Knowledge Requirements for Information Systems Outsourcing

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ABSTRACT

Information systems (IS) outsourcing is a complex, multi-layered and a multifaceted concept. An organisation may gain access to knowledge it does not own in-house or be able to obtain it at a lower price by entering into an outsourcing relationship. At the same time, the organisation may risk losing key skills and capabilities unless the outsourcing arrangement is managed strategically and knowledge transferred properly. Knowledge management is valuable in preventing a loss of knowledge when an organisation outsources its information system activities. This chapter analyses and describes the knowledge requirements relevant in an IS outsourcing arrangement.

Keywords: Information system outsourcing, Information systems outsourcing models, Knowledge management, Knowledge requirements, Knowledge creation

INTRODUCTION

Outsourcing as a business practice is flourishing in almost every domain and organisations are outsourcing software development, innovation and even functional departments [Hirschheim & Dibbern, 2014; Power, Desouza & Bonifazi, 2006]. In an environment where survival depends on cost-cutting and downsizing, information systems (IS) becomes a probable target for outsourcing as it is difficult to measure direct contribution of the IS function to the organisation as a whole [Benamati & Rajkumar, 2002; Dibbern, Goles, Hirschheim & Jayatilaka, 2004].

Outsourcing is defined as the action of transferring organisational work to an outsource vendor [Power et al., 2006]. The scope of work outsourced and the delivery of the outsource vendor against the scope is managed by an outsourcing arrangement that stipulates the contract conditions, the required service levels and the required deliverable quality of the arrangement [Power, Bonifazi & Desouza, 2004]. A special type of outsourcing is IS outsourcing and Sparrow [2003 : 1] defines IS outsourcing as "the practice of handing over planning, management and operation of certain functions to an independent third party, under the terms of a formalised service level agreement". Sparrow [2003] maintains that outsourcing should be seen as a strategic management tool. As such, it should be evaluated in the context of the strategic position of the organisation [Power et al., 2006].

In the context of an IS outsourcing arrangement, the focus of value creation no longer remains internal to the organisation, but occurs within the relationship between the client organisation and the outsource partner. The client organisation has to rely on its outsource partner to share knowledge and continually respond to change [Gottschalk, 2006]. Currie and Pouloudi [2000b] observe that one of the

emerging issues for management will be how to identify and evaluate knowledge-based assets in the context of IS outsourcing. A part of this emerging research agenda "is due to the growth in outsourcing and the realisation that many contracts have simply failed to take into consideration important issues of intellectual property protection, core competencies, managerial and technical capabilities and skills, and software development and exploitation" [Currie & Pouloudi, 2000b : 162].

However, the use of IS outsourcing as a strategy presents several knowledge management challenges to IS managers since both knowledge management and IS outsourcing are complex, multi-layered and multifaceted concepts [Currie & Pouloudi, 2000b]. An organisation may gain access to knowledge it does not own in-house, or may be able to obtain it at a lower price, by entering into an outsourcing relationship. At the same time, the organisation may risk losing key skills and capabilities, unless the outsourcing arrangement is managed strategically and knowledge transferred properly [Al-Salti, 2009; Currie & Pouloudi, 2000b; Laplante, Costello, Singh, Bindiganavile & Landon, 2004]. Knowledge management is important in preventing a loss of knowledge when an organisation downsizes or outsource its business activities [Aydin & Bakker, 2008; Christopher & Tanwar, 2012]. Currie et al [2000b] identified that one of the emerging issues for management is how to identify and evaluate knowledge-based assets in the context of IS outsourcing.

Knowledge transfer between the organisation and outsource vendor is required for all the phases prior and during an IS outsource arrangement [Beyah & Gallivan, 2001; Dibbern et al., 2004]. Currie et al [2000b] argue that knowledge transfer in all the IS outsourcing phases provides an opportunity to encourage researchers, and managers, to consider the value of knowledge-based assets, and to evaluate the extent to which knowledge can be acquired or lost through IS outsourcing. Aydin and Bakker [2008] concur that, although the importance of knowledge management in IS outsourcing is highlighted by scholars, little research is being done on how organisations deal with managing knowledge in outsourcing situations [Blumenberg, Wagner & Beimborn, 2009].

The focus of this chapter is to address this gap in research with the objective to investigate how organisations manage knowledge in outsourcing activities, with a specific focus on knowledge requirements. In order to analyse and describe the knowledge requirements relevant in an IS outsourcing arrangement, a research study was conducted in a telecommunication company in South Africa. This chapter reports on the knowledge requirements identified pertinent to IS outsourcing. The *background* section provides context for this chapter, the *IS outsourcing strategy and lifecycle section* provides a knowledge management perspective on IS outsourcing and the *study on knowledge requirements in IS outsourcing section* defines the method followed to conduct the research, as well as the findings of the study. The chapter is concluded with the *future research possibilities* and *conclusion* sections.

