different time periods of the contract may be related to various factors including market conditions, the occurrence of certain risk items and corresponding costs. Similarly, the ASP's attitude to the contract may vary from doing what is necessary to ensure that the outsourcer does not switch to another ASP at the end of the given time period to being unconcerned about whether the outsourcer switches. Also the value of a given performance level to the outsourcer and the corresponding cost to the ASP may vary in different periods.

A preliminary assumption of the transaction cost model presented by Bryson and Ngwenyama (2000) is that, given switching costs s_t, then associated with each performance level k is an associated vendor shirking level $kD(t)$ in period t such that $kD(t) = \mathrm{Max}\ \{kr : v_{k,t} - v_{kr,t} \leq s_t;\ k < kr\}$ if the vendor is concerned about the outsourcer switching to another vendor at the end of period t, with the assumption being that for all periods the vendor would always be concerned about the outsourcer switching at the end of the given period. However, it is possible that in a given period t the vendor may not be concerned about the outsourcer switching to another vendor at the end of period, and so $kD(t)$ could be the performance level that provides $C_{kD(t)} = \mathrm{Min}\ \{c_{kr,t} : k < kr\}$ even though $v_{k,t} - v_{kD(t)} \geq s_t$. Such a situation could arise if business is going overall poorly for the vendor, or in the other extreme, when business is going exceptionally well and so the vendor might not need the outsourcer's business.

Ngwenyama and Bryson (1999) showed that for given coordination, monitoring and switching costs, $kO(t)$, the optimal performance level from the outsourcer's perspective was the performance level that provided the following:

$$v_{kO(t)} - c_{kO(t)}(a)/(1 - \theta_{D(t)}) = \mathrm{Max}\ \{v_{k,t} - c_{k,t}(a)/(1 - \theta_{D(t)}) : k \in K(t)\}$$

where $K(t)$ was the set of performance levels that were acceptable to the outsourcer for period t, $v_{kO(t)}$ was the value of performance level $kO(t)$ to the outsourcer, $c_{kO(t)}(a)$ was to the vendor of performing at level $kO(t)$, and $\theta_{D(t)}$ was the minimum profit rate acceptable to the vendor which implied that the vendor would be paid $p_{kO(t)} = c_{kO(t)}(a)/(1 - \theta_{D(t)})$.

The outsourcer's profit is affected to the degree that the vendor is able to determine the level of performance. Thus, in order to maximize the outsourcer expected profit we must consider the vendor's choice. The outsourcer's expected profit under shirking can be modeled and analyzed as follows. Let $h_{kO(t)}$ be the probability that the vendor will shirk given the contract requirement for performance level $kO(t)$ and price $p_{kO(t)}$, and coordination strategy a. The outsourcer's expected profit may thus be expressed as:

$$E\{\Pi_o(t, K(t), kO(t), p_{kO(t)})\} = (1 - h_{kO(t)})\Pi_o(t, K(t), kO(t), kO(t)) + h_{kO(t)}\Pi_o(t, K(t), kO(t), kD(t))$$

$$E[\Pi_o(t, K(t), kO(t), p_{kO(t)})] = \Pi_o(t, K(t), kO(t), kO(t)) - h_{kO(t)}(v_{kO(t)} - v_{kD(t)})$$

where $\Pi_o(t, K(t), k1(t), k2(t))$ is the outsourcer's profit which he/she pays the vendor the price for performing at level $k1(t)$ but the vendor actually performs at level $k2(t)$.

Estimating the probability of shirking. Since the ASP's production cost increases with the level of performance provided, all else being equal, the ASP will increase profits by shirking on performance. However, the attractiveness of shirking in the given time period may be minimized if the ASP views his profit as resulting from the outsourcer's coordination strategy that reduces the vendor's production cost while maintaining the same price. Such a coordination strategy may include sharing the costs of certain RP/risk resolution strategies for dealing with specific risk items that are not the result of the ASP's business strategy. Thus, in analyzing this situation, it is necessary to estimate the probability of ASP shirking, given a certain level of performance and specific monitoring and coordinating strategy. We model this aspect of the decision problem as follows:

- For performance $kO(t)$ and strategy a_{i1} in period t, the increase in vendor profit as a result of shirking $\Delta_{kO(t),kD(t)}(a_i) = c_{kO(t)}(a_i) - c_{kD(t)}(a_i)$.
- Given coordination strategy be a_i on which the price p_t is based, and let the increase in vendor profit as a result of the coordination strategy a_i be $\alpha_{kO(t),kD(t)}(a_i)$.
- The vendor's perception of general marketplace revenue earning opportunities that would be lost if he/she performs at level $kD(t)$ instead of the contract level $kO(t)$ be $\beta_{kO(t),kD(t)}(a_i)$ even after receiving benefits as a result of the outsourcer investing in coordination strategy a_i.
- The vendor's perception of general marketplace revenue earning opportunities that would be gained if he/she performs at level $kD(t)$ instead of the contract level $kO(t)$ be $\varphi_{kO(t),kD(t)}(a_i)$ even after receiving benefits as a result of the outsourcer investing in coordination strategy a_i.

Let $h_{k,t}(p_{k,t},a_i)$ be the probability of shirking given the contract performance level k and coordination strategy a_i and base price $p_{k,t}$; $\Psi_t \in [0, 1]$ be a measure of the vendor's concern about whether the outsourcer switches at the end of period "t" such that if the vendor is unconcerned about whether the outsourcer switches at the end of period "t" then $\varphi_t = 0$, while if the vendor absolutely does not want the outsourcer to switch at the end of period t then $\varphi_t = 1$; and $w_t \in [0, 1]$ is a measure of the vendor's appreciation of the benefits received as a result of the outsourcer's investment coordination strategy a_i in period t. Shirking rules are as follows:

- If $\Psi_t = 1$, and $(\Delta_{kO(t),kD(t)}(a_i) - w_t\alpha_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i) + \varphi_{kO(t),kD(t)}(a_i)) \leq 0$ then the vendor will not shirk, and so $h_{k,t}(p_{k,t}, a_i) = 0$.
- If $\Psi_t = 1$, and $(\Delta_{kO(t),kD(t)}(a_i) - w_t\alpha_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i) + \varphi_{kO(t),kD(t)}(a_i)) > 0$ then the vendor will shirk with probability $h_{k,t}(p_{k,t}, a_i) = \text{Min}\,\{1, (\Delta_{kO(t),kD(t)}(a_i) - w_t\alpha_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i))/\Pi_D(t, p_{kO(t)}, kD(t), a_i)\}$.

- If $\Psi_t = 0$, and $(\Delta_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i)) > 0$ then vendor will definitely shirk and so $h_{k,t}(p_{k,t}, a_i) = 1$.

Factoring other reasons for underperformance. While shirking can be considered as underperformance that results from intentional action on the part of the ASP, underperformance could also result because of the occurrence of one or more general risk items, the prevention of which cannot be considered to be the ASP's sole responsibility. Let R_k be the set of those risk items, the occurrence of one or more of which could result in the inability to achieve performance level k, and let $p_{j,t}$ be the probability of risk item j occurring in period t. Then the probability of achieving performance level k in the absence of shirking is $\Pi_{j\in Rk}(1 - p_{j,t})$, while the probability of achieving performance level k given the possibility of shirking is $(1 - h_{k,t}(p_{k,t}, a_i))\Pi_{j\in Rk}(1 - p_{j,t})$. One notes that if there are five (5) such risk items that could compromise the ability to achieve level k and that each has a 2.5 percent probability of occurrence then the probability of achieving level k is less than 90 percent chance in the absence of shirking.

Specifying incentive contract. The incentive contract should have a penalty component and an incentive component. Bryson and Ngwenyama (2000) presented approaches for the case when vendor cost was certain and the case when vendor cost was uncertain. Given the page size limit on the paper we will focus on the case when vendor cost is certain.

Penalty component of incentive contract. If the contract requires the ASP to perform at level k in period t, then a penalty of Max $\{(v_{k,t} - v_{kD(t)}) + s_t, (c_{k,t} - c_{kD(t)} + \varphi_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i)) + s_t\}$ is charged to the vendor if he/she performs below level k. The first component of the penalty addresses the outsourcer's net loss in value as a result of shirking plus the amount needed to switch to another ASP; the second component focuses on making it unprofitable for the ASP to shirk as it covers the net profit that the ASP would receive from the outsourcer (i.e. $c_{k,t} - c_{kD(t)}$ and also other sources (i.e. $\varphi_{kO(t),kD(t)}(a_i) - \beta_{kO(t),kD(t)}(a_i)$) if he/she shirked.

Reward component of incentive contract. If the contract requires the ASP to perform at level k in period t, then payment to the ASP is in two portions $p_{kA,t}$, which would be paid during period t, and $p_{kB,t}$, which would be paid after a performance level audit has been done at the end of period t. Here, $p_{kA,t} =$ Max $\{c_{k,t}, p_{kD(t)}\}$; and $p_{kB,t} = (p_{k,t} - p_{kA,t})(1 + r)$ if the ASP actually performs at level k in period t, and $p_{kB,t} = 0$ if the ASP does not actually perform at level k in period t. The initial amount $p_{kA,t}$ is chosen to be the maximum of the actual project cost and the payment that the ASP would receive for performing at the corresponding shirking level $kD(t)$. The amount $(p_{k,t} - p_{kA})(1 + r)$ represents the future value of the amount $(p_{k,t} - p_{kA,t})$, where $100r$ percent is the relevant risk-free interest rate. This amounts to placing the sum $(p_{k,t} - p_{kA,t})$ in an escrow account at the beginning of the contract.

The incentive contract would thus specify performance levels for each period, and the corresponding penalty and incentive components. It should be noted that if the penalty amount is relatively insignificant for the vendor then such a penalty might not prevent the vendor from shirking and in such a case it might be advisable to avoid that vendor.

Concluding comments

In this paper, we have explored issues related to ERP outsourcing in terms of the ASP approach. Given the high stakes involved for the outsourcing firm it is important that vendor performance leads to the realization of the outsourcer's desired business objectives, but for this to be accomplished the vendor must have both the ability and desire to meet the terms of the contract. It is important that any outsourcing contract strike a delicate balance between penalties and rewards to ensure that the ASP vendor behaves in a manner that is consistent with the outsourcer's best interest when making decisions about allocating scarce resources to the outsourcer's ERP application.

We have, therefore, presented a framework with which to analyze the ERP outsourcing decision that explicitly factors the motivations of both the ASP vendor and the outsourcing firm to ensure that their respective goals are compatible in order to develop effective outsourcing contracts that will satisfy the business objectives of both parties. This framework has three phases: outsourcer business analysis, vendor business analysis, and outsourcing alternatives analysis. The first two phases include identifying business objectives of both parties, as well as identifying risks, their impacts and possible risk resolution actions. Since many ASPs are struggling for survival and it is difficult to determine which ASPs will be viable in the long-term, it is important to identify, assess and manage the different risks associated with an ERP system and the outsourcing of an ERP system.

The third phase focuses on development of effective outsourcing contract given the business objectives of both parties and the risks that were identified in the earlier phases. Following the work of Bryson and Ngwenyama (2000) and Ngwenyama and Bryson (1999), this phase involved the use of a transaction cost theory in the analysis to determine the likely profit and costs associated with various behaviors under the contract, and to develop an outsourcing contract that is attractive to both parties.

Although the area of information systems outsourcing has been addressed by other researchers, few articles have focussed on offering guidance for the development of incentive-oriented outsourcing contracts, and the issue of such contracts for ERP outsourcing to ASPs has not been adequately addressed in the research literature. The material offered in this paper makes a novel contribution to the body of knowledge on structuring incentive-oriented outsourcing contracts and has the ultimate objective of offering improved decision-making techniques to managers who have to make decisions on information systems outsourcing contracts.

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Application service provision: origins and development

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Keywords *Information systems, Suppliers, Outsourcing*

Abstract *For many years, IS outsourcing has been an important strategy researched by many academics and practitioners. The emergence of the application service provision (ASP) model has given a new dimension to outsourcing, but, at the same time, drawing much confusion as to whether it is a new model or just reshaped traditional outsourcing. The aim of this paper is to establish a discussion about linking these two phases in the development of information systems and technology (IS/IT) outsourcing: traditional IS outsourcing and ASP. The authors argue that the emergence of ASP is both evolutionary and revolutionary. Evolutionary in that it has its inspiration from traditional outsourcing, and revolutionary in that it exploits a revolutionary networking and communication media: the Internet. This paper investigates different aspects of each strategy (IS/IT outsourcing and ASP), then draws a model for relating them. The paper concludes by arguing that traditional IS/IT outsourcing assumptions could be used as a basis for studying the ASP environment; however, the need for further research on the new aspects of this model, and thus the formulation of new rules, remain of major importance.*

Introduction

Outsourcing is not specific to particular activities or business processes. It has been adopted for different purposes, varying from outsourcing functions as simple as cleaning to more delicate ones as information systems and technology (IS/IT). The latter has been of a particular focus in the literature, not only because IS/IT occupies an important place in the organizations, but also as a result of the confusing nature of IS/IT as whether it should be considered strategic or a commodity (Lacity *et al.*, 1995). While this debate continues, IS/IT outsourcing has grown rapidly over the past decade with more organizations transferring their routine computer-based operations to specialised third-party IS/IT vendors (Currie, 2000). By doing so, these organizations hope to focus on their core competencies in a highly-competitive business environment.

Although businesses have practiced the strategy of outsourcing IS/IT for many years (Gilley and Rasheed, 2000), at present, the IS/IT outsourcing environment, influenced by the rapid advancement in networking and communication technologies, is vastly different from the outsourcing environment in the mainframe and service bureau era. It has gone through different stages, from the stage where the bulk of IS/IT operations were outsourced, to the stage where different strategies have been developed to accommodate selective outsourcing (Currie and Willcocks, 1997; Lacity *et al.*, 1995). Although outsourcing offers organizations tremendous advantages, including financial performance improvements, more focus on core

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competencies, and increased flexibility (Gilley and Rasheed, 2000; Quinn, 1999), it has also proved to have some disadvantages such as the loss of market performance due to over reliance on outside vendors (Gilley and Rasheed, 2000).

In simple terms, outsourcing consists of conducting one or more organizational activities using external agents (Lacity and Hirschheim, 1993b). The concept of outsourcing has developed so widely that it has become a natural practice, rather than an option for some researchers. Quinn and Hilmer (1994), for instance, suggest that in order for any organization to further leverage its skills and resources, it has to concentrate on a set of core competencies and strategically outsource the other activities that are not strategic. For other researchers, outsourcing has reached such a high frequency of adoption that it is considered as a fashion, where Doig *et al.* (2001, p. 36) argue: "Every few years, the managers of the world get religion. Today, most of them believe in outsourcing."

In recent years, a new phenomenon has entered the IT market: application service provision (ASP), referred to by some as third wave outsourcing (Currie and Seltsikas, 2001), or "netsourcing" (Kern *et al.*, 2002). This new way of application outsourcing emerged largely as a result of the tremendous advancement in networking technologies, especially the Internet. As it will be discussed later in this paper, ASP has emerged as a solution for organizations, particularly small and medium sized enterprises (SMEs), which could not afford financially, the access to enterprise applications that were used by their larger competitors. However, since its introduction in 1999, ASP is still struggling to acquire the trust of most organizations, due to its immaturity and lack of success stories (Seltsikas *et al.*, 2002).

ASP, however, is frequently confused with traditional IS/IT outsourcing, with many claiming that it is just the old facilities management and service bureau that has come in another form. The authors argue that, although sharing similarities, ASP cannot be limited to be defined as a renewed form of traditional IS/IT outsourcing practices.

This paper aims to position ASP in the outsourcing field according to other IS/IT outsourcing practices. It starts by giving an insight into IS/IT outsourcing and its development. This is followed by an overview of ASP, its emergence and development. A discussion is, then, established about the changing phases of IS/IT outsourcing and the forces driving them. Finally, the paper concludes by arguing why traditional outsourcing assumptions are often irrelevant for the ASP environment and outlining future research aimed at developing a new set of rules for ASP.

IS/IT outsourcing

IS outsourcing is defined by Willcocks and Lacity (1998, p. 3) as the "Handing over to third-party management of IT/IS assets, resources and/or activities for a required result". Although practiced for many years, what has always driven confusion is the reason why IS, which is considered as an asset to many businesses, is being outsourced to third-party organizations (DiRomualdo and Gurbaxani, 1998). In fact, much discussion about the matter is found in the management literature, highlighting potential benefits as well as possible disadvantages and risks.

There are several drivers that led managers to think about outsourcing IS. The most obvious one is, undoubtedly, the search for cost efficiency (DiRomualdo and Gurbaxani, 1998; Takac, 1994). In fact, as organizations are becoming increasingly reliant on IT, the cost of the latter becomes a major burden. The search for improving business performance is another driver for outsourcing IS/IT, where the high pace of development of IS/IT and the resulting lack of skills have led outsourcing to become a valuable choice. On this, DiRomualdo and Gurbaxani (1998, p. 68) argue that "companies frequently confront a wide disparity between the capabilities and skills necessary to realize the potential of these technologies and the reality of their own in-house technology capabilities and skills. IS/IT outsourcing is playing an increasingly prominent role in strategies designed to close this gap". Furthermore, as many organizations abandoned strategies of diversification, they turned to aim at focusing intensively on core competencies, which has led IS/IT to come under scrutiny (Lacity *et al.*, 1996).

Outsourcing IS/IT has gone through different stages. One of the most known and referred to case is that of Kodak in 1989, where the company outsourced the bulk of its IS/IT (Lacity *et al.*, 1995). This type of outsourcing is referred to as "total outsourcing", where "the vendor is in total charge of a significant piece of IS work" (Lacity and Hirschheim, 1993a, p. 17). However, in research conducted by Lacity *et al.* (1996), it was discovered that most companies who engaged in total outsourcing deals, encountered many difficulties, including the increase in IT costs and poor levels of service. They concluded their research by suggesting that total outsourcing should be reserved for those companies with greater experience in IS/IT outsourcing and in long-term suppliers' relationships management.

Another alternative to total outsourcing is "selective IS/IT sourcing", which consists of outsourcing specific IS/IT activities so that management and control of core IS/IT activities, such as strategic planning, are maintained by the buying organization, while more mature and well-defined IT activities are outsourced with the benefits of accessing vendor expertise and economies of scale (Lacity *et al.*, 1996). Lacity *et al.* (1996) concluded that such deals, selective outsourcing, represent the future success of IS/IT outsourcing.