BACKGROUND

Organisations are constantly searching for ways to grow and maintain their competitive edge. Today's business activities depend greatly on IS enablement [Ang & Cummings, 1997; Aydin & Bakker, 2008; Goles & Chin, 2005]. This demands that IS maintenance be regarded as a critical process that needs to be performed with the highest possible quality. Achieving the desired IS quality requires both organisation-specific knowledge about internal business operations and explicit technical knowledge. In tis context, IS outsourcing is a complex and potentially daunting task if the organisation is unsure about its implications, its required business performance and its essential IS support and knowledge management [Aydin & Bakker, 2008].

IS outsourcing is not a recent management trend and has been present in its different forms from the early 1960's [Akomode, Lees & Irgens, 1998; Aydin & Bakker, 2008; Claver, Gonzales, Gasco & Llopis, 2002]. By IS outsourcing, organisations give way to greater dependence on external service

providers. The scope of IS outsourcing varies from data centres to application development, user and desktop support, operations and architecture [Ang & Cummings, 1997; Lacity & Willcocks, 2009; Lam & Chua, 2009]. However, irrespective of the scope of IS outsourcing, roles, responsibilities, governance, organisational relations and the kinds of knowledge required, outsourcing problems have organisation specific characteristics and vary considerably from one organisation to the next [Goles & Chin, 2005; Hirschheim & Dibbern, 2014].

There are many IS outsourcing models and many ways to employ them strategically as a management tool [Fink & Shoeib, 2003]. In the process of choosing an outsourcing model or combination of models, an organisation should consider future strategies, plans and budgets for IS as well as internal skills and capabilities [Cullen & Willcocks, 2003; Zelt, Wulf, Uebernickel & Brenner, 2013]. According to Sood [2005], the choice of outsourcing model can permanently change the way in which the organisation works. There are four main types of sourcing models that are used, namely, (1) onsite model, (2) offsite model, (3) offshore model and (4) hybrid model [Sood, 2005]. Using an *onsite model*, the outsourcing vendor places skilled individuals at the client organisation's location, constantly interacting with the client organisation's teams. In this scenario, the organisation's IS professionals are accountable for the day-to-day management of the outsource vendor, as well as providing logistical support such as offices, computers, software licences and phones [Sparrow, 2003]. With the *offsite model*, the outsource vendor has an office in close vicinity (e.g. same city) to the client organisation's headquarters [Power et al., 2006]. In this instance, the outsource vendor bears the cost of facilities and administration, although some of it may be included in the outsourcing fees [Sood, 2005]. When using the *offshore model*, the entire arrangement is accomplished in a different country that provides a more cost-effective location, with skills and communication infrastructure being readily available at low cost [Cha, Pingry & Thatcher, 2008; Ranganathan & Balaji, 2007]. With the *hybrid model*, the outsource vendor uses a variant of the onsite and the offsite models to enable most of the work to be done offshore [Aalders, 2001]. Several variations of these models have also been deployed in the past based on the nature of the outsourcing requirement and the outsourcing arrangement [Aalders, 2001; Carmel & Tjia, 2005]. Examples include the *near-shore* model that is similar to the offshore model, except that work is moved outside the country to neighbouring locations. The only advantage over the offshore model is that the travel time is just a couple of hours [Power et al., 2006].

IS outsourcing undertakes to leverage the outsource vendor's management practices and skills and the economies of scale arising from using a specialist IS outsource vendor [Aalders, 2001; Drucker, 2010]. However, research has shown that consequential knowledge management and value creation have been disappointing [Cullen & Willcocks, 2003; Drucker, 2010]. Client organisations report their frustration with cost–service debates and significant loss of control over their IS fate, including their knowledge base. Outsource vendors, on the other hand, find it difficult to deliver on promises of innovation and value added, hampered by their lack of knowledge about the client's long-term business strategy [Lacity & Willcocks, 2009]. In this context, Sparrow [2003] noted that the topic of IS outsourcing generates heated deliberation among IS professionals with arguments against and in favour of IS outsourcing. Some IS professionals perceive it as an enlightened approach to the management of routine IS services and a mature development of partnerships with suppliers [Sparrow, 2003]. Adversaries argue that outsourcing involves major risks with loss of control, loss of qualified IS resources, loss of flexibility and loss of competitive advantage in information management [Rao, Nam & Chaudhury, 1996]. Others see it as symptomatic of an organisation that has failed to grasp the strategic importance of IS and a lack of investment in the development of their IS staff, especially where the outsourcing arrangement transfer staff from the organisation to the service provider [Sparrow, 2003].

Knowledge is a crucial factor for IS outsourcing decisions, since organisations acquire external knowledge through this process and share organisational knowledge with the outsource vendor [Beyah

& Gallivan, 2001; Dibbern et al., 2004]. The importance of knowledge transfer in an IS outsourcing arrangement becomes observable when the outsourcing lifecycle is examined. Knowledge transfer is vital during the period prior to the outsourcing, when vendors are selected and contracts are drafted, during the implementation phase, when services are transferred to the vendor, and throughout the contract management and maintenance period, where existing practices are optimised and new practices created [Beyah & Gallivan, 2001; Vural, 2010].

However, the outsourcing of IS responsibilities to a vendor can negatively influence the downstream outcomes of IS projects by modifying whether and how retained organisation employees learn and preserve important explicit and tacit knowledge [Sparrow, 2003]. A lack of or insufficient learning by these employees may lead to the deterioration of internal knowledge assets and a loss of organisational memory. Furthermore, it may be difficult to restore a specific organisational competence, which was previously outsourced, when the organisation limits or ceases investing in its own competencies due to the outsourcing arrangement [Beyah & Gallivan, 2001]. The fact that an organisation relies on an outsource vendor does not mean that they should ignore the importance of an ongoing knowledge management programme specifically related to knowledge transfer [Beyah & Gallivan, 2001]. The potential loss of business achievements necessitates continual assessment of the impact of IS outsourcing decisions on the protection and enhancement of an organisation's knowledge base [Aalders, 2001; Beyah & Gallivan, 2001].

Knowledge management constructs are helpful in understanding IS outsourcing performance and provides a sound basis for examining and mitigating some of the risks related to outsourcing [Beyah & Gallivan, 2001; Dibbern et al., 2004]. However, according to Srinivas [1999], organisations lack the means to assign value to the knowledge that is transferred to the outsource vendor, the knowledge received from the outsource vendor, and the new knowledge created or exploited through the outsourcing arrangement. The lack of focus on what happens to knowledge when an organisation outsources is a serious gap in practice, and one that deserves thorough study and analysis [Kess, Torkko & Phusavat, 2007; Lacity & Willcocks, 2009].

In order to understand the knowledge requirements when an organisation outsources IS, knowledge management concepts can be applied to IS outsourcing phases. In the next sections, *IS outsourcing strategy and lifecycle* are described, as well as *knowledge and processes for organisational knowledge-creation.*

IS OUTSOURCING STRATEGY AND LIFECYCLE

The preparation for IS outsourcing in reality starts long before the first contact is concluded with an IS outsource vendor. The period before the actual involvement of the vendor could be the most valuable time of the entire outsourcing arrangement, as preparation is required before embarking on an IS outsourcing venture [Sood, 2005]. IS outsourcing decisions include many issues, such as competitive threats, latest trends and business changes [Goles & Chin, 2005].

A solid sourcing strategy that aligns with the overall business goals will ensure proper consideration of the different IS outsource models in order to achieve the best results [Gartner, 2007]. Figure 1 shows how organisations should evaluate the complex relationships between operating, IS and sourcing decisions in order to determine the best sourcing model as early as possible. An organisation's IS and sourcing strategies must be derived from, and be connected to, the business strategy. The *business strategy* defines a set of objectives associated with a *business vision,* for example, how to get addition-

al market share, better serve and retain clients, obtain competitive advantage and optimise processes. The *operations strategy* defines what the business will do, when the business will do it and how it will measure success. The *IS strategy* examines how the IS services can support the objectives set by the business strategy. The *sourcing strategy* mainly defines who will fulfil parts of certain objectives, through a set of plans and decisions that define and integrate internally and externally provided services, to fulfil the organisation's business and IS strategies [Gartner, 2007].

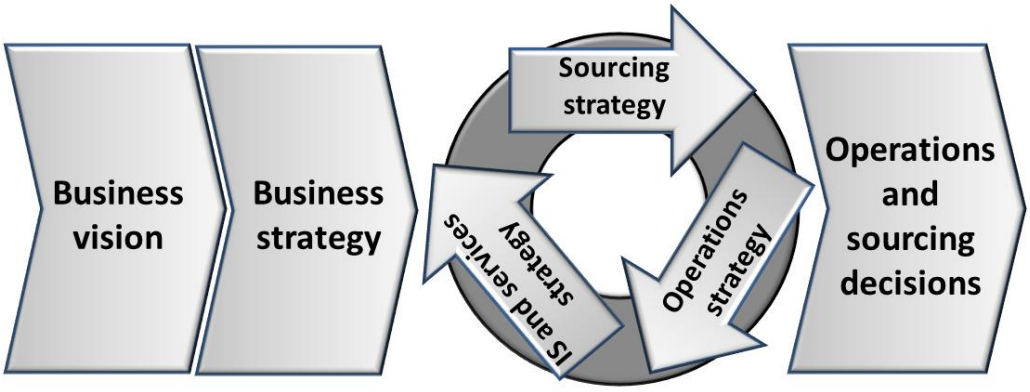

Figure 1: Business, IS and outsourcing strategy [Gartner, 2007]