In the late 1990s, a total expansion in the IS/IT outsourcing market was witnessed, with contracts varying in type, length and price, where, in some cases, "mega" deals were even worth over £1 billion with a duration of ten years, such as in the case of Cable and Wireless Communications and IBM

(Currie, 2000). Such organizations found many advantages in outsourcing (Currie and Willcocks, 1997; Lacity *et al.*, 1996; Takac, 1994). However, Currie and Willcocks (1997) also acknowledged that there can be pitfalls associated with outsourcing contracts, especially when appropriate care is not taken while and after signing these contracts. A list of the most common outsourcing advantages and disadvantages (Clark *et al.*, 1995; Currie and Willcocks, 1997; Earl, 1996; Takac, 1994; Willcocks *et al.*, 1996) are given in Table I.

Application service provision

Traditional IS/IT outsourcing, as we know it, is based on a one-to-one relationship between the service provider and the customer, i.e. the service offered by the service provider is unique to each customer. However, more recently, many ISVs and Telco's have begun to exploit the rapid development

Advantages	Disadvantages
Outsourcing IT could be more economic than maintaining it internally, as vendors might offer the same value for reduced price according to their economy of scale	Hidden costs, including those that may arise from failure to identify present and future requirements, loose drafting of contracts, lack of awareness of costs of managing the outsourcing arrangement and vendor opportunism
Fixed-price and agreed services levels can considerably reinforce predictability	There could be problems with cost savings and financial benefits associated with contracts, as these returns could be based on assumptions that become invalid over time
Service could be improved by vendors, who can provide additional technical capabilities	Service quality and performance could be affected negatively, especially with poorly specified contracts and agreements
Refocus on the core competencies of the business, i.e. by outsourcing, key IS/IT staff could be freed to concentrate on more important activities	Possibility of loss of control, especially in the cases of total outsourcing, where the client loses control over major and minor areas. Also, an increased dependency on external suppliers, and loss of internal technical knowledge
Access to leading-edge technology	Some issues of confidentiality may arise
By selling the IT assets to an external agent, cash could be generated, thus making from fixed costs variable	
It could be easier for organizations to access new technologies by outsourcing	
Value-added service, in the form of consultancy from the outsourcing provider	
Business growth is possible without changes to the IT infrastructure	

Table I. Common advantages and disadvantages of outsourcing of the Internet by using it as a source for software distribution based on a model that promotes a "one service provider to many customers" – one-to-many – outsourcing relationship. This method of software distribution is referred to as ASP and the service providers who use this method are referred to as application service providers (ASPs).

According to the ASP Industry Consortium, an ASP "manages and delivers application capabilities to multiple entities from a data centre across a wide area network" (Cherry Tree and Co., 1999). Being a form of application outsourcing, the model consists of, in its simplest form, deploying, managing and remotely hosting software applications through centrally located servers (Dewire, 2000; Kern *et al.*, 2002). Customers, in their turn, use the hosted applications in a rental arrangement. By taking away the day-to-day hardware and systems management duties, the ASP model promises to give organizations the opportunity to focus on their core functions (Columbus, 2000). It is, in fact, a new tendency in software distribution, which consists of delivering software as a service.

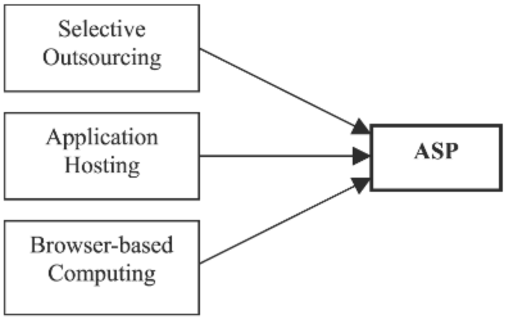
The emergence of the ASP model has been stimulated by many facts; mainly, a segment, SMEs, was almost excluded from enterprise applications market, due to their incapability to afford them. The model offers these SMEs the possibility of leveraging costs as a result of the economies of scales characterising it. Based on the principle of one-to-many, the ASP model is believed to create enormous cost savings of the order of 20-50 per cent (Miley, 2000). Furthermore, Miley (2000) argues that the ubiquity of the Internet, its integral and open standards and the devaluation of computers has led the Internet to revolutionise business practices. Thus, it can be argued that delivering applications through the Internet is only a natural phenomenon. The key drivers of the ASP model are shown in Figure 1.

It is also argued that the emergence of ASP has its roots in three separate trends: selective outsourcing, application hosting, and browser-based computing, as shown in Figure 2 (Tao, 2001).

In Figure 2, Tao (2001) argues that the ASP model is inspired and directly influenced by selective outsourcing, discussed in the previous section. The second driver, according to Tao (2001), is application hosting, where he considers Internet service providers (ISPs) as early forms of ASPs, as they provided hosted mail and Web servers. Finally, the third driver is

Source: Adapted from Cherry Tree and Co. (2000)

Figure 1.
ASP market drivers



Source: Tao (2001)

Figure 2.
Essential ASP components

browser-based computing, where the widespread development of Web-browsers made them capable of hosting real applications, instead of displaying a set of static content.

The size of the ASP market, as forecast by many analysts, is also an important sign of the importance of this business model. IDC, for instance, expected the market to grow from US$ 300 million in 1999, to US$ 25 billion in 2004 (Miley, 2000). Furthermore, IDC expects the US enterprise ASP spending alone to grow to US$ 2.5 billion by 2004. However, varying opinions exist among industry experts such as IDC, Forrester and Ovum on the growth of the ASP market, which were found to be inconsistent. Even if the ASP market is in continuous expansion as predicted by IDC, many issues still form a strong barrier to its development. Such issues are summarised as follows:

- Security is a main concern causing the ASP model to suffer; in fact, it is about the uncertainty of whether ASPs are capable of ensuring the security of proprietary information. This issue comes to its highest degree when mission critical applications are rented, on which companies depend.
- Performance concerns, where many analysts argue that deploying existing applications, which are based on client/server architecture on an ASP delivery, presents significant lack in performance, as these applications are not designed to be hosted. Instead, Web-enabled applications are the suitable architecture that can ensure optimal performance.

In addition to the advantages outlined in Table I for outsourcing, the claimed advantages of ASP are as follows (Kern *et al.*, 2002; Toigo, 2002):

- Reduced cost, as the service will be shared among many customers (companies) leading to profiting from economies of scale.
- Lower total cost of ownership.

- Efficiency in application maintenance and support, as the ASP will be having the appropriate and well-trained staff for supporting applications, platforms and network.
- Improved application timeliness, as products marketing life-cycle lead times could be dramatically reduced.
- Access to extensive online help and qualified support, eliminating the burden of doing it in-house.

Where does ASP stand?

Discussed earlier in the previous two sections are brief overviews of two marking periods in the history of outsourcing. IS/IT came under scrutiny, leading executives to think about outsourcing it, thus the emergence of IS/IT outsourcing as a field of interest. Recently, ASP is becoming a loud buzzword, attracting the attention of many executives, but with no success in attracting their confidence. However, as ASP is still not strongly established, researching it could prove to be difficult. Should we consider it as a traditional outsourcing model, and use the wide existing literature that explained traditional IS/IT outsourcing? Or more as a standalone field, that requires its own set of rules? In other words, as explained in the introduction, the emergence of ASP has always shown confusion whether this model is a real revolution or just an evolution from the traditional IS/IT outsourcing.

From studying both strategies – IS/IT outsourcing and ASP – it is clear that they both have common main incentives for their existence, as shown in Figure 3. In fact, focusing on cost efficiency and improving business performance are always sought by organizations, as well as aiming to focus on core competencies that can lead them to achieve and sustain competitive advantage. As shown in Figure 3, these shared drivers, which come mainly from the need for outsourcing, represent the common roots of both strategies; in other words, this shows the evolution of ASP from IS/IT outsourcing. It should, thus, be concluded at this level that ASP shows characteristics derived from outsourcing, and that literature on outsourcing, particularly IS/IT outsourcing, has to be considered for researching it.

On the other hand, it is found that when both strategies are compared, despite their common drivers, they have some unique characteristics drawing gap of difference between them. Taking the case of the former strategy – IS/IT outsourcing – it was mainly reserved for bigger firms, based on a unique provider/client relationship. This was due to the fact that different clients had different requirements, especially when selective sourcing is practiced. ASP, however, focuses mainly on sharing resources through a one-to-many type of relationship. This has helped the model to be targeted at a different segment of the market – SMEs – by focusing on economy-of-scale strategies.

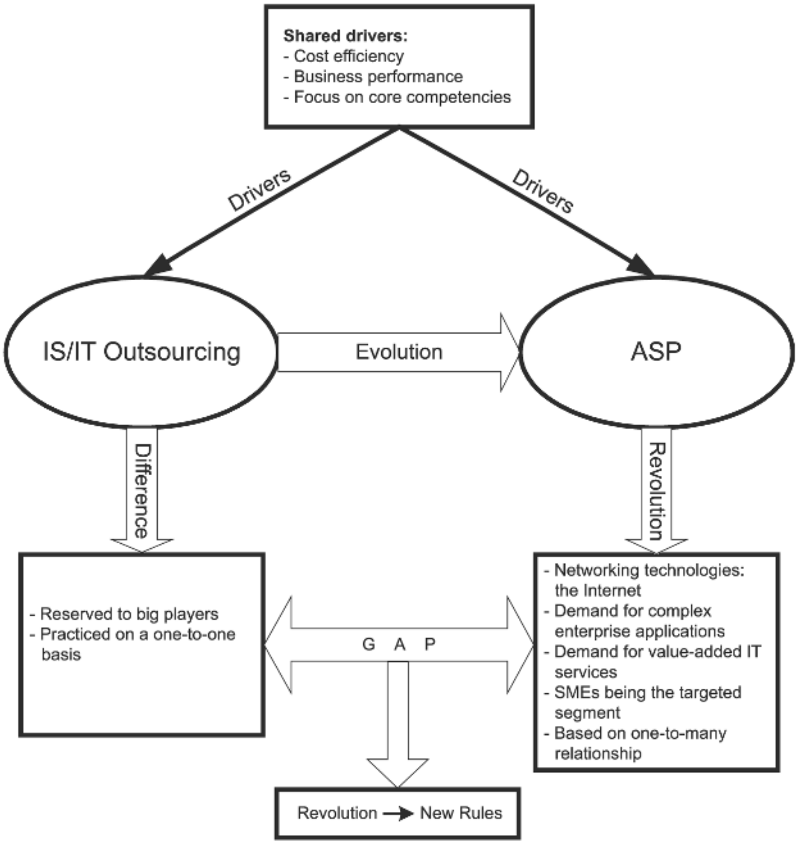


Figure 3. ASP's evolution/revolution model

Furthermore, the authors find the Internet as one of the main elements and influencing factors of the ASP model, and are of the view that the Internet as a communication media should not be neglected. It is a real revolution in itself, while its high speed of development in recent years has made it even more important and more reliable. Porter (2001, p. 64) argued: "Internet technology provides better opportunities for companies to establish distinctive strategic positioning than did previous generations of information technology." This means that the Internet as a media for business practices is no longer challengeable and is here to stay. In the case of ASP, it was mentioned earlier that the main segment that was targeted was SMEs which failed, financially, to access enterprise applications, yet exploited only by larger companies that are financially stronger. It is true that IT costs, in general, are continually decreasing, but what has the Internet to do with this situation? The Internet has overcome the lacuna of the earlier forms of networking: cost. By using a simple telephone line and a computer, it is possible to get connected. As a result, businesses have turned their interest towards the Internet as a means of business networking, instead of the expensive proprietary networks. This consists of a revolution in business networking and offers businesses a less costly solution for achieving their communication needs. It is, therefore, the development of the Internet that made the concept of ASP thinkable, and aimed at targeting SMEs for whom cost is a major burden. Given this context, the diagram presented by Tao (2001) in Figure 2 could be expanded as shown in Figure 4. According to the scenario presented in Figure 4, if we consider the Internet as one of the main elements that influenced the emergence of ASP, it can be argued that ASP offerings, targeting SMEs, would not have been possible without the presence of the Internet. Moreover, as a result of less costly and more ubiquitous networking configurations with the Internet, sharing services among client companies became possible. In such terms, the ASP model's emergence revolutionary character (Figure 4) could be further enhanced.

At this level, it should be concluded that ASP developed new characteristics that gave it a revolutionary character. These, in fact, represent the features that are unique to ASP, and that have helped the model to emerge.

On the other hand, it would be wrong if we neglect the fact that ASP has an evolutionary side, as shown in Figure 3.

Weighting the two scenarios above, it is true that ASP is both revolutionary and evolutionary. However, considering that it is hardly conceivable that something emerges with no influence, it would be wrong to suggest that a model such as ASP emerged from a predefined set of environmental variables and a set of practices already experienced. Instead, the highly significant role played by the Internet on the delivery of ASP solutions, makes it reasonable to suggest that ASP could be considered more revolutionary than evolutionary. Furthermore, even if the development of IS/IT outsourcing in the last two

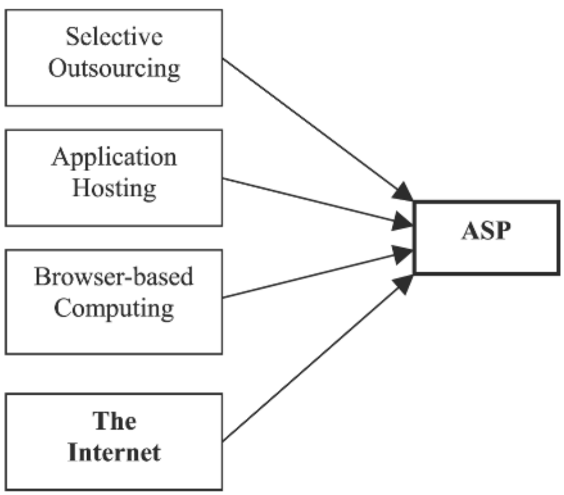


Figure 4.
The Internet as another major component of ASP

decades has been enormous, and it has certainly influenced the emergence of ASP as a way of outsourcing applications, many ASPs tried and still try hard to avoid discussing such a linkage, possibly due to numerous failures and unsuccessful deals already experienced with traditional outsourcing (Toigo, 2002).

As a result of such a discussion, it is clear that the ASP model shows two characteristics: an evolution from traditional IS/IT outsourcing, and a revolution as the model introduces new components, particularly the Internet (Figure 3). It has also been explained that ASP can be considered as more revolutionary than evolutionary. The issue that emerges here is, how should researching ASP be approached? In Figure 3, it is shown that the emergence of ASP has created a gap if compared to traditional IS/IT outsourcing, due to the new parameters involved with this model. Such parameters include the Internet as the media through which the model is delivered, the type of relationship between the vendor and the client (one-to-many), and the market segment targeted being SMEs. This gap suggests that there is a need for new rules to explain ASP. This does not separate ASP from its precedent IS/IT outsourcing strategy, as we suggest that the latter's literature is of great value, as ASP emerged from it; however, we also argue that this set of literature is not sufficiently adequate to be uniquely used for researching ASP.

Conclusion

In this paper, the authors have established a link between two phases in the history of outsourcing: IS/IT outsourcing and ASP. It has been argued that both strategies share some common drivers, and that ASP has evolved from IS/IT outsourcing. It has also been argued that ASP involves a new set of parameters, which make from it a revolution compared to traditional outsourcing. As a final conclusion, it was argued that IS/IT outsourcing literature cannot be neglected, and has to serve as a basis for researching ASP; however, the revolutionary character of ASP has created a gap in rules, which have to be identified in order to explain ASP.

Identifying new rules for explaining the ASP model remain an important issue for further researching the field; however, what should also be considered is the highly dynamic nature of the ASP environment, as it influences enormously the way this field is researched. Considering the original ASP model when it emerged, it presented many weaknesses and was mainly suffering from a lack of strategic differentiation in the offerings (Seltsikas *et al.*, 2002). In fact, the similarity of offering led to an explosion of the market as a result of low entry barriers, as shown in Figure 5. According to the competitive forces model, shown in Figure 5, it should be noticed that the ASP market was highly accessible, and thus wide open to new entrants who aim to penetrate it. As there are low barriers for entering the market, the latter tends to grow at a high pace, and therefore the number of competitors grows significantly, which

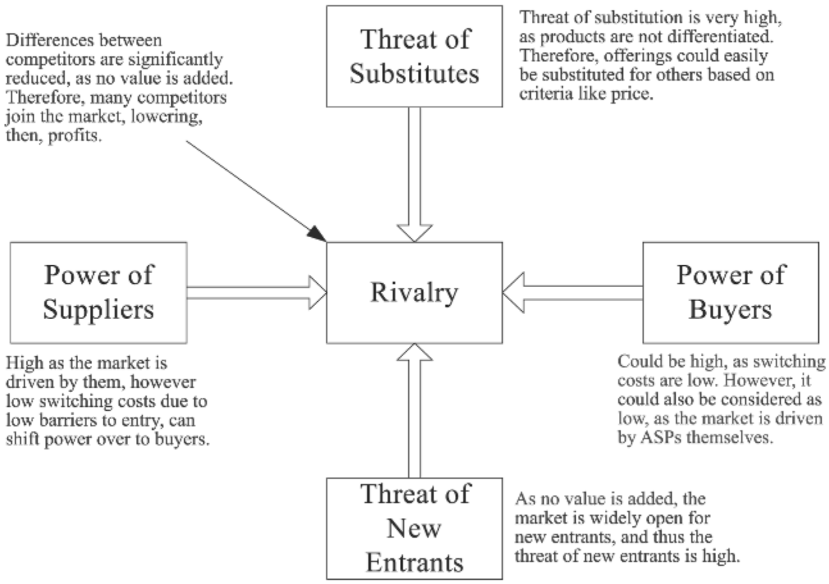


Figure 5.
Competitive forces for the ASP market initially

Source: Adapted from Porter (1985)

makes the realisation of profit, a difficult target to achieve. As a consequence, the different players in the ASP market felt the need for differentiating their products, by offering additional value-added components. Thus, for ASPs, hosting and managing applications cannot provide sustainable strategies. Instead, they need to focus on building sustainable ASP-related businesses that will offer value-added component(s) to their service that is simultaneously difficult for competitors to replicate and customers to replace.