Once an IS outsourcing strategy has been defined, an IS outsourcing lifecycle guides an organisation in realising the full value that outsourcing can provide [Gartner, 2002a]. The first step in any outsourcing initiative is to identify the strategic intent and key objectives of the IS outsourcing arrangement, as it will determine what will be outsourced, how success or failure will be measured, how it will guide the choice of outsource provider and facilitate the allocation of appropriate management skills and effort [Cullen & Willcocks, 2003; Gellings, 2007]. Several outsourcing lifecycle models exist, consisting of numerous steps. For example:

- Cullen and Willcocks [2003] identified three distinct phases of outsourcing: (1) the architect phase, (2) the engage phase and (3) the govern phase. The first two phases deal specifically with the decision to outsource, the preparation for the outsourcing arrangement and comprises of the activities required to make the arrangement work. The third phase, govern, comprises of the management of the outsource arrangement [Cullen & Willcocks, 2003].

- Sood [2005] describes an outsourcing lifecycle consisting of seven steps, namely, (1) request for proposal and vendor selection, (2) contracts and negotiations, (3) rates for each type of working profile, (4) setup and logistics, (5) programme execution, (6) implementation and testing, and (7) programme completion. The first 3 steps of the lifecycle deal with the process of evaluating and selecting the vendor on the basis of the match between the vendor's proposal and the organisation's requirements and criteria, agreeing a master services agreement governing the overall terms of conditions of the outsourcing arrangement, as well as statements of work for each engagement included in the master agreement. Steps 4 and 5 focuses on the initial planning and logistics to kick-start the outsourcing process and the planning for the involvement of the in-house team, as well as the definition of a transition plan for the transfer of knowledge to the new team. The last two steps refer to execution i.e. the implementation and monitoring of the outsource arrangement and metrics to measure whether the relationship is working well, as this will assist with enforcing the service level agreements (SLAs) and knowledge transfer [Goo, Huang & Hart, 2008]. If reverse knowledge transfer is not required, then the vendor will undertake to sustain and maintain implementation [Sood, 2005].

In the next section, *knowledge management* and *knowledge creation processes* are described towards understanding knowledge requirements in IS outsourcing.

Knowledge and processes for organisational knowledge-creation

Information becomes internalised knowledge when it is accepted and retained as appropriate representations of the relevant knowledge [Frappaolo & Capshaw, 1999; Godbout, 1999; Lindvall, Rus, Jammalamadaka & Thakker, 2001]. Knowledge comes with insights, framed experiences, intuition, judgement and values, and encompasses the scope of understanding and skills that are mentally created by people [Clarke & Rollo, 2001]. Knowledge can be categorised as either being explicit or tacit. Explicit knowledge can be articulated in the form of text, diagrams or product specifications for example [Clarke & Rollo, 2001; Nickols, 2001]. Nonaka [1991] refers to explicit knowledge as formal and systematic, like a computer program. Tacit knowledge is far less tangible than explicit knowledge and refers to personal and context-specific knowledge, making it difficult to communicate and formalise [Clarke & Rollo, 2001; Nonaka & Takeuchi, 1995]. Tacit knowledge includes cognitive and technical elements, where the technical aspects refer to concrete know-how, crafts and skills. Cognitive elements include mental models such as paradigms, beliefs and viewpoints and are seated in how individuals perceive and define their world [Polanyi, October 1962]. The articulation of tacit mental models is a key factor in creating new knowledge [Nonaka & Takeuchi, 1995].

The interaction between tacit and explicit knowledge occurs at an individual, and not organisational, level [Nonaka & Takeuchi, 1995]. The management of this knowledge is inherently linked to the sharing of knowledge between individuals and to the collaborative processes involved [Edersheim, 2007; Meihami & Meihami, 2013]. Organisational learning results from a process in which individual knowledge is transferred, enlarged and shared, and is characterised as a spiral of knowledge conversion (Figure 2) from tacit to explicit [Nonaka & Takeuchi, 1995; Nonaka, Toyama & Byosiere, 2001].

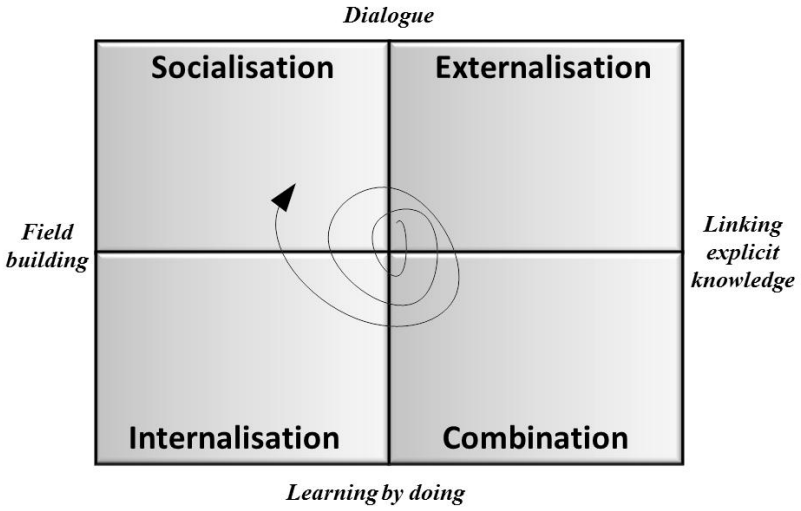

Figure 2: Knowledge spiral [Nonaka & Takeuchi, 1995]

The process of knowledge conversion progresses through four different modes as shown in Figure 3: socialisation (tacit to tacit), externalisation (tacit to explicit), combination (explicit to explicit) and internalisation (explicit to tacit) [Nonaka & Takeuchi, 1995].

- *Socialisation* includes shared information and experiences, as well as the sharing of tacit knowledge between people through observation, imitation and practice.
- *Externalisation* is the process whereby tacit knowledge is articulated as explicit knowledge through collaboration with others by means of conceptualisation and extraction such as converting tacit knowledge into words or numbers. The use of technology to manage and search explicit knowledge bases is well established, and explicit knowledge is shared not only via document management systems, e-mails, in meetings, etc., but also through education, learning and training interventions.
- *Combination* is the enrichment of the collected information by re-configuring it or enhancing it through sorting, adding, combining or categorising it so that it is more usable. In order to act on information, individuals should understand and internalise it.
- *Internalisation* involves the process of creating an organisation's own tacit knowledge. The process is closely related to learning-by-doing, through studying documents or attending training in order to re-experience to some degree what others have previously learned. Individuals are afforded the opportunity to create new knowledge by combining their existing tacit knowledge with knowledge of others [Krogh, Ichijo & Nonaka, 2000; Nonaka & Takeuchi, 1995].

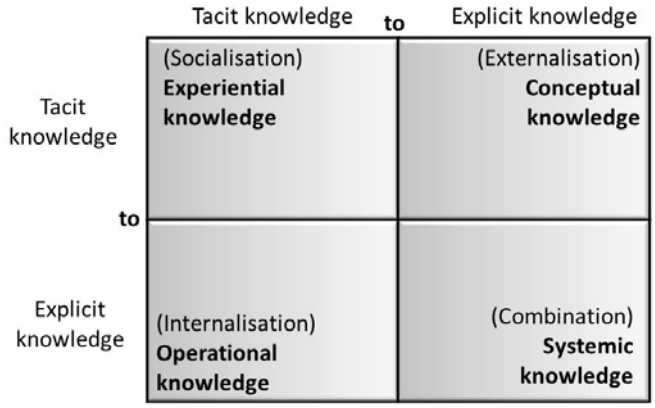

Figure 3: Contents of knowledge created by the four modes [Nonaka & Takeuchi, 1995]

Organisational knowledge creation is a dynamic interaction between tacit and explicit knowledge induced by several triggers as shown in Figure 3 [Nonaka & Takeuchi, 1995].

- Socialisation facilitates the sharing of experiences, technical skill and mental models and usually commences with building a field of interaction. The content of knowledge created through this mode is *experiential knowledge.*
- The outcome of externalisation is *conceptual knowledge* as it is activated through dialogue and collective reflection and facilitates the articulation of tacit mental models.
- By networking newly created and existing knowledge from sections in the organisation, the combination mode is triggered creating *systemic knowledge*.
- Lastly, learning by doing prompts internalisation constructing *operational knowledge*.

In the next section the relationship between IS outsourcing and knowledge management is considered.

A knowledge management perspective on IS outsourcing

Knowledge transfer has come to the fore in response to the increasing size, complexity and scope of organisations, as well as the increasing capabilities of modern IS to support knowledge-orientated activities [Niederman, 2005]. Knowledge is an important factor for IS outsourcing arrangements, as knowledge flows in both directions between the organisation and the outsource vendor with the aim of increasing the collective knowledge of each other's knowledge domain [Aydin & Bakker, 2008; Blumenberg et al., 2009]. Technology-specific knowledge, such as the IS services provided, flows from the organisation to the outsource supplier, and business-specific knowledge about processes and procedures flows from the supplier to the organisation. The purpose of this knowledge transfer is to increase the knowledge shared by the organisation and the outsource vendor [Bandyopadhyay & Pathak, 2007; Blumenberg et al., 2009]. Knowledge sharing and management in the context of IS outsourcing is not a stand-alone practice; it should be integrated into all aspects of the outsourcing arrangement [Aydin & Bakker, 2008; Balaji & Ahuja, 2005; Blumenberg et al., 2009]. The inseparability of IS from the internal production service in the client organisation implies that, even in situations of total outsourcing, a minimum set of capabilities are retained in-house by the client organisation [Miozza & Grimshaw, 2005].