In keeping with these arguments, the ASP market has witnessed major changes with the emergence of different variations of the initial concept, classified as (Currie and Seltsikas, 2000; Lehman Brothers, 2000): *enterprise ASPs* where ISVs deployed their own ASP strategy, choosing to offer their services directly to their customers, accessing thus a wider segment; *ASP enablers* support the infrastructure through which ASPs deliver their offerings; *pure play ASPs*, characterised by owning their delivered resources, and acting as a single point taking responsibility of all the requirements for delivering their resources; *vertical ASPs*, targeting industry-specific applications and processes; *horizontal ASPs* offering, mainly, collaborative applications such as e-mail; and *full service providers* (FSP) providing an end-to-end solution. These variations are significantly supported by the focus on leveraging partnerships to create differentiation and thus raising barriers to entry (Columbus, 2000).

This paper has attempted to position ASP against traditional IS/IT outsourcing and argued that ASP did not emerge from scratch and was influenced by traditional IS/IT outsourcing, but is revolutionary as new parameters are involved.

From this point of view, the authors suggest, for future research, a reconsideration of every aspect of IS/IT outsourcing, but in the context of ASP. This gives a solid basis from the well-established outsourcing literature. However, focusing on the new issues that emerge with this new model remains of major importance.

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A framework for global IS outsourcing by application service providers

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Keywords *Service delivery, Decision making, Information systems, Outsourcing*

Abstract *The phenomenal growth of the Internet has persuaded many companies of its potential as a channel for outsourcing information systems applications. Application service providers (ASP) are firms that offer outsourcing application services to many organizations via the Internet. By contracting ASP, organizations are having information technology (IT) staff focusing their efforts on core competencies while, at the same time, capitalizing on the expertise of outsourcer. On the other hand, many ASP turn some of their projects to global outsourcer. The study develops a framework that identifies the critical factors influencing ASP' decision to outsource globally. These factors are product development costs, IT talent, product quality, communication technology, tax incentives, and cultural differences. The rest of the paper discusses the differences between different types of global outsourcing, explore the emerging trend and advantages of utilizing ASP, and recommend measures to ensure the success of projects to be developed globally. The framework developed in this paper represents a foundation for more rigorous empirical research to identify the significance of each influencing factor. The results can provide ASP managers with a road map that addresses issues of concern in global outsourcing.*

Introduction

Outsourcing information systems (IS) has been the focus of many studies. The trend among organizations to outsource part or all of their IS has been documented (O'Henry, 1996; Teng *et al.*, 1995). Loh and Venkatraman (1992b) define outsourcing as "the significant contribution by external vendors of the physical and/or human resources associated with the entire or specific components of the information technology (IT) infrastructure in the user organization". Grover *et al.* (1994) broadly defined outsourcing of IS activities as the practice of contracting part or all of an organization's IS activities to an external provider.

Several studies have addressed the factors influencing outsourcing decision. Quinn and Hilmer (1994) emphasized that focusing on core competencies is a major reason behind strategic outsourcing decisions. Core competencies are an integrated set of skills, processes, and procedures in an organization (King, 1995). Core competencies are what provide an organization with its competitive advantage. Cross (1995) supported the core competence factor when he studied IS outsourcing in the British Petroleum Company. However, cost reduction has been the most common reason among organizations to outsource IS activities

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(Alpar and Saharia, 1995; McFarlan and Nolan, 1995). Loh and Venkatraman (1992a) supported the cost reduction motive empirically by finding that an organization's IT cost structure is directly proportional to the degree of IT outsourcing. Other cited motives to IS outsourcing are organizational IS capabilities (Grover *et al.*, 1994), competitive pressure (Lacity *et al.*, 1994), environmental factors such as industry and/or economy conditions (Smith *et al.*, 1998), and organizational internal politics and conflicts (Lacity and Hirschheim, 1993). In utilizing the Internet, Chen and Soliman (2002) studied factors influencing the decision to outsource IS applications to service provider vendors in the US market. They found that production costs advantage, transaction costs, asset specificity, internal expertise, maturity of technology, application service providers (ASP) value chain, and application media fit.

Previous research in the area of IS outsourcing has two voids. First, the rise of IS application outsourcing to service providers utilizing the Internet has not been given enough attention that result in the development of cumulative research in that area. Second, the trend that many service providers have turned some of their projects to a global outsourcer due to lower development costs and/or high quality products has not been addressed. This paper develops a framework that examines the factors affecting a domestic service providers' decision to turn many of their projects to second-tier offshore outsourcers. Moreover, this study explores different levels of global IS outsourcing and the trend among many organizations to utilize the Internet to outsource applications to domestic service providers.

Global outsourcing

Global outsourcing is similar to traditional outsourcing. However, in the case of global outsourcing, the required development tasks are contracted to an offshore service provider. Global outsourcing takes several forms: direct global outsourcing, global outsourcing via domestic consultant, and global outsourcing via ASP.

Direct global outsourcing

The simplest form of global or offshore outsourcing is direct outsourcing. This form of global outsourcing can be achieved when the contracting company has an internal IS needs and seeks the help of an external offshore provider to fulfill these needs. That was the case with Aetna, a US Healthcare company, when it contracted Infosys Technologies, an Indian service provider, to assign 50 IT developers to fix a Y2K problem (Greenemeier, 2000).

Global outsourcing via domestic consultant

This adds a third party to the above direct form. Here, a domestic consulting firm is involved in overseeing the contractual agreement between the two direct partners. The domestic consulting firm supervises the project and provides IT expertise in dealing with the overseas IT developers. In many cases, the consulting firm acquires the outsourcing contract and uses global IT developers to perform the technical component of the contract. Lifeguard Inc., a Northern California provider of independent health insurance plans, is an example of a company that utilized this form of outsourcing. The company outsourced its managed-care administration software packages for its health-care administrators to Cognizant Technology Solutions Inc. Cognizant, an outsourcer whose main development facilities are in India, uses the combination of its onsite project-management expertise along with development and coding expertise from its facilities in India to fulfill its obligations (Mateyaschuk, 1999)

Global outsourcing via ASP

It is a developing new form of outsourcing. With the recent development in telecommunications technologies and the phenomenal growth of the Internet in the business world, global outsourcing via ASP has become a viable option to many organizations. Coffman (2000) defines ASP as companies that "deliver and manage applications and computer services from remote data centers to multiple users via the Internet". These data centers are owned by the contracted ASP or rented from a wholesale service provider (Turner, 2000). Synxis Corp., a Denver ASP that provides hospitality industry service, is an example of cooperation of ASP and global IT providers. The company turned to Bulgarian programmers to develop a vital online hotel-reservation system for its clients (Robb, 2000). Figure 1 shows the ASP relationship with both client organizations and second-tier domestic and offshore outsourcers.

ASP: a global trend

Many organizations are joining the trend of using ASP for their application needs. According to AMR Research, the enterprise ASP market is expected to reach approximately \$4.7 billion by 2004. These figures are considered to be a step up from the \$296 million in 1999 (Higgins, 2000). In a recent study by The Philips Group, it is estimated that approximately 70 percent of large organizations are very likely to use an ASP for e-commerce applications within the next four years (Booker, 2000). An IDC study reveals that, in Western Europe, ASP services are expected to increase from \$258 million in 2001 to \$6.5 billion in 2006.

The benefits gained from utilizing ASP take several forms. First, most organizations must upgrade computer applications every 12-24 months (Holohan, 2000). Licensing fees, hardware and installation requirements, lost work time during upgrades, and training end users are among several factors that make the practice of upgrading a computing environment costly. In outsourcing internal applications, companies would enjoy the benefits of

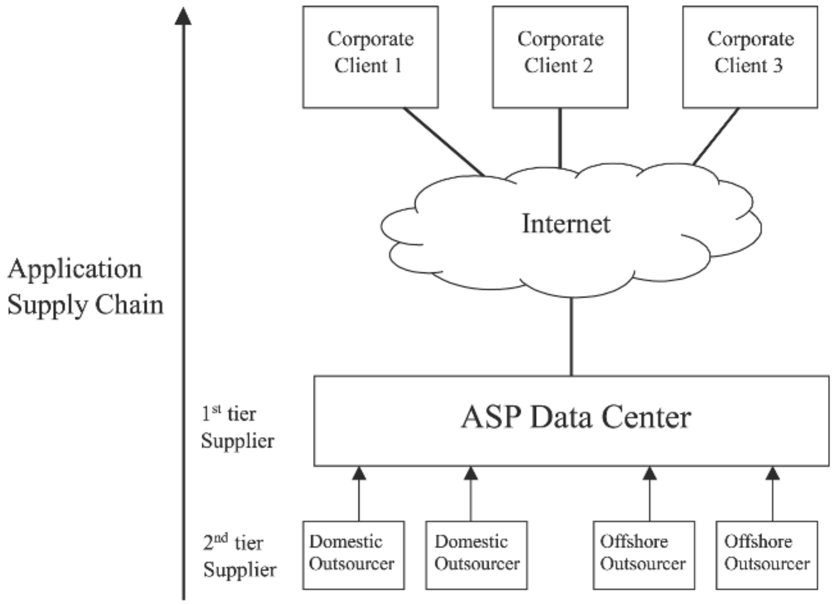

Figure 1.
ASP and global outsourcers

pay-per-use, continuous access to upgrades, and remote application access from anywhere (Beale and Lindquist, 2000). In addition to the reduction in support costs, organizations are able to avoid new investments in hardware and software that might become out-dated quickly (Reed, 2000). Moreover, outsourcing applications reduces the money and time involved in purchasing, installing, upgrading, and maintaining hardware and software (Grandinetti, 2000). It moves the traditional form of software licensing to a subscription pricing agreement (Kashmeri, 2000). More importantly, it reduces time to market products despite internal information infrastructure limitations (Booker, 2000). Furthermore, utilizing the Internet as an application platform facilitates the deployment of new systems in response to market changes (Dewire, 2000). Finally, ASP provides organizations with the scalability they need to meet business growth while maintaining their focus on their core competencies (Curtis and Alphonso, 2000).

The world map of global outsourcing

The number of countries that join the global outsourcing map is on the rise. However, there are several areas in the world that dominate the game. India is considered a major player when it comes to providing IT talent to ASP worldwide. It has been reported that in 1999 about 150 of the *Fortune* 500 companies were using Indian providers for IT development assignments (Mateyaschuk, 1999). In another report by India's National Association of

Software Services Companies, US IT projects shipped to India alone increased by almost 60 percent, which represents nearly 200,000 IT jobs (King, 1999). Many major US companies such as Disney Co., Daimler-Chrysler, and Nortal Networks are among those that outsource IT projects to India. GE, for example, accounts for 8 percent of India's $4 billion global software export business (Robb, 2000). Russia is establishing a strong presence by providing a significant number of IT talent reserves to ASP. Although the bulk of the work being done in Russia is not comparable to India in volume, the projects in Russia are scientifically intensive in nature, due to the mathematical training received by Russian programmers (Prencipe, 2001). China is growing as a strong player in the global outsourcing arena. China's IT industry will experience a 20 percent annual growth rate during the next five years (Prencipe, 2001). Consequently, many US IT projects are finding their way to China. To prepare talent for these projects, Cisco has doubled its training programs in China during the past three years. In Mexico, according to IDC, the growth of IT income from offshore assignments will, in the near future, surge more than 80 percent to $30 million (Robb, 2000). Other countries such as Bulgaria, Egypt, Ireland, Israel, and Slovenia are among those that are gaining ground on the global IT outsourcing world map.

Factors influencing ASP to global outsourcing

The decision to globally outsource IS applications by ASP carry certain characteristics that are unique to this new environment which involves the Internet, a client organization, and an offshore outsourcer. To that end, it is important for ASP managers to understand these specific factors that play a significant role in their decision to outsource globally. The model, shown in Figure 2, examines the unique factors affecting the ASP decision to outsource globally. The model will be used to develop prepositions to understand the significance of these factors on an ASP decision. The factors are product development costs, IT talent, product quality, communication technology, tax incentives, and cultural differences.

Product development costs

Product development costs are often cited in the literature as a major factor influencing global outsourcing (Greenemeier, 2000; King, 1999). ASP market is a growing yet competitive market. The continuous rise of the cost to hire domestic IT workers affects the financial bottom-line for most of ASP. For example, a US-based ASP with an IT workers ratio of 25 on-site to 75 offshore in India is expected to pay a blended hourly labor rate of about $37, compared with an average rate of $75-$100 for 100 percent US teams (King, 1999). According to Prencipe (2001), spending on offshore IS expected to increase from $5.5 billion in 2000 to more than $17.6 billion in 2005. With the

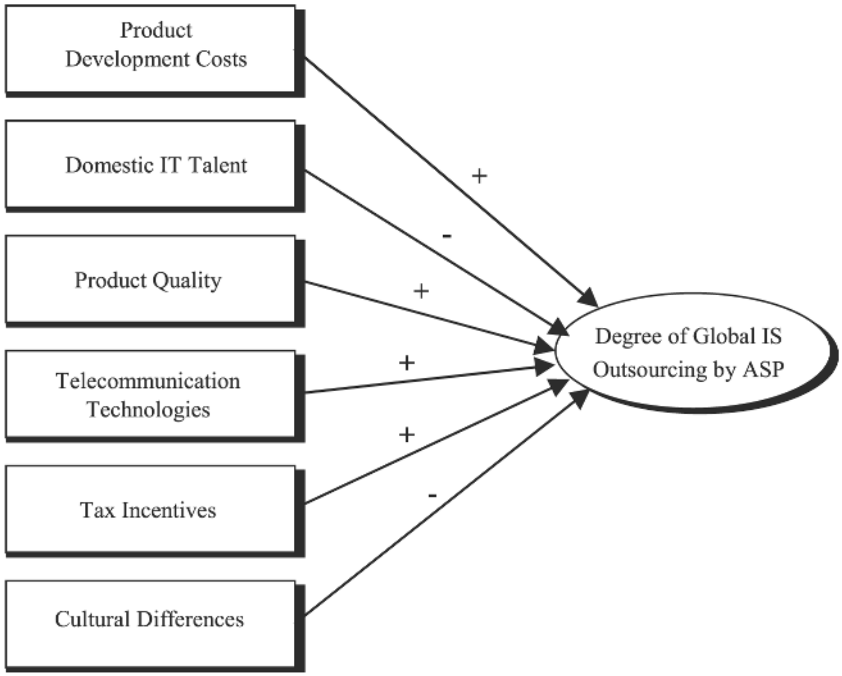

Figure 2.
ASP global IS outsourcing model

participation of ASP as major players in global IT outsourcing and fueled by the low product costs, electronic commerce and Web-based application development is projected to be the fastest-growing segment of offshore outsourcing. Therefore, *P1* is as follows:

P1. The IT product development cost is positively related to the degree of global IS outsourcing.

Domestic IT talent

Domestic IT talent is considered to be another influencing factor. Shortage of IT talent in most developed countries is a notable motive for ASP to outsource globally. That was the case for Tufts Health Plan, a $1 billion US health insurance company serving businesses in northeastern states of Maine, Massachusetts, Rhode Island, and New Hampshire. The company contracted a global Indian outsourcer in order to overcome the domestic shortage in IT talent (Mateyaschuk, 1999). On the contrary, Eastern Europe and India, for example, have access to thousands of Java and Web-based application programmers. These offshore programmers can deliver product that meets high quality standards. Therefore, *P2* is as follows:

P2. The level of availability of domestic IT talent is negatively related to the degree of global IS outsourcing.

Product quality

Product quality is another often-cited justification for offshore application development migration. Many large global developers boast of having attained levels of four and five of the Capability Maturity Model (Robb, 2000). However, in some cases, a major obstacle facing ASP going global is the verification of the claim of the overseas outsourcer that "we can deliver". Orion Auto, for example, a US insurance company in Colorado, after contracting with an offshore company to fix a Y2K problem found that the outsourcer itself was not Y2K compliant (Mateyaschuk, 1999). Therefore, *P3* is as follows:

P3. The quality level of an outsourced product is positively related to the degree of global IS outsourcing.

Telecommunication technologies

Telecommunication technologies' advancements have significantly paved the way for the existence of ASP. On one hand, ASP utilize the Internet to establish business communications with their clients. On the other hand, they are taking advantage of the ever-increasing speed and reliability of communications technology to globally outsource IT projects. Advancements in telecommunication technologies have resulted in lower communication costs, better project management, and faster product development. Therefore, *P4* is as follows:

P4. The level of advancements in telecommunication technologies is positively related to the degree of global IS outsourcing.

Tax incentives

Tax incentives offered by many countries around the globe play an important role in attracting significant foreign investments. Consequently, ASP waste no time in taking advantage of these attractive tax incentives. In Ireland, for example, five US companies have recently opened IT R&D centers in Belfast and hired around 60 Irish programmers to develop C++ and Java applications mainly because of significant tax incentives (King, 1999). Therefore, *P5* is as follows:

P5. The level of tax incentives in the provider's country is positively related to the degree of global IS outsourcing

Cultural differences

Cultural differences usually have their toll on global operations. In many cases, doing business globally for ASP is not a smooth ride. Cultural clash has been always an issue when it comes to doing business globally. Cultural differences are attributed to differences in business norms and procedures, interpretation of requirements, or even what constitutes an "acceptable" final product. Also political stability is considered to be an issue of concern (Gallagher, 2001). Political stability of certain regions around the world has a negative effect on the effort to build a long-term relationship between an ASP and an overseas outsourcer. Therefore, *P6* is as follows:

P6. The level of differences in business cultures between the two parties is negatively related to the degree of global IS outsourcing.

Recommendations and conclusion

Global outsourcing IT applications, particularly by ASP, holds many promises for higher quality yet lower cost products. However, in order for an ASP to be successful in offshore outsourcing, certain measures need to be in place. First and foremost, an ASP need to have a clear statement of expectations of each project (Soliman and Tafti, 2002). Communicating the expected results with the outsourcer ensures mutual understanding of the scope of the project and establishes common measures to answer the question: What is considered to be an "acceptable" final product? Second, ASP should take extra steps to cope with cultural differences related to understanding business requirements, conducting appropriate tests, and meeting delivery schedules. These steps can be in the form of visiting overseas facilities and implementing a strong project-management team. The careful selection of an offshore outsourcer is another factor affecting the success of global outsourcing efforts by ASP. The selection checklist should include an assessment of the outsourcer's qualifications according to the Capability Maturity Model (Gallagher, 2001) and the experience that the outsourcer has in developing similar projects. Moreover, according to Robb (2000), unless there has been an established relationship with one of the big offshore outsourcers, it may be beneficial to select a smaller competitor who would be more focused on the particular needs of the project concerned. Finally, what to outsource is a critical question facing every ASP. A better candidate type of projects to outsource globally is the continuing-maintenance-type (Robb, 2000).