As the same knowledge is used to solve many different problems, it is recognised that the same IS capability can transform different organisations in different ways. Outsource vendors benefit fully from their knowledge resources as they reuse the same knowledge assets in different contexts for different customers. Similarly, IS functions have to design adequate knowledge transfer strategies to build expertise so that new problems can be solved by reusing the same knowledge. The fact that an organisation relies on an outsource vendor does not mean that it should ignore the importance of an ongoing knowledge management programme specifically related to knowledge transfer [Beyah & Gallivan, 2001]. The importance of a shared knowledge base is highlighted as a basis for performance gains, as it creates sensitivity to the organisational environment of the other party and encompasses goals, constraints, interpretations and behaviour [Cruz, Perez & Cantero, 2009]. Such an environment for knowledge integration is created through a common language and frequent interaction, consequently fostering knowledge transfer and having a positive influence [Beyah & Gallivan, 2001; Blumenberg et al., 2009].

Organisations discover the effective deployment of IS management and derive business value from it through experiential learning and hands-on experience. Often challenges are not appreciated unless they are experienced, as the understanding of the value of an IS innovation tends to materialise in an evolutionary manner. Organisations choosing to outsource may unintentionally fragment this knowledge by missing critical learning opportunities, with a resulting loss of ensuing business gains. This necessitates constant assessment of the impact of IS outsourcing decisions on the protection and enhancement of an organisation’s knowledge base [Beyah & Gallivan, 2001]. The delivery of business value is essentially a set of knowledge-based activities in the context of IS, as it involves the integration and harmonisation of knowledge "from many individuals of different disciplines and backgrounds, with varied experiences and expectations, located in different parts of the organisation" [Blumenberg et al., 2009 : 344]. The consideration of knowledge-based activities implies and requires a close partnership consisting of both formal processes and informal working relationships between the functional areas in the organisation and IS. These interactions between functional areas in the business and IS are of the utmost importance for cross-functional knowledge transfer, although the impact on IS outsourcing performance has not been researched comprehensively [Blumenberg et al., 2009; Lee, 1996].

STUDY ON KNOWLEDGE REQUIREMENTS IN INFORMATION SYSTEMS OUTSOURCING

In order to understand the cross-functional knowledge transfer between the client organisation and outsource vendor, a research study was conducted with the objective to investigate how organisations manage knowledge in outsourcing activities, with a specific focus on knowledge requirements. The purpose of this research study was to gain an understanding of the knowledge requirements between a client organisation and an outsource vendor as the client organisation already holds knowledge, the outsource vendor brings knowledge and through the process of IS outsourcing, new, joint knowledge is created. In order to define knowledge requirements relevant in an IS outsourcing arrangement, data considering knowledge sources, means of knowledge transfer in an IS outsourcing arrangement and knowledge sharing specific to the IS outsourcing lifecycle, was collected.

The research design, data collection method, respondent profile, respondent feedback and findings are discussed in the following sections.

Research Design

An interpretive case study [Larsen & Myers, 1999; Orlikowski & Baroudi, 1991] was concluded at a large telecommunication organisation within the South African context. The interpretive case study research methodology was chosen, as the study attempted to learn from the current situation in real life [Larsen & Myers, 1999; Olivier, 1997] and the results are expressed using descriptive statements [Olivier, 1997]. Yin [2003] defines five components of research design that are important for case studies namely the questions, the propositions, the unit(s) of analysis, the logic linking the data to the propositions and the criteria for interpreting the findings. The unit of analysis in this single case study is the organisation, with the objective to distil the key knowledge requirements in an IS outsourcing arrangement.

The company where the case study was conducted operates in a competitive telecommunication market in South Africa. Product and services are key differentiators and technology enablement plays a significant and key role within this company. This environment was relevant for data collection as it utilises an outsourced model for IS and applies a multi-sourcing approach for application development projects. A scoping study for the replacement of a legacy retail billing system and the implementation of a customer management system were outsourced to a systems integrator through a procurement process. The scope of work outsourced included business process modelling, high level solution design and architecture, an implementation programme work plan and a data migration strategy. The resource model that the client organisation utilised for this project consisted of a small number of permanent employees with specialist knowledge, outsource vendor resources and independent specialist contractors hired in by the client organisation. A key objective for the outsource vendor was to design a future-proof, integrated and optimised business process set and this requirement emphasised the requirement for knowledge sharing and knowledge flow between all three groups of resources. The target audience for this data collection consisted of permanent employees, contractor and consultant resources, as well as business users and programme sponsors.

IS outsourcing lifecycles were described in the *IS outsourcing and lifecycle section* and the 3-phase lifecycle proposed by Cullen and Willcocks [2003] were utilised to design the questionnaire. The research participant questionnaire consisted of four sections, namely:

1. *Respondent demographical information*: General information regarding the research participant e.g. whether from the client or vendor organisation, whether they utilise a knowledge base or not,

the source of the knowledge base, e.g. internal, external, the outsourcing model that they operate within.

2. *Knowledge sources in IS outsourcing*: This section established what knowledge management systems are referenced, the reasons for using such a knowledge management system and knowledge transfer mechanisms.
3. *Architect, engage and govern phases of IS outsourcing life cycle*: This section contained three open-ended questions. Firstly, a question relating to the definition of outsourcing key objectives, benefits and the outsourcing business case; secondly, a question referring to the outsourcing model, the outsource arrangement definition and contract negotiation; and thirdly, a question related to the monitoring and management of the outsource arrangement, commercial management, the measuring of outsourcing benefits and the termination / exit processes.
4. *General section*: This section consisted of one open-ended question where the research participants could indicate any further general feedback and comments regarding the knowledge components of the IS outsource arrangement.

The criteria and rationale used to identify the research participants are summarised in Table 1. These criteria informed the typical profile of the research participants. The rationale focused on IS outsourcing project areas where knowledge, knowledge bases and knowledge sharing were the key drivers. In addition, three main selection criteria informed the participant profile:

1. Research participant representation from all IS outsourcing programme work streams, namely business requirements, technical requirements, project management and commercial management
2. Research participants who understand systems with broad business process management knowledge, knowledge and expertise about outsource vendor management and research participants who work in environments where knowledge and knowledge sharing are key priorities
3. Research participants from different levels of the organisational hierarchy in both the client organisation and the outsource vendor organisation, for example programme directors, business analysts, solution architects, and so on, including onsite, near-shore and offshore resources.

This selection ensured that different perspectives on the research questions were obtained in order to contribute to the richness of interview data.

Table 1: Identification of research participants

Main criteria	Sub-criteria	Rationale
IS outsourcing programme work streams	Business requirements	• Best practice process design knowledge • Business, business process and process modelling knowledge
	Technical requirements	• Solution design concepts and knowledge • Integration of business and technical requirements
	Project management	• Project plan and project artefact management • Deliverable quality assurance
IS outsourcing project commercial management	Business model management	• Business process scenario and process measurement knowledge • Business case for IS outsourcing
	Outsource vendor management	• Outsource vendor management expertise • Contract and payment profile management
Organisational hierarchy	Programme director/owner	• End-to-end view of IS outsourcing arrangement, including all components such as business case, commercial management, artefact management and business (organisational) knowledge
	Outsource vendor team members	• Knowledge sharing from outsource vendor to client organisation • Knowledge sharing from client organisation to outsource vendor

Main criteria	Sub-criteria	Rationale
		• Outsource vendor best practice contribution to IS outsourcing arrangement
	Outsourcing project team members	• Knowledge sharing from outsource vendor to client organisation • Knowledge sharing from client organisation to outsource vendor • Business, organisational and business process knowledge

The first column in Table 1 depicts the *main criteria* for research participant selection and it points to the relationship type between the organisation and the research participant. The second column, *sub-criteria*, reflects the specific area of work of the research participant and the last column provides the rationale for including different work areas.

In order to establish the knowledge requirements relevant to an IS outsourcing arrangement, a web link to the questionnaire, together with an explanation of its purpose, was emailed to the identified target audience, which comprised 62 research participants representing multiple roles in the client organisation and the outsource vendor organisation. The survey was completed by 40 respondents, thereby giving a response rate of 65%.

Data Analysis

Quantitative and qualitative feedback was gathered using the questionnaire. Totals of the responses submitted were reported on in the *respondent profile* and *knowledge sources in IS outsourcing sections*, the answers to the open-ended questions were collated, relevant parts of the data were identified and common themes were classified [Flick, 2007]. The process of identifying common themes and classification was concluded through a two-step process. Firstly, descriptive codes were used in order to attributing a theme to a segment of text [Welman, Kruger & Mitchell, 1994]. Secondly, open coding was utilised in order to establish themes from the questionnaire data [Leedy & Ormrod, 2014; Myers & Avison, 2002]. Open coding is a process of reducing data to a small set of themes that describe the phenomenon under examination [Leedy & Ormrod, 2014].

Respondent Profile

The purpose of the first three questions in the questionnaire was to determine the profile of the research participants, that is, their affiliation to the client organisation, the project stream of the outsourcing arrangement to which they were allocated and, lastly, the phase of the outsourcing project they focused on. Of the 40 participants that completed the questionnaire, 22 were permanent employees of the client organisation, 12 were contractors or consultants contracted to the client organisation and seven were employed by the outsource supplier. Business owners and line managers formed part of the permanent employee contingent of the respondents. With respect to the outsourcing arrangement the respondents contributed to, more than one phase could be relevant. Accordingly, ten respondents contributed to the architect phase, 11 to the engage phase and 25 to the govern phase of the IS outsourcing arrangement.