In summary, the phenomenal growth of the Internet and the advancements in telecommunication technologies provide organizations with an application supply chain. ASP can benefit significantly by establishing a global link in their supply chains. Global outsourcers can provide a high-quality, lower cost application if approached right. The framework developed in this paper represents a foundation for more rigorous empirical research to identify the significance of each factor discussed earlier on the ASP decision to globally outsource IS projects. The results can provide ASP with a road map that addresses issues of concern in global outsourcing.

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A case analysis of business process outsourcing project failure profile and implementation problems in a large organisation of a developing nation

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Keywords *Outsourcing, Developing countries, Public sector organizations, Risk analysis, Kuwait*

Abstract *As is the case for many developing economies, internationally published research on information systems (IS) practice in Kuwait is in short supply. The few reports of Kuwaiti IS/information technology (IT) practice highlighted in studies of Middle Eastern or Arab computing, have also largely discussed them in terms of these broader regional identities rather than their specific national context. Business process outsourcing (BPO) is becoming a widely-accepted management practice throughout the world. In recent years, outsourcing of information services has become a pervasive phenomenon. Increasingly, organisations rely on external service providers for IS/IT services. Kuwait has been used as an example of a developing country where the data collection for this study was done there. This study employed case study methodology because the author was interested in answers for "how" and "why" questions and because the study was partly exploratory. The primary data on IS/IT outsourcing practices, obtained for the first time in Kuwait, were collected by means of semi-structured interviews supported by organisational documentation. The case study discussed in this paper brought to the surface critical elements missing in the contract that led to the demise of the BPO project. Studying failure is preventive because it helps organisations reduce the probability of failure in the future. A central argument of this paper concerns the need to understand the complex cultural and political implications of outsourcing within a global context (perspectives), a policy that is becoming increasingly important. The case study findings are crucial as they provide a careful diagnosis of failed IT outsourcing project.*

Introduction

Business process outsourcing (BPO) is becoming a widely-accepted management practice throughout the world, as organisations in different industries outsource more of their processes to world-class service providers to increase performance, shareholder value, and profitability (PriceWaterhouseCoopers, 1999). BPO involves management responsibility for a complete business process or activity (Michell and Fitzgerald, 1997).

Project management outsourcing is where management outsources a specific project or portion of information systems/information technology

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(IS/IT) work. Examples of project management outsourcing include the use of vendors to develop a new system, support an existing application, provide training, or manage a network (Currie, 1995).

The combination of new public management reforms and "informatization" presents opportunities for the business process re-engineering activities and functions (Muid, 1994). Awareness and debate about the possible implications of this are limited. Public service reforms which lead to both fragmentation and contract culture have implications for IS/IT development and implementation (Muid, 1994).

IS are often viewed as expensive failures, which alienate their intended clients through irrelevance or insensitivity to their requirements (Crowe *et al.*, 1996). Despite warnings and advances in development tools and techniques, IS projects continue to fail at an alarming rate, and the problem of run-away development projects has never been more serious (Lyytinen and Robey, 1999). The high proportion of reported IS failures (Beynon-Davis, 1995; Mitev, 1996; Oz, 1994; Sauer, 1999) indicates that there are problems associated with IS development.

IS/IT outsourcing has become a widespread world-wide phenomenon both in the private and public sectors and has received much attention in more recent years (Buck-Lew, 1992; Currie, 1996; Evans, 1994). IT outsourcing here is defined as a decision taken by an organisation to contract-out or sell some or all of the organisation's IT assets, people and/or activities to a third-party vendor, who, in return, provides and manages the services for a certain time and monetary fee (Lacity and Hirschheim, 1993; Loh and Venkatraman, 1992).

This case study brought to the surface critical and fundamental elements missing in the contract that led to the demise of the BPO project. Studying failure is preventive, because it helps organisations to reduce the probability of failure in the future. Performance failure and implementation errors provide clear signals that something is wrong and missing and must be dealt with. Also, attempting to provide a careful diagnosis of a failed outsourcing project, as failed endeavours are not widely publicised (Ang and Toh, 1998). Organisations restrict access to such information because failure can potentially damage their image, reputation and credibility (Sitkin, 1992). As Sitkin (1992) argues, research that over-emphasises successes to the extent of avoiding failure is dangerous.

The paper is structured as follows: Section 2 sets out a review of the IS/IT outsourcing phenomenon and also the developing countries, public sector and cultural factors are discussed. The research methodology is described in Section 3. The results of the case analysis of the data are presented in Section 4 and Section 5 presents the conclusions and an indication of the future work.

Literature review

Outsourcing phenomenon

The 1990s has witnessed a big explosion in the outsourcing of computing services. IS/IT outsourcing has become a widely-used management practice. In the UK, and other parts of the Western world, outsourcing was fuelled by political and economic winds of privatisation, a major consequence of which was the transfer of public sector IS services to agencies operating in the private sector.

The policy of market testing in the UK is leading towards significant changes in the way IS services are provided in support of government business. Market testing is now planned for some or all of the work of IT directorates in almost all central government departments (Muid, 1994). Consequently, large-scale IS outsourcing can have a major effect on organisations' cost of operations, cash flow, productivity, profitability and growth prospects.

Lacity and Hirschheim (1993) provide three definitions of IT outsourcing:

(1) Body shop outsourcing.

(2) Project management outsourcing.

(3) Total outsourcing.

Perhaps the greatest risk in IT outsourcing arrangements, after security considerations, is the loss of control and flexibility (Lacity *et al.*, 1995; McFarlan and Nolan, 1995). Particularly vulnerable is software outsourcing (Ang and Toh, 1998).

A good starting point to the discussion is to attempt to define, what is meant by "business processes"? Davenport and Short (1990, p. 12) define business processes as "a set of logically related tasks performed to achieve a defined business outcome". This definition is similar to Pall (1987) "the logical organisation of people, materials, energy, equipment, and procedures into work activities designed to produce a specified end result (work product)". In fact, process thinking has become widespread in recent years, largely due to the quality movement (Davenport and Short, 1990). A cross-organisational boundaries; that is, they normally occur across or between organisation subunits. Processes are usually independent of formal organisational structure.

Five major steps are involved in building new business processes (Davenport and Short, 1990):

(1) Define business vision and process objective.

(2) Identify the process to be redesigned.

(3) Understand and measure the existing process.

(4) Identify the IT levers.

(5) Design and build a prototype of the new process.

The current competitive marketplace demands operational productivity, administrative efficiency, agility, shorter turnaround times and increased shareholder value. BPO is the survival key in transforming processes to achieve these end results.

The core of a software contract is dependent on three components: product definition, intellectual property protection and payment structure (Whang, 1992). Given the high level of interest in IS/IT outsourcing, which now exists within the public sector, we have examined and concentrated on contracts awarded by a governmental institution.

Developing countries

It is recognised that successful implementations of IT projects are complex tasks dependent on factors both internal and external to the organisation (Hirschheim, 1986; Klein and Hirschheim, 1987; Kling, 1980). Most studies on IS/IT management have focussed on issues more germane to the developed countries and specifically on organisations in the private sector. They have limited relevance to IS/IT projects in public organisations in developing countries, mainly for two reasons. The first reason is that there are dissimilarities between issues related to IS/IT management in the government and the private sector (Bozeman and Bretschneider, 1986; Bretschneider, 1990). The second reason is that there are differences related to the IS/IT management issues in the developed and developing countries, largely due to the differences in the social, political and economic, cultural and environmental contexts. The far greater impact of the environment on organisations (and IS/IT) in developing countries, influences IS/IT design and implementation in ways which are different in the two contexts (Jain, 1997).

Although many failures of IT are cited in literature, there are some organisations in developing countries, which have been able to relatively successfully implement IT applications. It would appear that these organisations not only design internal mechanisms to harness this technology, but also manage the external constraints which tend to hamper IT implementation in other organisations. Given this scenario, there is a need to document and generalise the experience of such organisations. This paper examines a large IT project in a public sector organisation in Kuwait to identify the issues that need to be addressed for successful management of IT. The paper sheds light on the main factors that have led to the total failure in a complex IT project where the cost was as high as several millions.

Background on Kuwait

The State of Kuwait lies on the north-east shore of the Arabian Peninsula, bordered on the east by the Arabian Gulf, in the north by Iraq, and in the south and west by Saudi Arabia. Kuwait is an oil-rich country, which is fairly homogenous in terms of its level of urbanisation and infrastructure development.

Kuwait is considered to be a developing country with a stable political system, a relatively liberal economic policy and an increasingly significant role in the global economy. Unfortunately, very little research has been undertaken on the status of IS in Kuwait. Kuwait has been under-researched in the IS/IT literature (Alshawaf, 2001). No studies of IS/IT outsourcing have yet been found for Kuwait.

Public sector

The public sector is particularly under-studied and under-represented in terms of management prescription (Willcocks and Lacity, 1998). Additionally, the complexity of IS in the public sector is often very high (De Loof, 1997), mainly because of the complexity of the legislation that underlies the organisation processes. Also, there are many stakeholders in the politics of the public sector who may have very different and perhaps conflicting perspectives. At the same time, the public sector organisations were not always attractive to IS/IT specialists. In fact, the IT managers in the public sector were always having problems of recruiting and retaining good IS/IT professionals due to below-market salaries (De Loof, 1997; Lacity and Willcocks, 1997).

The risk of failure is especially troubling for government managers who face an environment where technological innovation is difficult and errors are publicly reported (Borzo, 1999). It is not uncommon, though, for agencies to respond to fiscal scarcity with technological solutions (Weikart and Carlson, 1998).

Cultural factors

Culture is the way people interact with each other and it is the way that comprises ideas through which people perceive and interpret life. Understanding culture is a crucial issue for successful management of IT. Indeed, culture is a world of symbols constructed by people and in which people live, it is a structure of meanings, beliefs and values which conditions human behaviour, allowing its interpretations. National culture has gained much importance in the study of organisations and management despite the many difficulties inherited (related to) its conceptualisation, operationalisation, and interpretation (Tayeb, 1994). Culture has been defined by Hofstede (1991, p. 5) as “the collective programming of the mind that distinguishes the members of one category of people from those of another”. According to Hofstede (1980), national culture shapes the type of organisations and the nature of social structure.

Research methodology and case descriptions

Research approach

The key objective of this research is to develop an approach based on the fit between theory and practice of the IS/IT outsourcing phenomenon by a large governmental institution in Kuwait. To satisfy this objective, the case study method was considered as an appropriate tool for gathering the required information. Case study research is an accepted research strategy in the IS discipline. A number of IS/IT researchers have identified a case study as their research strategy (Benbasat *et al.*, 1987a, b; Kaplan and Duchon, 1988).

Yin (1994) states that a case study, from a research strategy point of view, may be defined as follows:

> An empirical enquiry that investigates a contemporary phenomenon within its real life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used.

According to Leidner and Jarvenpaa (1993, p. 28):

> Case study research is appropriate in situations where the research question involves a "how", "why", or exploratory "what" question, the investigator has no control over actual behavioural events, and the focus is on contemporary as opposed to historical phenomenon.

Case studies are most appropriate for exploratory and explanatory research, since they are able to capture a greater depth and breadth of detail on the subject's activities. They are particularly powerful techniques to answer "how" and "why" questions. The qualitative approach is particularly suitable for studying phenomena in which little previous research has been conducted and it is not supported by a strong theoretical base (Benbasat *et al.*, 1987a, b; Walsham, 1995). In addition, Walsham (1995) suggests that the case study is the preferred method in investigating the use of IT in a social context and it can yield rich insight. Furthermore, McBride (1997) stated that to understand the evolution and the progress of ISs is far better served by a qualitative approach. The case study offers deep and rich insight and understanding can be achieved rather than using quantitative approach. According to Avison (1993) the strength of the case study is also in its use for examining natural situations and in the opportunity it provides for deep and comprehensive analysis.

In line with the above recommendations, a case study approach based on the frequent visits, face-to-face interviews and document review was used to gain a deeper understanding of the failed IT project. Moreover, this case study is grounded in theory, drawing references from published literature and linking it with the interview data, and other relevant materials.

Construct validity was established by triangulation, and chain of evidence. A case study protocol, as proposed by Yin (1994), was utilised to support the objective of reliability. Empirical research was undertaken in two iterative phases in 1999 and 2000 in Kuwait to identify the current practices. The data were collected in two phases: first, through casual conversations, in-depth, informal, and unstructured interviews; second, through semi-structured interviews and document review.

The case study discussed in this paper concerns a large institution in Kuwait (Alpha) and a reputable software consultancy firm (Omega).

Selection of respondents
The intention of the study was to target the highest possible level in the IT departments of each organisation, IT general managers, IT directors, head of the IT department, or equivalent.

Case study discussion

Historically, IS/IT systems have been provided by government staff. The legacy in many departments is of in-house developments and in-house system integration. Nevertheless, expenditure on IS/IT by many departments is already dominated by money spent with the private sector to purchase services and business systems solutions.

Recent failures of government IS/IT to achieve their objectives have highlighted the risk involved in large-scale IT outsourcing projects. One instance was the computerisation of Alpha, a major public sector organisation. During the 1970s, Alpha had a third-generation computer system which was developed by an international well-known IT vendor. However, the IT system was outdated and inadequate. For example, the system was performing its function through the batch COBOL system. The updating files were not done effectively and instantly and the manual processes intertwined with the automatic were inefficient and cumbersome, while errors rates were high. Since Alpha is a very large organisation, it has three different IT departments, including: the Information Department; Operation and Technical Support Department; Application and Development Department. In the aftermath of the liberation of Kuwait in 1991, Alpha was very serious in updating or even developing a new and world-class IT system to carry its different public services and functions. The head of the information department had taken the initiative to the director general of Alpha, calling for a new world-class IT system that included a request for a new "giant" relational database system.

In 1993, plans were conceived and developed to reform completely the use of IT in Alpha. The main aim was to provide much better services to the public, including reduction of payment errors. The director general of Alpha with other top officials had requested a "strategic feasibility study plan" to find out what were the merits, benefits, and costs of the new proposed IT system. Alpha approached a consultancy firm to get their feedback, comments and recommendations. In the late 1990s, based on the consultation report, Alpha approached Omega, a well-known IT vendor and software consultancy firm, for assistance in the software development. Omega was a very internationally reputable firm. After two rounds of negotiations, the IT outsourcing contract project was awarded through direct negotiations. There was no bidding or calling for tendering. The project started in the 1990s. Once the deal became operational, however, given its complexity and size and the time pressures for delivery there was an understandable focus on the "contractual" level.

The initial design phase consisted of designing and building three different database systems which would be integrated in a later phase to form a "giant" relational database management system. The three different proposed systems would contain all different functions and needs of Alpha. Omega suggested that they would rather start with the analysis phase, followed by design phase, and later building, operation and testing phases at the end. Omega consultants realised that some of the business processes were inefficient or ineffective, and therefore in need to redesign.

The analysis is centred around IS development effort and the roles of end-user departments. It is widely believed that software development projects require a significant mount of resources and can become a major source of disputes between the user and the developer communities (Richmond *et al.*, 1992). These IS/IT development projects are seen as a series of exchanges between the development team and the client group which pays for the development effort. Each one of these transactions represents steps such as the definitions, design or the delivery of a particular IS/IT subsystems. Other transactions may include amendments, modifications or enhancement to an existing application.

In the case of Alpha, business functional requirements were not specified in detail and not all consequences were appropriately considered. Therefore, defining the business functional requirements was a very difficult task, since it encompasses many different functions and a variety of people. Thus, the design of the systems that meet the business requirements was also delayed several times and was not moving according to the schedule.

Most of the operational business processes in the cases investigated were very information-intense or consisted of information processing. This was not of concern to any of the interviewees and had no noticeable influence on the outsourcing decisions. High variability and uncertainty of business processes posed a number of problems, especially if sourcing decisions coincided with or preceded reorganisations and if it was not clear whether public organisations planned to move into a new environment. These problems would also have occurred if the projects were performed internally, but became more serious in outsourcing situations, because with outsourcing it is more difficult to change requirements during activities. During the analysis phase, it was significantly recognised by the development team that there is a crucial need to change many operational business processes for the new IT systems. Department's head and senior management in Alpha rejected, for a number of reasons, many of the redesigned operational business processes suggested by the consultants and the vendor development team. Perhaps one of the obvious reasons is that the new processes have eliminated the routine job that was being undertaken by many employees. Also, the new business processes were probably rejected for political, organisational and cultural problems. It seems that new suggested business processes would have made things in a much better shape and would have eased the work, but would have created enormous problems for the current management and stakeholder. Mitev (1996) supports this line of argument which reaffirmed the social, organisational, and political aspects of IS failure.

Studies conducted by Baroudi *et al.* (1986) and McKeen *et al.* (1994) indicate that user participation has a direct relationship with the user satisfaction and IT system usage. In this investigation, no user participation in the contract negotiation process was found; they were only brought in from other departments at a later time and had no prior experience in managing outsourcing contracts. There was a lack of cooperation by the end-user department because there was lack of top management involvement. The lack of top management involvement and support is always an issue of concern. The IT literature is replete with studies that emphasise the importance of top management support in making progressive use of IT (Grover and Goslar, 1993). Top management support can facilitate implementation of new IT strategies in various ways. It is crucial to mobilise resources for implementing the IT strategy. Thus, strong top management commitment is an essential ingredient for a successful adoption of IT outsourcing. In addition, with the support of top management, an easy decision-making process can be initiated and completed. Also, in a high-power distance culture like Kuwait's (Aladwani, 2001), power structures are respected and top officials tend to dominate decision making. However, it should be noted here that most, if not all, of the top management executives in the Kuwaiti public organisations lack crucial awareness and adequate knowledge of IT in general. This line of argument is supported by Abdul-Gader (1999) who found a severe lack of sufficient computer knowledge among middle and top management in the public sector of the Arab Gulf states. They mostly believe that IT is mainly supportive/operational (i.e. non-core) and, therefore, a big budget should not be allocated to IT. This often arises from a fear of unknown IT technology. In addition, Gibson (1998) asserted that top management involvement is a critical ingredient for the successful planning of IT transfer in the developing countries of Latin America. Aladwani (2000) emphasised in his study on IT projects in Kuwait, the importance of involving the management and users in IT implementation activities. Management has to be "deeply involved in" and provide quality input to the IT initiatives and projects.

A successful IT application requires that users are intimately involved in the development process and this is as important as competent project managers and technical skills. But this involvement may be easier to prescribe than to realise. One issue is identifying the end-user. Within Alpha, for example, there are multiple users. The wide range of users has led to the development of a highly complex set of relationships. Moreover, the representation of users' need is not straightforward. Indeed, users' need and expectations vary as their level of sophistication develops or their business changes. The latter is a particularly important issue given the increasing rate of management change in contemporary public administration and the evolving impact of globalisation.

IT vendors in outsourcing services often adopt a strategy of putting forward the best, most experienced people, for contract proposal. As the project progresses, the experienced people are pulled out of the projects to pursue or deliver new business. In their place less experienced staff are assigned to complete the existing projects (Ang and Toh, 1998). This was a very clear deficiency in this case study. Omega brought different consultants from different countries. They were an heterogeneous combination. Omega did not realise the importance of cultural and environmental factors. As the new consultants arrived to meet Alpha's senior staff, it would take much time and a great deal of effort to understand the new "environment" and to get acquainted with the business requirements of the new proposed IT systems.

Mumford (1983) thus argues that the building of a successful IS includes all the design of social and organisational activities as well as non-technical aspects. The failure to consider non-technical aspects is likely to lead to a mismatch between the "characteristics of the systems" and the requirements of the organisations and to the end-users who use it.

After two years, the IT project was still far from completion. Technical and political problems were further compounded by the announcement that the team responsible for design and implementation was to be changed for unobvious reasons. After some deliberations, the project was starting again but with no clear direction. Alpha was very much concerned with eventualities that were starting to emerge. Omega had to change its development team once again without offering justifiable reasons. Almost three years had passed with no "real" achievement. The proposed three IT systems were still on papers in its initial analysis phase.

Eventually, Omega had to withdraw, claiming that they were not able to develop the systems. Alpha took the case to the local legislation system in Kuwait as the case was being reviewed in the court.

Currie (1995, p. 135) reported the problems of IT outsourcing contracts in the UK public sector organisations which were described as five-fold. They included: cost escalation, maintaining quality, over-dependence on IT suppliers, lack of supplier flexibility, and lack of management skills to manage the vendors.

The insights drawn from this research are especially pertinent to the successful adoption of IS/IT outsourcing practices within the developing countries, because they highlight dilemmas and barriers that are the direct outcome of cross-cultural innovation.

Finally, it is important to give serious thought to the effect of such a failed case. Alpha, as they claim, lost several million pounds as a result of this failed IT project.

Case study results and findings

The results provide a pragmatic picture of the situation.

In light of the proceeding discussions, a number of interesting and important issues have come from the analysis of the text data and the key issues are presented here.

(1) First and foremost, considerable attention should have been paid to a number of cultural and possibly political and environmental factors which, in this case study, were viewed as impediments for the successful adoption of IT outsourcing practices.

(2) Lack of top management support, which resulted in the failure outcome of the IT project.

(3) Lack of user participation and involvement.

(4) Vendor brought different heterogeneous consultants and different development teams, consisting of people with many diverse cultural backgrounds.

(5) Lack of IT experience in dealing with the vendor (managing the IT outsourcing relationship).

(6) Business and system functional requirements were not specified in detail and were not clear (i.e. inconspicuous or vague).

(7) Over-reliance on a single supplier (i.e. vendor).

(8) There was no formal and systematic evaluation methodology on the IT outsourcing during the contract lifetime.

(9) Contract type was "time and material", which was not highly detailed and designed to reduce uncertainty during the lifetime of the contract. For example, if the client was not receiving the quality of service for the value of money, it was suggested that would be a just cause for enforcing penalty payments or, in extreme cases, an early termination of the contract.

(10) A policy of rewards and penalties clauses and existing arrangements, which should be tied to the fulfilment of the contract control, was missing from the original contract.

(11) No request for proposal (RFP) was issued so that the vendor had understood fully what to deliver.

(12) Alpha was often not clear about the type of the desired IT systems being analysed and designed.

(13) Alpha accepted the agreement/contract given to them by the vendor (Omega), which protected the vendor and reserved his rights more than the client. This is largely due to the lack of experience in drafting contracts with the IT outsourcing deals.

(14) Lack of IT project management expertise from both the parties.

(15) Poor IT management is also considered to be an impediment in the successful adoption of IT outsourcing practices.
(16) Lack of good communication between all staff involved with the project was felt to be very important, as the project was managed by a variety of people originating from different cultures.
(17) Vague implementation timetables.
(18) There was no outsourcing advisor to the client, Alpha.
(19) There was not a very detailed and clear service level agreement (SLA).
(20) Lack of communication of the importance of standard operating procedures.

Conclusion

The purpose of this paper was to describe and diagnose a failed contract to illuminate the added complexities of software outsourcing. To accomplish our objective, we relied on Alpha-Omega case study analysis to overcome the shortcomings of outsourcing.

Companies encounter various other problems in establishing and maintaining the outsourcing relations as well (Radosevich, 1996; Smith *et al.*, 1996), they include screening and evaluating of suitable outsourcing partners from around the world and high expenses for managing the relationships. The software outsourcing projects in developing and emerging countries become influenced by a variety of factors. Due to these, it is very challenging to manage the outsourcing process and project. Therefore, a systematic approach is needed to select the appropriate software-producing vendors. Moreover, IT projects in developing countries are still undertaken in ways that are not clearly related to strategic change, and efficiency improvements remain an overriding consideration.

The analysis of the Alpha-Omega case shows that the outsourcing failure can be attributed to the lack of attention by the outsourcing parties to critical elements. Major oversights include lack of client authority over selection and changes in developmental team staff from the consulting firm; lack of punitive incentive systems of delays; lack of IT project management expertise from both parties; lack of communication of the importance of standard operating procedure; lack of top management and user departments involvement; and lack of attention to the cultural and environmental issues.

Several interesting points and trends were observed in this study that have been analysed qualitatively, but will be subject of further research. In this context, the discussion in the paper provides a useful guide to local and national policy makers, especially in the developing nations context.

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An enterprise layer-based approach to application service integration

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Keywords *Modelling, Business planning, Object-oriented methods*

Abstract *At present, many companies rely on third-party applications and application services for (part of) their information systems. When applications from different parties are used together, an integration problem arises. This paper describes an integration approach based on the construction of an enterprise layer. This approach is deliberately kept away from a document-based, flow-oriented approach, where business processes are hard coded into the application architecture. Interaction is based on the concurrent update of a shared underlying enterprise layer. At the same time, the application architecture becomes easily adaptable to re-engineered business processes.*

Introduction

The dramatic advance in Information and Communication Technology over the past decade allows for innovative organisational forms that were unthinkable before. Whereas most companies used to develop all the required business information systems support in-house, the need for shorter software life-cycles, the shortage of IT skills and the increased affordability and ability to amortise the cost of business solutions drive more and more companies to buy or rent the required software as applications or application services from application providers. In the best case, a single software product line is available for the entire company. In many cases, however, the company will have to rely on the services of different providers for one or more functional domains.

When a company obtains its software from different providers, a number of problems must be solved.

- Software has a significant impact on the ways of working of an enterprise and shapes the possible business processes of the organisation. An approach of one software package per functional unit suits the more functionally-oriented organisational forms. A more process-oriented organisational form with enterprise-wide integrated processes is much less well supported. If a process-based organisation wants to successfully integrate applications from different providers, first it must integrate the business processes from the different applications.

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The case described in this paper has resulted from a project executed with the company NOVAXESS based in Amsterdam, The Netherlands.

- Besides integrating applications from an organisational point of view, the information management aspects must also be integrated. Each application maintains it own data, but often data will be replicated across different functional domains. For example, data about "products" and "customers" will appear in the sales and marketing, service provisioning, customer services and financial domains. An integrated process-based approach requires an integrated information management support (Seltsikas, 1999). Replication of data must be carefully managed and avoided whenever possible, as it is likely to cause errors in the processes and complicates successful automation of business processes.
- Third-party applications that support (part of) the core business processes of a company also maintain valuable core information. If, after some time, the company wishes to switch to another application service provider, the question arises of how to recover this core information and how to merge it into the new application.

Similar problems arise when different companies want to integrate their business processes to a certain level: the integration of the business processes must be supported by integrated information processing across companies (Leclerc, 2000).

In the remainder of this paper, we present an integration approach based on the concept of an enterprise layer. This kind of approach allows us to stay away from a document-based, flow-oriented "stove-pipe"-like system, where information is vehicled from one application to another by feeding the output of one application as input to the next in line. Rather, the common information is stored into a shared object database that can be accessed through an event-handling layer. This event-handling layer shapes the manipulation of enterprise layer objects through the definition of business events, their effect on enterprise objects and the related business rules. This "primary copy" is then used to synchronise all information in the third-party applications by means of co-ordination agents. The enterprise layer also allows companies to remain more independent of their ASPs as they remain the owners of the core company data.

The remainder of this paper is organised as follows: Section 2 describes the problem of application integration in more detail, illustrated by means of a real-life case study of a company in the telecommunications business area. Section 3 presents the overall architecture and the methodology used to build the enterprise layer. Section 4 zooms into the details of the implementation and Section 5 explains how exactly information in the enterprise layer and the different applications can be synchronised. Finally, Section 6 draws some conclusions.

Business units with stand-alone software packages

To illustrate the problem of application integration we describe the real-life case of a company in the telecommunications business area (Lemahieu *et al.*, 2002). The company positions itself as a broadband application provider for the SME market. In this environment, one of the key factors is the ability to handle large volumes of small orders. This is only possible by means of business processes that are properly automated. The company is organised around four key business units: *Sales and Marketing, Service Provisioning, Finance* and *Customer Services*. The main business process is shown in Figure 1.

The business unit *Sales and Marketing* is responsible for identifying emerging trends in the telecom industry and offering new telecom services in response. They are in charge of PR activities, contacting potential customers and completing sales transactions. They notify the Service Provisioning and Finance/Billing department of ordered products.

The business unit *Service Provisioning* is responsible for the delivery of the sales order (SO) and organises the provisioning of all telecommunication services ordered by the customer. They have to coordinate the installation of network components at the customer's site and the configuration of these components according to the type of service requested. They notify the Billing Department of terminated installations and the Customer Support Department of installed configurations.

The business unit *Finance* takes care of the financial counterpart of sales transactions and keeps track of the payments for the requested services.

The business unit *Customer Services* is responsible for the service after sales. They can consult the entire network infrastructure built at a specific site and can inform a customer about the progress of specific service provisioning activity or about a network problem on request.

Apart from the sales business unit that relies only on elementary office software, each of these business units relies on different software packages from application service providers. These packages are stand-alone tools tailored to the problems at hand. Although each software package is very well suited for supporting a specific business unit, the lack of integration between

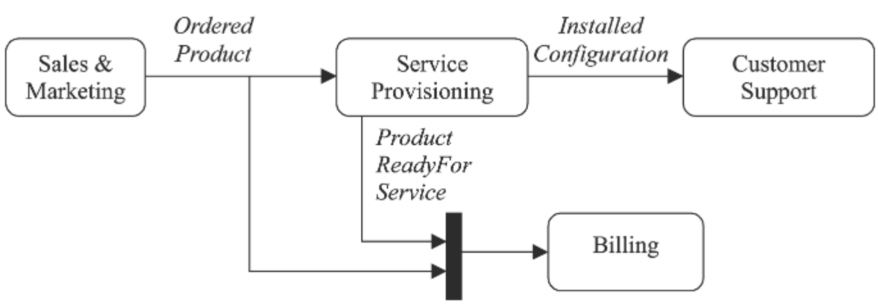

Figure 1.
Main business process

the different stand-alone applications causes problems. The main reason for this is that each application looks after only its own data storage and business rules, resulting in a state of huge data duplication and severe risks for data inconsistency on a company-wide level. The authors illustrate the drawbacks of this state by means of two examples.

The first example is related to the storage of people data. In the *Sales and Marketing* business unit data is stored on in-house sales people, out-house distributors and commercial contacts. The *Service Provisioning* application and the *Customer Services* application maintain data on technical contacts. The *Finance* application keeps track of financial contacts. Since the company mainly deals with SME, an individual often takes several of these roles simultaneously, so that data about one person will be distributed and replicated across several business units. The company could benefit from an approach ensuring that data on a single individual are stored and maintained in one place. For example, the company can then ensure that when a person misbehaves in one of the above roles, this person will not be accepted to take on the role of, say, financial contact in the future. Such a policy is only possible when all information on individuals is centralised.

The second example is related to the storage of product data. The *Sales and Marketing* business unit is responsible for conducting market research and offering appropriate telecom solutions to keep pace with the evolving business opportunities. What they sell as one single product can be further decomposed into a number of parts to install and parameters to configure by the *Service Provisioning* business unit. An example of this is shown in Table I.

These business units need a different view on products. *Sales and Marketing* and *Finance* need a high-level product view and are not interested in low-level issues related to the installation and configuration activities. *Service Provisioning* needs to know the parts, where to install and configure and does not bother about the high-level sales and marketing issues.

In an attempt to keep a unified view on products while accommodating for their different needs, people of the business units tend to twist the product definitions in their respective software packages. By abusing attributes and fields for cross-referencing purposes, they try to maintain a more or less integrated approach. However, as the set of products in the product catalogue will increase, a unified view is no longer sustainable. Also, in an international set-up with multiple business units, a unified view can be held no longer: what

Product	Parts and parameters
Bi-directional link of 256 kbps	Installation of an unbundled line (2 ×) Installation and configuration of a router (2 ×) Configuration of a virtual circuit with bandwidth of 256 kbps

Table I.
Commercial and technical view on products

if a single product from a sales point of view requires different technical configuration activities depending on the business unit?. An example of the latter is Internet access: it can be implemented by means of an unbundled line in the Netherlands and the UK, but it must be provided with a leased line in Belgium where unbundling of the local loop is not (yet) possible.

The company would certainly benefit from a scalable design reconciling the commercial and the technical views that can be taken on a single product, the former important for the *Sales and Marketing* and *Finance* business units and the latter important for the *Service Provisioning* business unit.

Enterprise layer as an integration approach

A possible approach to the integration problem would be to build "bridges" between the different software packages. Such a bridging approach is usually based on the "flows" of information through the different business units. From the business process shown in Figure 1 we can derive such an architecture for the case at hand (Figure 2).

Such an architecture does not resolve data mapping and data duplication problems: information about customers, products, and other common entities is still found in different places. Although it is unlikely that data replication can be completely avoided, another major problem with this kind of architecture is that the business process is hard-coded into the information management architecture. Re-engineering of the business processes inevitably leads to a reorganisation of the information management architecture. Such a reorganisation of IT systems is a time-consuming task and impedes the

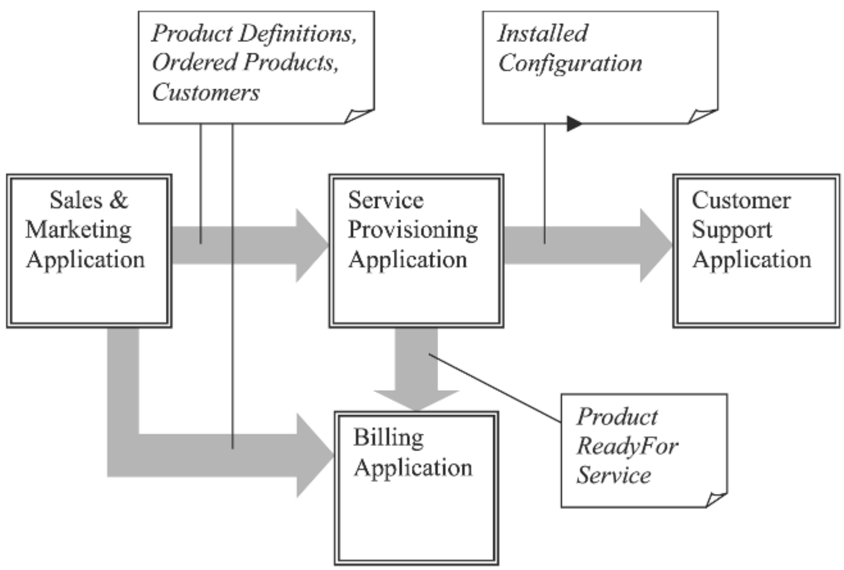

Figure 2.
"Stove-pipe" architecture derived from the information flow defined in the business process

swift adaptation of a company to the ever-changing environment in which it operates.

An approach to overcome the data synchronisation problem and the problem of hard-coding the underlying business processes is to define a common layer serving as a foundation layer on top of which the stand-alone business applications can function independently and in parallel. This common layer has to encompass all relevant business objects, relations between business objects and business rules for modelling their behaviour. The developed common layer will be called the *enterprise layer*; it will co-ordinate the data storage by unifying definitions.

For the development of the enterprise layer, the object-oriented analysis method MERODE (Snoeck and Dedene, 1998; Snoeck *et al.*, 1999) was adopted. A particular feature of this method is that it is specifically tailored towards the development of enterprise models. MERODE advocates a clear separation of concerns; in particular, a separation between the information system services and the enterprise model. The information systems services are defined as a layer on top of the enterprise model, which fits well with the set-up of the project.

A second interesting feature of MERODE is that, although it follows an object-oriented approach, it does not rely on message passing to model interaction between domain object classes as in classical approaches to object-oriented analysis (Booch *et al.*, 1999; D'Souza and Wills, 1999; Fowler and Kendall, 1998; Jacobson *et al.*, 1997). Instead, business events are identified as independent concepts. An object-event table (OET) allows us to define which type of events affect which type of objects. When an object type is involved in an event, a method is required to implement the effect of the event on instances of this class. Whenever an event actually occurs, it is broadcast to all involved domain object classes. This broadcasting paradigm requires the implementation of an event-handling layer between the information system services and the enterprise layer.

To better illustrate the responsibilities of the different layers, we exemplify objects in the domain and event-handling layers by considering an example of an order handling system. Let us assume that the domain model contains the four object types Customer, Order, Order Line and Product. The corresponding UML (Booch *et al.*, 1999; Fowler and Kendall, 1998; Marshall, 1999) Class diagram is shown in Figure 3. It states that a customer can place 0 to many orders, each order being placed by exactly one customer. Orders consist of 0 to many order lines, each order line referring to exactly one product. Products can appear from 0 to many order lines.

Business event types are *create_customer, modify_customer, end_customer, create_ order, modify_order, end_order, create_orderline, modify_orderline,*

Figure 3.
Class-diagram for the order handling system

end_orderline, cr_product, modify_product, end_product. The OET (Table II) shows which object types are affected by which types of events and also indicates the type of involvement: C for creation, M for modification and E for terminating an object's life. For example, *cr_orderline* creates a new occurrence of the class Orderline, modifies an occurrence of the class Product because it requires adjustment of the stock-level of the ordered product, modifies the state of the order to which it belongs and modifies the state of the customer of the order. Table II shows a maximal number of object-event involvements. If we do not want to record a state change in the customer object when an order line is added to one of his/her orders, it suffices to simply remove the corresponding object-event participation in the OET. Full details of how to construct such an OET and validate it against the data model and the behavioural model is beyond the scope of this paper, but can be found in Snoeck and Dedene (1998) and Snoeck *et al.* (1999).

Information system services are considered as a layer on top of the event-handling layer. Output services query (read) the domain objects and send this information in the appropriate format to a user interface, a printer or another external element of the system. Input services are services that add, modify or delete information in the domain model by generating the appropriate events. Figure 4 shows how objects in the different layers interact. The event-handling layer can, for example, be implemented by one class per type of event. This class is responsible for checking the validity of the invoked event and for broadcasting the event to all involved objects. Input services can update information in the enterprise layer by invoking the relevant event. For example, the create customer service will invoke the *create_customer* event. Output services, such as, for example, the customer list service, can directly inspect the state of enterprise objects.

The event-broadcasting approach allows us to implement the enterprise layer (together with the event-handling layer) by means of an object-oriented implementation technology as well as a relational or object-relational

	Customer	Order	Order line	Product
create_customer	C	–	–	–
modify_customer	M	–	–	–
end_customer	E	–	–	–
create_order	M	C	–	–
modify_order	M	M	–	–
end_order	M	E	–	–
create_orderline	M	M	C	M
modify_orderline	M	M	M	M
end_orderline	M	M	E	M
create_product	–	–	–	C
modify_product	–	–	–	M
end_product	–	–	–	E

Table II.
OET for the order handling system

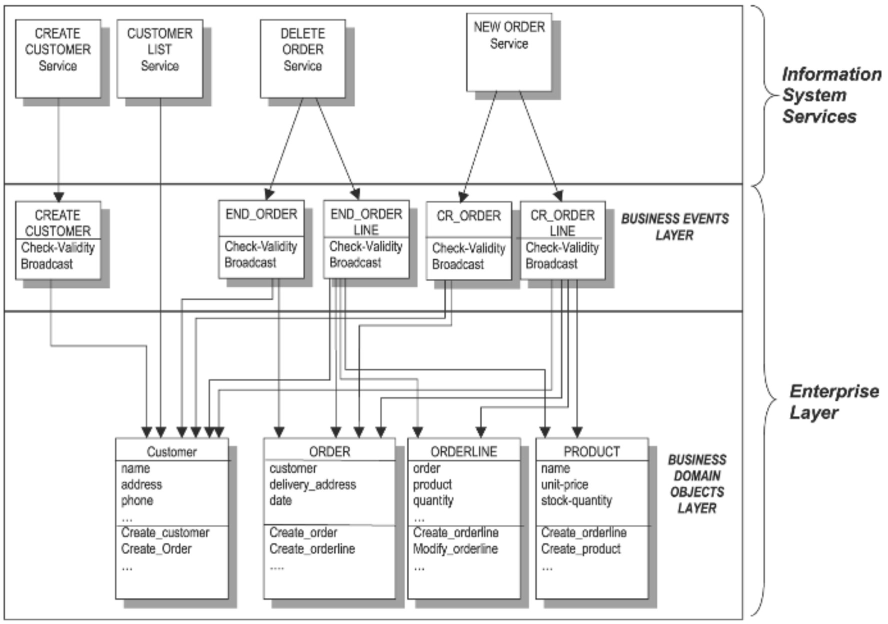

Figure 4.
Sublayers within the enterprise layer

technology. When all applications are not object-oriented, there is still enough freedom to choose the most appropriate implementation technology for the enterprise layer, without danger for a paradigm mismatch between the specification and implementation.

Once the enterprise layer is developed, the integration of the business unit applications will be realised by plugging them in on the enterprise layer as part of the information systems services layer. An important feature of the enterprise layer is that it is a *passive* layer that is not aware of its possible users. Therefore, an *active* interface between the enterprise layer on the one hand, and the business unit applications on the other hand, has to be defined. This interface can be realised by developing agents responsible for co-ordinating both sides. They will listen to the applications and generate the appropriate events in the enterprise layer so that state changes in business classes are always reflected in the enterprise model.

For the case at hand, the enterprise layer contains all the common objects for the acquired software packages and the domain objects required for the Sales and Marketing business area. Apart from co-ordination agents, user interfaces will be developed that interact directly with the enterprise layer. An example of the latter is the entering of SOs and customer self-care functions such as access and maintenance of personalised content. The resulting infrastructure is shown in Figure 5.

Notice how in this type of application, the business process is not hard-coded in the architecture. All information flows through the enterprise layer (Figure 6). In this way, the integration approach is deliberately kept away from a document-based, flow-oriented "stovepipe"-like system. Interaction between respective application services is not based on feeding the output document of one application as input to the next in line, but on the concurrent updating of data in the shared, underlying enterprise layer. The latter defines a unified view on key business entities (e.g. Customer and Product), it encompasses relationships between business entities and formulates their behaviour in terms of *business events*, apart from other business rules. This results in a maximum flexibility in the interaction between the users and system. However, wherever certain workflow-related aspects in the business model necessitate a strict flow

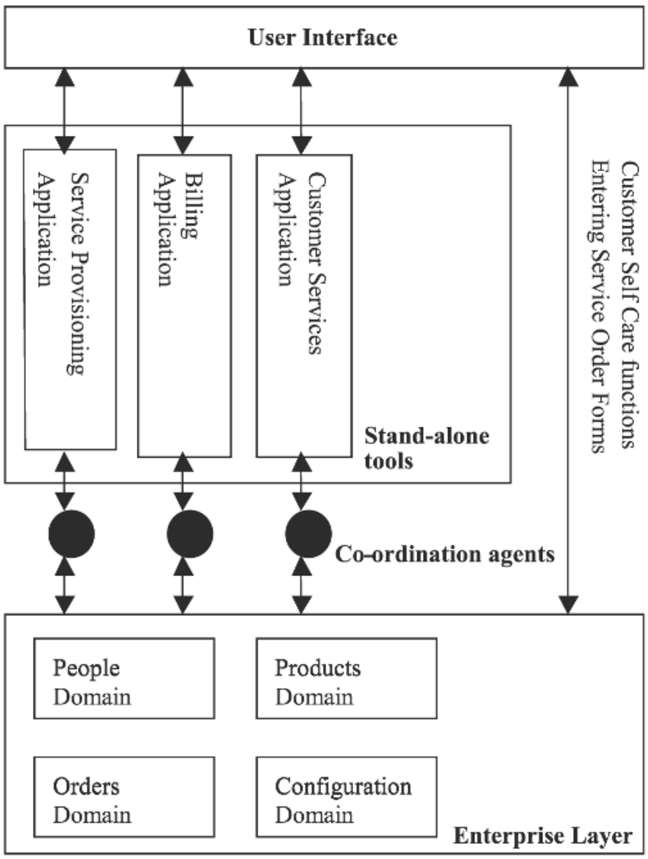

Figure 5.
Enterprise layer integration approach

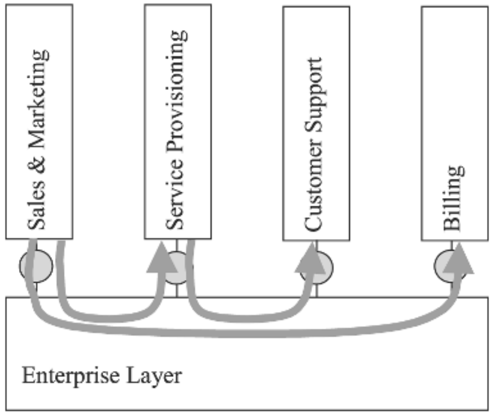

Figure 6.
Information flows in the enterprise layer integration approach

of information, the correct consecution of business events can be monitored by the sequence constraints enforced in the enterprise layer.

Such sequences between the activities are enforced in the enterprise layer by allowing domain objects to put event sequence constraints on their corresponding business events. For example, when a customer orders a product, a new order line is created. In terms of enterprise modelling, this requires the following business events: *create SO*, *modify SO*, *create order line* (OL), *modify OL*, *end OL*. The *customer-sign* event models the fact that a final agreement with the customer has been reached (signature of SO form by the customer). At the same time, this event signals that installation activities can be started. These kind of sequence constraints can be modelled as part of the life-cycle of business objects. In the given example, this would be in the life-cycle of the SO domain object. As long as it is not signed, a SO stays in the state "existing". The *customer_sign* event moves the SO into the state "registered". From then on, the SO has the status of a contract with the customer and it cannot be modified any more. This means that the events *create OL*, *mod OL* and *end OL* are no longer possible for this SO. The *operations-accept* event signals that the SO has been planned for installation. When installation is successfully terminated, this is recorded by means of the *set-completed* event. Finally, the *start_billing* event signals the start of the billing process. The resulting finite state machine is shown in Figure 7. In this way, the sequence constraints mimic the general business process defined in Figure 1.

By listening to the *customer_sign* event, the co-ordination agent for the Service Provisioning application knows when a SO is ready for processing for Service Provisioning. In a similar way, the enterprise layer allows us to monitor signals from the Service Provisioning area (such as the completion of installations) and to use these signals to steer the completion of SO. In its turn, the completion of a SO will be used by the billing agent to start the billing

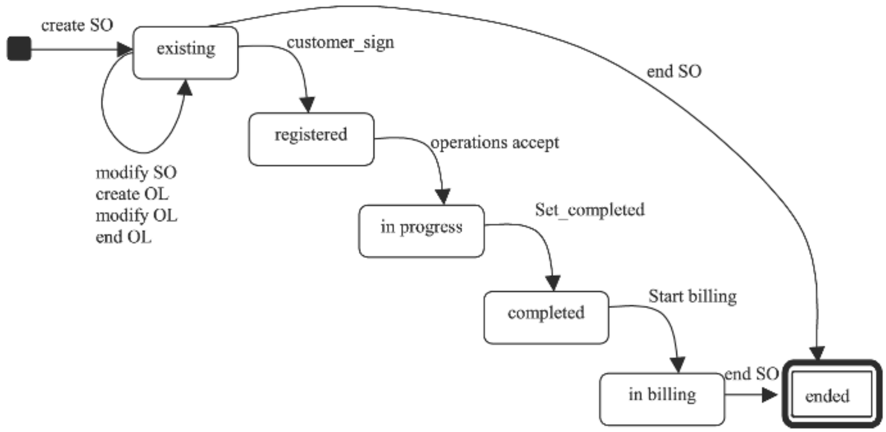

Figure 7.
State machine for SO

process. In this way, the enterprise layer allows for an automated co-ordination of the behavioural aspects of different business areas. A re-design of the business process requires the re-design of the event sequencing in the enterprise layer, but leaves the co-ordination mechanisms unchanged.

Implementation aspects

A MERODE-based enterprise layer can be implemented in several possible ways. The earlier case uses a relational database for "passive" data storage and enterprise JavaBeans for the "active" aspects of the enterprise layer. The MERODE enterprise objects are represented as distributed objects, which are mapped transparently into relational tables. Hence, although a relational database is used for object persistence, the external view is fully object-oriented, such that interaction can be based on (remote) method invocation or event-handling. External applications and services only interact with the enterprise Beans, the relational database is never accessed directly. However, this is not an absolute requirement: other implementations were built around a purely relational design, augmented with stored procedures for the active components.

Although the data in the enterprise layer can be queried directly by means of purpose-built user-interface components, its primary focus is to offer a unified view on the data objects observed by the respective application services, to which the enterprise layer serves as a foundation layer. The information exchange between these services and the inherently passive enterprise layer is mediated by the co-ordination agents. Each application service deals with two potential types of data (Figure 8): its *proprietary data* that are only relevant to that particular service and the *shared data* that are relevant to multiple applications and that are also present as attribute values to the objects in the enterprise layer. Whereas the proprietary data are handled by means of the application service's own mechanisms (such data are not relevant outside the

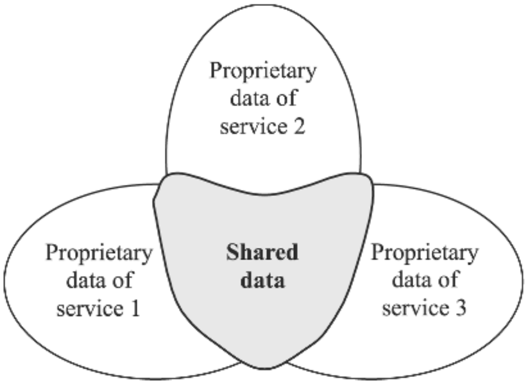

Figure 8.
Proprietary data and shared data of application services

application service anyway), it is the task of a co-ordination agent to provide the application with the relevant shared data and to ensure consistency between the views of application service and the enterprise layer on these data. Such an agent can be rewritten when an application is replaced, hence leaving both the application services themselves and the enterprise layer virtually unaffected.

A co-ordination agent supports the interaction between an application (service) and the enterprise layer in two ways: by inspecting attribute values of enterprise objects and by *generating business events* that affect the state of one or more enterprise objects. These two mechanisms correspond roughly to "reading from" and "writing to" the enterprise layer (Figure 9).

"Reading" from the enterprise layer, i.e. information is passed from the enterprise layer to an application service, is rather straightforward: the co-ordination agent inspects the relevant attributes of one or more enterprise objects and passes these values to the service. The situation where information is passed from the application to the enterprise layer (the application "writes"

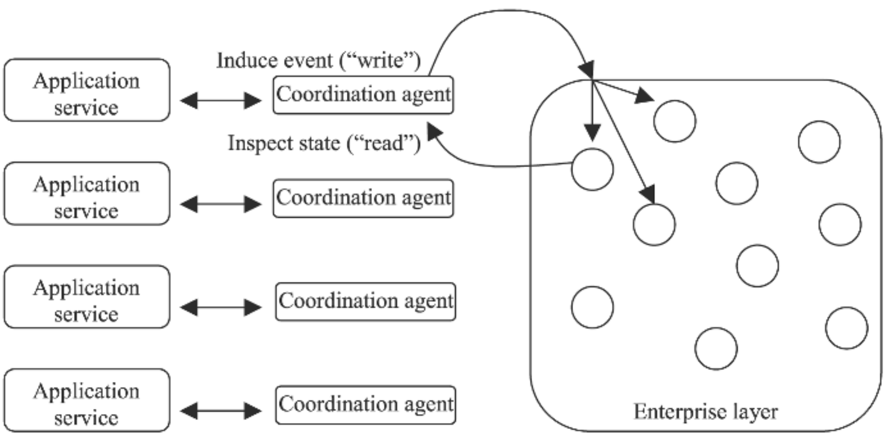

Figure 9.
Interaction between application services and enterprise layer

to the enterprise layer) is a bit more complex: because the updates that result from a given business event are to be co-ordinated throughout the enterprise layer (they can be considered as a single transaction), co-ordination agents should never just *update* individual attributes of enterprise objects. Changes to the enterprise layer are only to be induced by generating business events, as stated in the MERODE specification. A business event corresponds to a row in the OET and affects all enterprise objects whose column is marked for this row.

A co-ordination agent has to acknowledge relevant events that occur in its associated application service. The co-ordination agent "writes" to the enterprise layer by triggering the corresponding business event in the enterprise layer. The enterprise objects can subscribe to business events that are relevant to them (as denoted in the OET). The enterprise objects have a method for each event type in which they participate. If a relevant event occurs, they execute the corresponding method. This method checks constraints pertinent to the (object instance, event type) combination and executes the necessary updates to attributes of that particular object if all constraints are satisfied. If all constraints are not satisfied, an exception is generated. For example, when a *create_orderline* event is triggered, four domain objects are involved that might impose some preconditions on the event. For example:

- the order line checks that the line number is unique;
- the product it refers to, checks its availability;
- the order it is part of, checks whether it is still modifiable;
- the customer object validates the event against a limit for total cost of outstanding orders.

The global result of the business event corresponds to the combined method executions in the individual objects. The transaction is only committed if none of the objects that take part in the event have generated an exception. Otherwise, a rollback is induced.

Preservation of consistency between the replicated data by means of the co-ordination agents

The implementation modalities of "reading from" and "writing to" the enterprise layer in an actual co-ordination agent may vary, depending on the application or application service's architecture and the middleware. The interaction mechanism is sufficiently flexible to cater for configurations with a tight coupling between (local) applications and the enterprise layer, e.g. by means of CORBA (Siegel, 1996), RMI (Pitt and McNiff, 2001) or COM (Sessions, 1997) as well as for configurations where (remote) application services and the enterprise layer are very loosely coupled, e.g. by means of SOAP (Seely and Sharkey, 2001). A mixture of both is equally feasible.

Also, not every application or application service's interaction mechanism will allow for the shared data to be accessed directly from the enterprise layer in real time. If an application (service) allows for external data (i.e. beyond the proprietary data that possibly exists in a local database) to be accessed through a gateway, all shared data can be accessed directly from the enterprise layer, without the need for replication in the application's proprietary database. The co-ordination agent interacts directly with the application's in-memory data structures for storage and retrieval to/from the enterprise layer. In terms of data integrity, this is the preferable approach, as the shared data are not replicated; hence, cannot give rise to any inconsistencies between the application service and enterprise layer. The interaction is synchronous, with all updates becoming visible in both the enterprise layer and the application service without any delay.

In the case where an application can only read from a local, proprietary database, the co-ordination agent is responsible for "pumping" the relevant shared data from the enterprise layer to the local database and vice-versa. The enterprise layer contains the "primary" copy of the shared data, but a subset of the enterprise layer's business objects is replicated in the proprietary database of the application (service). A crucial task of the co-ordination agent will be to guarantee a satisfactory degree of consistency between the enterprise layer and replicated data, especially given the situation of concurring business events. For that purpose, co-ordination agents can subscribe to insert-update-delete events (caused by other applications triggering business events) to the enterprise layer objects that are relevant to the agent's corresponding application service (using, e.g. the observer pattern (Gamma *et al.*, 1999)). When an insert-update-delete event occurs, the updated data can be transferred to the proprietary database by the agent. Such "general" events are sufficient for this purpose, as the agent only needs to know *that* an update has happened, not *because of which business event*. The enterprise layer itself can never take the initiative to call on an application service: it is not aware of its existence.

Such updates can be propagated synchronously or asynchronously. Asynchronous interaction may be inevitable in two cases. With regard to "reading" from the enterprise layer, an application service may not always be able to immediately process an update, e.g. because it is too slow, the connection is unreliable, etc. In that case, the update propagations will be packaged by the co-ordination agent as *messages* and are *queued* until the application is able to process the updates. Another cause for asynchronous interaction, when "writing" to the enterprise layer, could be the fact that the application service's interface does not allow the co-ordination agent to adequately acknowledge the application's internal events. Consequently, the co-ordination agent is not immediately aware of updates to shared data replicated in the local database. These updates can only be detected by means of periodical polling; hence, will only be propagated to the enterprise layer periodically.

If the interaction between the application service and the enterprise layer is asynchronous, a continuous consistency between the updates in the application and the enterprise layer cannot be guaranteed. Shared data are replicated in the service's local database and the updates are propagated periodically. However, an asynchronous approach has the advantage of allowing a very loose coupling between the application and enterprise layer, whenever a synchronous approach with a tighter coupling is not feasible.

Conclusions

In this paper, an integration approach based on the construction of an enterprise layer have been presented. This enterprise layer is more than a shared object database. It also contains an event-handling layer that accepts business events generated by the application layer above and broadcasts the events to the involved enterprise object types.

The business events are the basic mechanism by means of which co-ordination agents manage the consistency of shared data. The event mechanism supports a variety of co-ordination policies: direct access to the enterprise layer, and synchronous and asynchronous update mechanisms for the replicated data.

An important advantage of the concept of event broadcasting is that it allows implementing the enterprise layer together with the event-handling layer by means of object-oriented as well as relational or object-relational technology. This ensures enough freedom for implementation technology choices, which is interesting when all applications are not based on the same technology.

Because all applications interact through the enterprise layer and never interact directly with each other, the removal of an existing application or the addition of a new application does not affect the other applications.

Finally, the enterprise layer architecture does not hard-code a particular business process, such that the application architecture offers the much required flexibility to adapt business processes to the ever-changing environment of today's enterprises.

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Re-engineering business processes through application service providers

Challenges, issues and complexities

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Abstract *The quest for service excellence and competitive edge by firms result in the constant search for effective process and information systems management methods. The recent emergence of the application service provision (ASP) business model has promised firms remote-access to industry robust business processes and "best of breed" enterprise applications on a rental basis. This paper examines how the ASP business model facilitates business process and information systems improvements in firms through effective process management. This is pursued through a review of relevant literature and empirical evidence gathered from a case study-based investigation in six firms in the UK. By examining the features of remote application and business process outsourcing in the context of business process management, this paper outlines how firms can improve their business and IT performance. Findings from empirical evidence are used to substantiate the arguments and suggest areas for future research.*

1. Introduction

To meet the challenges imposed by turbulent economic conditions and severe competition, firms look towards investment in new technology and skills to enhance their competitive position. The vast interest in business process re-engineering (BPR) in the 1990s, offering organisational transformation through the streamlining of business processes and application systems, promised more than it delivered (Hammer and Champy, 1993). The more recent promises of developing e-business led firms to make further investments in technology and staff, usually with disappointing results. This poses a dilemma for senior executives, who wish to remain at the competitive edge through technology innovation, yet are forced to cut costs in an economic downturn. Balancing these competing objectives depends on whether information technology (IT) is perceived as a strategic weapon or merely a utility within the firm (Lacity *et al.*, 1995). Many find that, for them, the answer to this question is the latter and are therefore encouraged to transfer the responsibility for IT to an external vendor through outsourcing (Currie, 2000). In its simplest form, IT outsourcing involves the significant contribution of external vendors in the physical and/or human resources associated with the entire or specific

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component of the IT infrastructure in an organisation (Loh and Venkatraman, 1992).

Although in the past, outsourcing was often seen as a practice used to offload the routine day-to-day operations of a firm to a third party to manage, recent emergence of the ASP and business process outsourcing (BPO) models have added a new dimension to outsourcing. While changes in industry landscape and high levels of reorganisation across industries have increased demand for outsourcing (Kern *et al.*, 2002), the notion of allowing key IT staff to focus on a firm's core business processes has made it even more attractive to firms.

According to the application service provision (ASP) Industry Consortium, an ASP manages and delivers application capabilities to multiple entities from a data centre across a wide area network.

BPO involves the assumption of a responsibility by a service provider for a series of tasks that, performed together, achieve a specific business outcome (Currie *et al.*, 2003).

With the emergence of ASP and BPO, management thinking has changed to consider outsourcing as a partnership with a third-party service provider to gain access to high-performance business processes and best-of-breed software applications to keep pace with industry best practice (Linder *et al.*, 2001). By doing so, firms hope to utilise the expertise of outside firms to initiate new process improvement opportunities, and aim to release their own employees from performing routine IT operations to focus on core business processes.

This paper draws from the literature and a case study-based investigation to show how outsourcing through an ASP facilitates effective process management. It begins by presenting a literature review of the impact of process management and ASP on a firm's business and IT environment. This is followed by an analysis of the findings from an empirical study of the selection and procurement of ASP solutions. This is followed by a discussion on how business and IT improvement efforts have evolved over time and the strategic benefits that can be realised from application and BPO. Finally, the paper concludes by suggesting that ASP and BPO may improve a firm's performance and competitiveness by facilitating effective process management.

2. ASP and process management: the link

In this section, the authors examine literature on process management, ASP and BPO to identify the impact of these management concepts on a firm's business process and IT environment.

2.1 Performance improvement through effective process management

Process management is defined as a methodology for assessing; analysing and improving the performance of key business processes based on customer needs and wants (IBM, 1995). Since the emergence of BPR in the early 1990s, process management has established itself as the foremost technique for managing an effective, efficient and competitive firm. It is widely acknowledged that the full potential of a firm's business processes is realised only when they are managed properly (Champy and Nohria, 1996; Hammer and Champy, 1993). Two of the best early examples of the use of process focus for competitive advantage, according to Johansson *et al.* (1993), is Tescos and Sainsburys, leading players in the UK retail environment.

A *process*, as described by Harrington (1991) is "any activity or group of activities that takes an input, adds value to it, and provides an output to an internal or external customer" (p. 9); while a *business process* is described by Davenport and Short (1990) as a set of logically-related tasks performed to achieve a defined business outcome. It is generally recognised that *business processes* have two important characteristics; they have internal or external customers and cross-functional and organisational boundaries (Earl, 1994).

Firms usually have *core processes*, which are central to business functioning, which relate directly to external customers and are commonly the primary activities of the value chain; *Support processes* often have internal customers and are the back-up (or back office) of core processes that will commonly be the more administrative secondary activities of the value chain; and *Management processes* are those that firms plan, organise and control resources (Earl, 1994; Ould, 1995). Furthermore, larger firms will usually have *business network processes,* which extend beyond the boundaries of the firm into suppliers, customers and allies (Earl, 1994).

Figure 1 shows how a typical process-oriented firm differs from a functional one, where functions are vertical while processes are horizontal and cut across functions (Carr and Johansson, 1995).

It is already known that firms which focus on business processes, instead of functions, are in a better position to deliver cost-effective, efficient services to their customers (Carr and Johansson, 1995; Hammer and Champy, 1993). Over the last decade, software applications have also evolved from supporting functional firms to being process focused. A good example of which is enterprise resource planning (ERP) systems (Davenport, 1998). Both academics and practitioners have identified numerous benefits from business process management (or process improvement). Some of the benefits of process-oriented work, as suggested by Kaplan and Murdock (1991) are outlined as follows.

- Helps to focus the entire firm's improvement efforts on a targeted set of high-leverage performance goals, and links improvement efforts to the overarching strategic objectives that drive competitive success.
- Incorporates the entire chain of related activities across the firm's boundaries, functions, and geographies, as well as incorporating suppliers and customers.

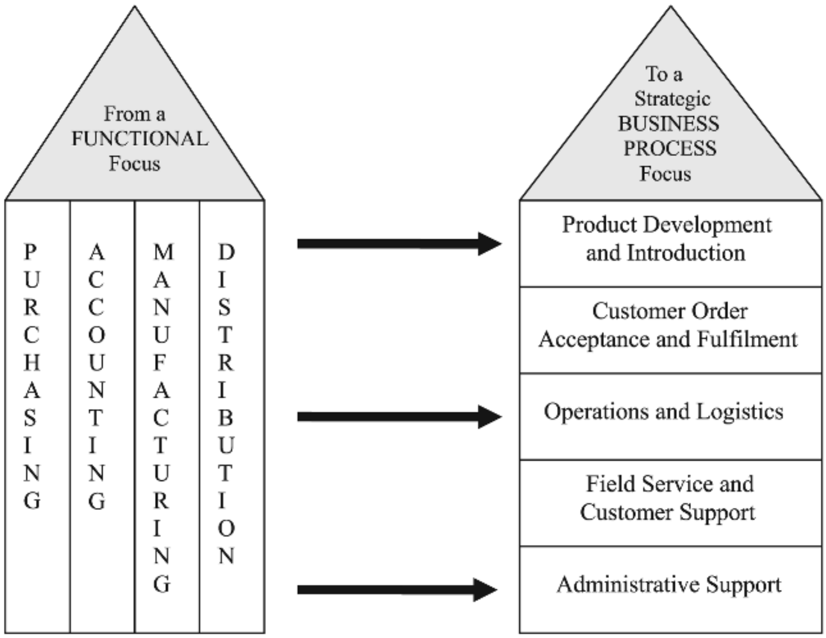

Figure 1.
Process vs functions

- Emphasises cross-functional measures and optimises performance across functions, rather than within functions.
- Encourages result-oriented view of the business, such as total delivered cost and end-to-end cycle times, etc., and develops an external view of the business based on the perspective of customers and suppliers, and awareness of competitors.

The advent of BPR in the early 1990s, introduced with it the practical difficulties in re-engineering legacy information systems (IS) in firms. Many practitioners found that redesign and alterations to the existing information systems which support a firm's business processes were a difficult task (Child *et al.*, 1994; Stickland, 1996; Weerakkody, 2001). The implications for information systems and how a firm's existing systems can evolve to support a re-engineering project is an area which had relatively little research during the BPR years (Behrsin *et al.*, 1994; Child *et al.*, 1994; Stickland, 1996). We believe that the emergence of the ASP business model is highly relevant to this context, as it embodies many of the principles of BPR (such as performance gains, cost reduction and process focus). More significantly, on this occasion, the ASP business model promises to address some of the IS issues that BPR failed to address (Hammer and Champy, 1993).

2.2 The impact of ASP and BPO on a firm's performance

In this section, the authors examine whether the emergence of ASP and BPO models have encouraged performance improvement and process management efforts in firms.

Traditional IS/IT outsourcing, as we know it, is based on a one-to-one relationship between the service provider and customer. However, more recently, many ISVs and Telcos have begun to exploit the rapid development of the Internet by using it as a source for software distribution based on a model that promotes a "one service provider and many customers" outsourcing relationship. This method of software distribution or outsourcing is referred to as ASP and the service providers who use this method are referred to as application service providers. In its simplest form, an ASP involves deploying, managing and remotely hosting software applications through centrally-located servers (Currie and Seltsikas, 2001).

Many IT functions often struggle to change their systems to keep pace with the rapid changes to business processes in present day firms. It is argued that, while about 80 per cent of a firm's IT budget is used to achieve operational parity to keep up with competitors, the remaining 20 per cent is spent on specific business processing software (Computer Business Review, 2001). Many consider the ASP model as an ideal solution to this problem, where the burden of systems development and maintenance is outsourced to a third party, leaving the firm's own IT staff to focus on their core competencies (Butler Group, 2000; Columbus, 2000).

Today's firms are increasingly feeling the pressure to utilise their skilled IT staff, particularly systems analysts, for strategic projects while maintaining 24×365, reliability, availability and performance of their less strategic, but business critical systems. At the same time, technology and corporate data continue to evolve at a pace that makes it difficult for IT professionals and firms to keep their knowledge and systems up to date without being distracted from the customer-related activities that are critical to a firm's profitability. Moreover, the rapid business change that is taking place in the industry results in a gap between the business processes and IT (Child *et al.*, 1994; Stickland, 1996). In this context, the ASP model represents a means of bridging the gap and is somewhat similar to the service bureau model of the 1960s and 1970s. More significantly, it helps firms to move from being "technology" to "business process" focused.

Some also argue that the ASP concept has given rise to the idea of performance metrics and service level agreements (SLA) in IT departments (Bernard, 2002). This idea not only helps firms to manage their internal IT development process effectively, but also makes the IT function act as an internal ASP. The attractive feature in this scenario is that it helps to improve the processes that make up the IT function.

The ASP model: best of breed applications as a service. One of the attractive features of the ASP model is that it offers the chance for smaller firms that were hitherto unable to afford "best of breed" Enterprise Applications, to benefit from the economies of scale characterising the ASP model (Miley, 2000). The promise to deliver Enterprise Applications on a rental mode will enable many small and medium businesses (SMBs) access to specific business process expertise in the application logic of the systems being rented (Ledford, 2001; Wetzel, 2001). This will help firms to maximise the potential of their business processes and IT systems and changes the focus from continuous *systems development and maintenance* to *continuous process improvement and management*.

The above arguments are substantiated by Davenport (1998), who states that "when developing information systems in the past, firms would first decide how they wanted to do business and then choose a software package that would support their proprietary processes" (p. 125). However, with the *best of breed* applications, the sequence is reversed and the business process often has to be modified to fit the system. ERP systems are a good example of generic applications. Their design reflects a series of assumptions about the way firms operate in general. Service providers try to capture best practice scenario from experience and incorporate these into their applications. This often results in the customer/user firm having to restructure their business processes to fit the requirements of the system (Davenport, 1998). In this context, the ASP model offers small and medium size firms using ERP software the chance to focus their limited IT staff and tight budgets on re-engineering and improving their business processes (Outsourcing ASP Analyst.com, 2001).

From ASP to BPO: the challenges. While the ASP model has so far focused on selling access to managed applications, it is currently moving to provide business services (Computer Business Review, 2001; IDC, 2002). This has encouraged some firms not only to outsource their application software to a remote vendor, but also to hand over the running of some of their routine non-core business processes to service providers (Cherry Tree and Co., 2001; Currie *et al.*, 2003). This evolution is referred to as BPO, where entire business processes that are deemed to be "non-value-added functions" are outsourced and handled by a separate firm. Such a model will enable ASPs to offer a clearer return on investment, making them a more alluring prospect for potential customers. As a result, the service provision industry has seen an increase in demand for suppliers who are both ASP and BPO providers (Brown, 2001). While the ASP model provides supporting software to run a firm's business process, a BPO model provides expertise to execute the business process itself (Computer Business Review, 2001). Moreover, whereas ASPs usually provide applications to sustain improved business processes or introduce process improvement to a firm through the provision of "best of breed" applications; BPOs are capable of introducing improvement by offering "best practice" business processes to a firm through outsourcing.

Although resulting in a similar outcome, which is better business process management leading to productivity gains, cost savings and improved overall service levels, BPO differs from BPR. While the emphasis of BPO is on handing over the overall responsibility of re-engineering, deployment and operations of a process to a third party, BPR aims to maintain these activities centrally within the firm. Further, BPR promotes the philosophy of "fundamental rethinking", which encourages redesigning your processes from scratch, often resulting in disruptions to business. Conversely, BPO facilitates continuity and incremental change through the outsourcing of selected processes to a third-party firm, who continuously improves and encapsulates industry best practice to their business processes.

The lack of ASP-ready ERP applications and issues such as application integration across business processes has impeded the growth of the ASP model (Weerakkody *et al.*, 2003). Large outsourcing vendors, having evaluated the potential of the ASP market, realised that simply Web-enabling current software applications to SMBs would not generate sufficient profits. However, the recent emergence of the Web-services concept promises to provide a platform and supporting tools capable of better integration of software applications across business processes. Given this context, many of the larger software and consultancy firms (such as IBM, EDS and SUN) are now shifting their strategies to BPO (Currie *et al.*, 2003).

Some analysts argue that, as a concept, BPO is not new. Firms like IBM and Computer Sciences Corporation (CSC), for example, have been offering BPO services since the late 1970s under the bureau service umbrella (Twentyman, 2001). However, over the last few years, with the emergence of BPR in the early 1990s and the ASP model in late 1990s, the term has grown in popularity and has been revitalised. In addition, advancements in information and communications technologies (ICTs), particularly those relating to the growth of the Internet, corporate extranets and intranets, have enabled business-to-business commerce. As such, the realisation of BPO becomes a distinct possibility as the technical and communications infrastructure enables firms to outsource selected business processes to third parties. Further, enterprise systems in many firms are increasingly modular and able to interact with other internal and external applications, which have made the outsourcing of business processes such as human resources, financial accounting, and procurement, a less complicated task. This is further facilitated by Web-services and Microsoft's NET and Sun Microsystems J2EE platforms (Currie *et al.*, 2003).

3. ASP enabled process improvement: a case study investigation

Moving on to the *real world*, this section aims to corroborate the arguments presented in the previous section in the context of empirical evidence gathered from a case study-based investigation in six UK firms.

3.1 Research method

The approach used for the research described in this section is qualitative in nature as the emphasis was on discovery and understanding. The companies for this research were chosen from different backgrounds, i.e. large, small, public and private sectors, to gain a broad understanding of effects of outsourcing through an ASP.

Semi-structured interviews were carried out to gather data with face-to-face interviews, which lasted between 75 and 120 minutes In almost all cases, all interviewees were heads of IT functions, as it was considered important to interview staffs, who were involved in the outsourcing decision. This meant that they provided essentially managerial perspectives. Apart from the face-to-face interviews, telephone and e-mail were used to clarify and probe more certain issues in some cases. The use of semi-structured interviews was judged most appropriate for exploratory research, because it allowed the researchers' understanding to increase incrementally throughout the series of the interviews (Denzin, 1978; Yin, 1994).

In addition to the interviews, additional information was gathered through Web sites, databases, and through company documentation wherever possible. The background to data collection is summarised in Table I.

3.2 Background to the cases

The empirical research focused on six companies who were outsourcing their IT systems to an ASP. The industries covered include: leisure (two companies referred to as A and B); consultancy and technology solutions (C); manufacturing (D); freight forwarding and logistics operations (E); and local council (F).

For the majority of these firms, IT was primarily viewed as a support service rather than a strategic activity. Further, half of the companies studied did not have a coherent IT strategy, with most activities being carried out on an *ad hoc* basis. Growing competition and the need to improve the IT environment were the primary influence on the decision to outsource. The decision to outsource was taken at a strategic level, by either a director or senior manager in the firm usually representing the IT function.

In three of the six firms researched (A, C and E), the decision to outsource was influenced by the need to maximise productivity, meeting growing user requirements and facilitating the changing needs of the organisation. Rather than developing IT systems internally to support these needs, management in all of these three firms considered outsourcing their IT activities to an ASP. This decision was influenced mainly by the benefits offered by the ASP

Table I.
The data collection approach

Firm/No. of employees	Type of process/application outsourced	Job title of interviewee	Method of empirical data collection	Documentation collected
A 250	Core and support *Horizontal and vertical* CA[a] HOST[b]	IT and e-business director	Face-to-face interview Telephone interview E-mail	Web site information
B 200	Core and support *Horizontal and vertical* CA HOST	Acting IT manager	Face-to-face interview Telephone interview E-mail	Web site information
C 10,000	Support *Horizontal* TP[c]	Commercial director Operations director	Face-to-face interview E-mail	Web site information
D 200	Support *Horizontal* FIN[d]	Director of operations	Face-to-face interview Telephone interview	Web site information
E 110	Core and support *Horizontal* CA HOST	Administrative director	Face-to-face interview E-mail	Web site information
F 10,000	Support *Enterprise* ERP[e]	Assistant director of IT Corporate manager of IT Systems manager	Face-to-face interview Telephone interview	Web site information Vendor evaluation criteria – part of tender documentation

Notes: [a]Collaborative applications; [b]host internal systems through an ASP; [c]transaction processing; [d]financial applications; [e]enterprise resource planning systems outsourcing model, such as: the ability to focus on strategic activities; access to new technologies and skills; reduce costs by renting software; faster implementation of software; and eliminating problems related to employing, training and retaining new IT staff.

Further to the data collection background, Table I outlines the nature of applications outsourced by the six firms studied and the type of process (Section 2.1) supported by the applications outsourced.

In firm C, a number of mobile employees worked on client premises, which led to the generation of expense transactions that were handled manually. Senior management realising that there were many drawbacks in the manual process, saw automation as the solution to improve the efficiency of the process. The commercial director stated:

> We had lot of problems in the manual system where expense claims weren't coming in on time. The new ASP system allows us to automate the process of generating expense transactions. Also, it has a better reporting system.

Firm C's operations director summarised the benefits of their ASP solution as: rapid implementation which enabled the company to access the application quickly; the effectiveness of the application in terms of report generation; ability to access the applications through the Internet; and the cost-effectiveness of the system due to the pricing method (i.e. pay-per-user-per-month basis).

The scenario at firm B was different, as the outsourcing of applications to an ASP was considered at a time when two key members of their internal IT team left the firm. Due to uncertainties involved with employing a new IT team and the benefits offered by the ASP outsourcing option, in this case, staffing issues, access to improved technologies, cost savings and the ability to access applications $24 \times 7 \times 365$, a decision was taken to outsource all of firm B's IT activities.

Further, the ASP model's minimal dependency on hardware meant that firm B did not need to upgrade their PCs regularly. The IT manager stressed:

> I have no hardware responsibility. Moreover, by having the servers at the ASP site, it enables us to give much more attentiveness to our services and support.

Restructuring was the influencing factor in firm D's decision to outsource via an ASP. Business re-engineering efforts in the firm resulted in the discovery that substantial cost savings can be made from software licensing and maintenance fees currently paid to vendors such as Microsoft. Moreover, the ability to focus on core competencies reduced problems related to hiring and retaining new IT staff, rapid implementation of applications, ability to grow with the firm (flexibility), minimum up-front investment, and access to new skills and expertise were all evidence that were enough to convince senior management at firm D to hire the services of an ASP.

The sixth and final firm, F (the council), had a different story, which was largely influenced by the e-government initiative for the UK. Although the council had an in-house IT system, this was considered difficult to interpret and lacked real-time reporting and information-gathering facilities. In this backdrop, firm F decided to re-examine its existing business structure and IT infrastructure, resulting in the decision to invest in a new integrated ERP system, which could improve, primarily, their financial management process. Senior management were again attracted to the ASP option due to the benefits characterising the model. As one senior source pointed out:

> A number of influencing factors came together against the background of the latest Central Government initiatives. We felt that the time was right to look for an innovative financial solution that would not only benefit the council, but also enable the private sector partner coming in to provide real benefit to us.

It was also thought that outsourcing to a third party would allow firm F to concentrate on their core activities instead of worrying about managing IT. As the corporate manager of IT explained:

> We wanted to provide a service to the community and not to be IT experts. By outsourcing we could get away from managing day-today IT and rather focus on our jobs – to provide a service to the community.

Highlighting the inefficiencies in their current IT management process, the corporate manager of IT in firm F explained:

> Prior to 1999, we had about 44 people providing all our IT services in-house and we didn't monitor what we provided very well because it was not money going out. The department remained the same whilst the use of IT across the firm grew dramatically – IT wasn't improving or growing according to demand. So, that's where we really were before introducing the ASP solution. Now, the new ASP system generates reports providing accurate updated information unlike the old system, where the users had to rely on batch processing.

In summing up, the need to improve their business process and IT environment was seen as a consistent feature for outsourcing in five of the six firms researched. Numerous benefits offered by the ASP business model (mentioned earlier) convinced senior management to outsource their application systems to an ASP in preference to in-house IT development or traditional bureaux type outsourcing.

3.3 A synopsis of the findings

Interviews in the six firms researched strongly suggest senior management were convinced that outsourcing IT applications through the ASP mode would enable them to free key staff from performing routine IT-related work to focus on core business processes that are central to the firm. Further, the reduction of IT costs, as well as the handing over of the burden of managing IT activities to a third party, was a significant influence; while the flexibility of applications and disaster recovery and back-up facilities offered by ASPs were also considered as important when making the decision to outsource to a remote service provider. The main drivers for outsourcing IT systems to an ASP in the firms researched were summarised in Table II.

Many of the firms researched found that most ASPs in the market based their solution on Microsoft products; mainly MS Office and MS Exchange (see type of applications outsourced in Table I). Although many were considering outsourcing their applications that support administrative (non-core) processes, such as payroll, human resources and accounting operations, few found suitable ASPs that could provide a remote solution for these processes. Given this context, many firms utilised the services of an ASP to host their internal applications with a view to eliminating their hardware and maintenance costs (Tables I and II). Only one firm was able to find a reliable vendor and was bold enough to outsource their financial management process using an ERP system (Table I, firm F).

Many also found that ASPs were primarily targeting corporate customers with a large number of users. Although financially rewarding from a vendors perspective, small to medium size customers were often left with a limited choice of applications. In the case of firm E, a series of discussions and

Drivers for outsourcing Firm	A	B	C	D	E	F
24×7 software applications delivery	M	M	H	L	H	M
Ability to access applications over the internet	L	L	H	L	H	NI
Reliable disaster recovery, back-up and restore procedure	H	H	NI	H	H	H
To achieve faster software implementation	M	M	H	H	M	M
To allow management to concentrate on “core” activities	H	H	H	H	H	H
To reduce costs through						
use of existing infrastructure	H	H	NR	NI	H	L
elimination of up-front software licenses	H	H	M	H	H	H
minimising internal IT staff	H	H	NR	M	H	H
To eliminate the problems related to						
managing daily IT activities	H	H	M	H	H	H
managing internal IT staff	H	H	NR	H	H	M
Improve performance by automating the manual process	H	NR	H	NR	NR	NR
To gain access to scarce IT skills	M	L	NR	L	M	H
To achieve greater predictability of IT costs	H	H	NI	H	H	H
Greater flexibility offered through outsourcing as opposed to in-house management of software	M	M	H	H	H	H
To keep pace with the latest information and communications technologies	L	L	NI	L	H	H
To improve customer service	H	H	NR	NR	H	H

Notes: L – low, M – medium, H – high, NI – not important, NR – not relevant

Table II. Drivers for outsourcing IT applications via an ASP agreements were needed to persuade an ASP to customise applications that the firm required.

In keeping with prior arguments in the previous section, Table II clearly shows that the ASP model has a positive influence on a firm's desire to reduce costs and streamline operations, the same goals as BPR (Section 2.1). Given the evidence, the authors suggest that application outsourcing via an ASP can facilitate process improvement and better process management in firms.

4. Discussion

By the mid-1990s business process management and re-engineering (BPR) had established itself as an effective method for improving firm performance and reducing the operational costs (Champy and Nohria, 1996; Stickland, 1996). However, re-engineering and process improvement efforts in large firms have shown that many IT systems supporting both core and non-core processes impede improvement and change (Broadbent and Weill, 1999; Weerakkody and Currie, 2002). Instead of facilitating improvement, often legacy IT systems tend to constrain business change. This has led, according to Lacity and Willcocks (1998), even large corporations to outsource IT systems that underlie some of their non-core business processes. While freeing IT staff from performing endless updates and tinkering with legacy systems, outsourcing helps to reduce the operational cost of IT (DiRomualdo and Gurbaxani, 1998; Lacity *et al.*, 1996; Takac, 1994). Cross (1995) describes the case of British Petroleum, where IT costs fell from $360 million in 1989 to £132 million in 1994, due to the firm's strategy of outsourcing IT systems. He also describes how outsourcing has helped BP to achieve greater flexibility in their systems and gain access to higher quality IT systems and technical skills. Furthermore, our research[1] showed that, in an outsourcing relationship, often the service provider gets involved in technology implementation that supports BPR.

More recently, the ASP and BPO business models have promoted the message of "firms benefiting from the skills, expertise and products of market-leading service providers by outsourcing their business processes and supporting applications". The ASP literature also argues that, by outsourcing non-core business process and supporting applications to remote service providers, firms are able to focus on core business processes that help sustain profitability and competitive edge (Columbus, 2000; Kern *et al.*, 2002; Linder *et al.*, 2001). Research by Kern *et al.* (2002) found that "the main business benefits revolve around two main aspects: ASPs reduce the need to retain in-house skilled IT professionals and ASPs provide access to the latest applications of any complexity" (p. 157). Not surprisingly, this is consistent with what we found in our research (Table II).

Furthermore, the ASP model has enabled leading service providers, such as IBM, EDS and Oracle, to combine the rigours of BPR with the benefits of remote application outsourcing to deliver high-performance business processes and "best-of-breed" applications over the Internet (Heart and Pliskin, 2001). This offers firms, particularly SMBs, access to efficient and cost-effective automation for their business processes while retaining the ability for users to maintain control of the processes (Kellett, 2002).

In summary, the literature (Currie *et al.*, 2003; Kern *et al.*, 2002; Ledford, 2001; Wetzel, 2001) and empirical evidence presented in the previous two sections, strongly suggest that the following strategic benefits are perceived from remote application and BPO.

- *Focus on firm's core business* – key employees are released from performing non-core or administrative processes to focus more time, energy, and resources on building the firm's core businesses. By outsourcing non-core processes, management can focus on strategic issues and increasing sales and market share, developing new and improved products, expanding into new markets, and enhancing customer satisfaction.
- *Achieve cost reductions* – eliminate unnecessary operating costs while reducing and bringing other administrative costs under better control through re-engineering, process improvements and implementing advanced technologies.
- *Maintain competitive edge* – enable firms to compete more effectively in the global marketplace by way of access to "best-of-breed" business processes and supporting applications. Market leading service providers aim to achieve world-class standards for their business processes through continuous benchmarking and re-engineering toward best practices of the world's leading firms.
- *Facilitate changing business needs* – firms can benefit from the specialist business and technical expertise of service providers to make continuous improvements in process effectiveness and efficiency. Access to flexible and scalable services and products helps to facilitate changing customer requirements.

Despite the benefits outlined above, the ASP concept has failed to fulfil predictions for success in terms of market growth (Dean and Jackson, 2000), and the model's adoption has been slower than expected (Clancy, 2001). Research by the authors[1], to date, identified issues such as vested interests within IT departments, problems of customer positioning within the market and fears of insecurity and privacy as preventing many companies from fully investigating and integrating the ASP business model (Currie *et al.*, 2003). The field research (described in Section 3) showed that only one firm out of the six investigated was confident enough to outsource an ERP-type application, while the others were content on using collaborative-type applications. Further, it failed to convince us that ASP solutions helped any of the firms studied to neither maintain competitive edge nor make any significant cost savings.

Nevertheless, we found that the ASP model facilitated changing business needs moderately in the firms by making available and being able to speedily implement basic software and collaborative-type applications.

The ASP market has also witnessed major changes with the emergence of different variations of the initial concept (Currie and Seltsikas, 2001; Currie *et al.*, 2003). With an increasing number of companies claiming to be offering ASP services, the market has become fragmented, leading to uncertainty concerning the original characteristics of the ASP model (Weerakkody *et al.*, 2003). While these issues have contributed to customers being slow to adopt the ASP model, our research[1] indicated that the concept of outsourcing business processes is gradually gaining momentum. However, we believe that the BPO model will only thrive with further developments in technology, such as SUN Microsystems' J2EE and Microsoft's. NET platforms. Besides, many ASPs are yet restricting their offerings to collaborative and transaction processing type applications or hosted solutions (Table I), whereas customers often require Web-based software solutions capable of integrating the existing enterprise applications and legacy systems (Currie *et al.*, 2003). This is substantiated by the fact that, of the six firms researched, only one was using remote outsourcing via the ASP model to outsource parts of an integrated enterprise system, while the rest were content on outsourcing collaborative tools and simple applications.

5. Conclusion

The move from the emphasis of "functional" to "process orientation" in firms has encouraged many firms to continually search for effective process management methods for their firms. Over the last decade, leading software vendors (such as IBM, EDS and Oracle) have flooded the market with numerous enterprise software applications, which base their application logic on industry best practice for specific business processes. The emergence of the ASP concept has seen many such software vendors Web-enabling their enterprise applications. This offers the opportunity, particularly for SMBs, to restructure their business processes to fit "best-of-breed" applications, which they can purchase on a fixed rental basis. While the ASP model provides supporting software to run a firm's business process, a BPO model provides expertise to execute the business process itself. In this scenario, access to "best-in-class" business processes ensures that it directly impacts the process management environment in the outsourcing firm.

The empirical evidence gathered from six firms that use the services of an ASP, indicate that the reduction of IT costs, focus on core competencies, improving service quality and efficiency and better utilisation of human resources, were the key factors attracting customers to the ASP model. When examining these findings in the context of the literature, it can be argued that ASP and BPO have a significant impact on the effective process management capabilities of a firm. Interestingly, some also argue that ASPs have been responsible for improved process management within internal IT functions by introducing a culture of "service quality and performance monitoring" into the IT discipline.

The arguments presented in this paper are further supported by the findings of a study by Price-Waterhouse-Coopers (PWC) in 1999, of 304 *Fortune* 1,000 large corporations, which found that 63 per cent of the firms studied had outsourced one or more business processes and 42 per cent had outsourced applications processes (PWC, 1999). More significantly, PWC also found that many of the firms achieved 85 per cent greater efficiency without having to invest in people and 75 per cent increase in profitability.

When examining how process management relates to ASP and BPO, it is clear that the principles of effective process management (or BPR) are similar to the goals and objectives of ASP and BPO (i.e. performance improvement and cost reduction). Ironically, like BPR, the first phase ASP model (from 1999 to 2002) has failed to deliver the expected results and live up to analyst predictions (Currie *et al.*, 2003). Our research indicates that many ASPs are confined to offering simple office collaboration tools, such as e-mail and Microsoft office applications as complex enterprise applications for the ASP model are yet to be developed. Investigations in six firms also failed to produce any evidence that ASP or BPO was initiating BPR-type radical change in industry. However, despite the embryonic state and lack of customer evidence, the underlying philosophy of the ASP concept has convinced the authors that, by outsourcing non-core applications to an ASP, firms are able to focus better on core business processes that help sustain profitability and competitive edge. Similarly, we argue that BPO allows firms to improve their business processes by directly benefiting from industry best practice.

Our findings also show that the ASP model, in particular, appeared to be vendor-driven and paid little attention to facilitating changing customer needs. From a software delivery model that was promoted essentially as "one-to-many", the ASP model has tended to offer applications that are "same-for-all". Therefore, we believe that new Web-enabled, ERP-type applications need to be developed for the "one-to-many" delivery model if the ASP concept is to thrive. While this requires more time and effort on the part of the vendors, we found that the BPO concept has been gaining momentum since of late. The proposition of providing process management expertise as a service has got many firms interested in outsourcing their non-core business processes to a third party. The authors believe that the advent of the Web-services concept will promote BPO as a complex form of outsourcing in the future, which will incorporate both application and processes integration across different firms and industries. This will provide an ideal platform for BPO service providers to develop their own applications to support their process expertise, or partner with ASPs and offer a combined business process and IT outsourcing solution to customers in the future.

Future research

Since early 2002, the ASP business model has been overshadowed by the emergence of the Web-services concept, which uses Sun Microsystems' J2EE and Microsoft's. NET platforms. Web-services represent business functions or processes that can be accessed by another application over public networks using generally available protocols (Triple Tree, 2002). Many firms are now shifting their strategies from ASP to BPO, as the emergence of Web-services will enhance integration of software applications across business processes (Currie *et al.*, 2003). The authors strongly believe that the Web-services concept will consolidate the application and BPO market-enabling better overall process and IS management in firms. However, being primarily a "new-technology"-driven concept, the authors suggest that more research is needed to address a number of gaps that are evident in the Web-services literature on how firms could achieve the above.

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