Knowledge Sources in IS Outsourcing

The purpose of the second section of the questionnaire was to establish what knowledge was required for the various phases of the IS outsourcing arrangement, what knowledge bases were utilised and how

knowledge was transferred. Accordingly, respondents could select more than one of the options provided.

Table 2 presents the source of the knowledge management systems referenced. Twenty respondents indicated that this was an internal organisational knowledge management system, whilst 16 respondents referenced a knowledge management system external to their organisation (nine utilised web resources and seven the system at the outsource partner). Twenty referred to a subject matter expert within their organisation, and 11 referenced a subject matter expert outside their organisation. Two research participants indicated that they had not referenced a knowledge management system or utilised experts for this IS outsourcing arrangement.

Table 2: Knowledge management system source

Knowledge management system internal to your organisation	20
Knowledge management system external to your organisation – web resources	9
Knowledge management system external to your organisation – outsource partner	7
A subject matter expert internal to your organisation	20
A subject matter expert external to your organisation	11
We do not reference a knowledge management system or utilise experts	2

Table 3 presents the knowledge components referenced for IS outsourcing. Best practice operational knowledge (21 respondents) and project documentation (19 respondents) scored the highest in terms of knowledge components referenced. Thirteen respondents referenced a lessons learnt repository, 13 benchmark information, and ten accessed client or outsource vendor intelligence. Only three respondents specified that they utilised a human resource skills database, while five respondents indicated that they had not used a knowledge management system or database for this IS outsourcing arrangement.

Table 3: Knowledge components referenced for IS outsourcing

Best practice operational knowledge base	21
Client / outsource vendor intelligence	10
Human resource skills database	3
Project documentation management	19
Lessons learnt repository	13
Benchmark information	13
We do not use a knowledge management system / base	5

The way in which the knowledge required, was transferred, is shown in Table 4. In this instance, the respondents could choose all the relevant options provided. Two respondents indicated that they had all the knowledge required to perform their task on the IS outsourcing arrangement, while 21 indicated that they obtained the knowledge by doing their own research. Direct observation was highlighted by 19 research participants, a documented knowledge repository by 18 and joint execution by 17 research

participants. Fifteen indicated that they obtained the required knowledge through learning by doing and by concluding a proof of concept. Nine indicated experimentation and comparison as a means of knowledge transfer, five referred to narration and one respondent indicated imitation as a mechanism for obtaining knowledge.

Table 4: Methods of knowledge transfer

Direct observation	19
Narration	5
Imitation	1
Learning by doing	15
Experimentation and comparison	9
Proof of concept	15
Joint execution	17
Documented knowledge repository	18
Lecture	2
My own research	21
I have all the required knowledge	2
We do not transfer knowledge	0

Architect, Engage and Govern Phases of IS Outsourcing

The purpose of the third section of the questionnaire was to obtain any additional feedback from research participants on knowledge flows for the architect, engage and govern phases.

Research participants shared several comments regarding the *architect* phase of the IS outsourcing arrangement. Some of the comments shared include:

> *Live demonstrations and presentations of the current challenges faced from all parties involved.*
> *A better managed knowledge repository. Knowledge should be more available.*
> *Market the framework used to select the outsourcer. Obtain buy in and adapt the framework where necessary. Define key individuals and work with them in their respective domains*
> *Availability of documented organisation knowledge, crucial business decision making of available options based on an existing business strategy*
> *Knowledge sharing sessions with SME from outsource partner with specific agenda and objectives*
> *Would be ideal to have a centralised repository that contains all the up-to-date business rules, migration plans, etc. that is easy to read and access.*
> *Joint execution, and conducting formal knowledge transfer workshops.*

The analysis of comments delivered the following emerging themes for the *architect* phase:

1. *Client organisation consideration:* This theme included the client organisation buy-in to the outsource vendor arrangement framework, client organisation to outsource vendor skill gap analysis, a comprehensive outsource business case, detailed planning with appropriate stakeholders and access to a benchmarking repository. Knowledge of the organisational environment and the strategic

objectives communicated by top management are key, since decisions on IS outsourcing must be taken in the IS departmental context as well as the organisation as a whole. Knowledge of the various cost factors must be considered in terms of development/deployment costs and ongoing costs, with a specific emphasis on licence costs, human resource costs, hardware infrastructure costs, and suchlike for cost analysis purposes. The cost impact of smaller areas of outsourcing rather than 'big bang' outsourcing should be considered. Sensitivity refers to local shareholder and staff expectations and is easier to manage in a start-up organisation as no critical staff volumes are in place. In terms of risk, offshore data is a key concern in terms of regulatory and intellectual property loss.

2. *Client organisation preparation to embrace*: This theme consisted of defining an agile business decision-making process, a detailed understanding of the outsource requirements by the client organisation, client organisation training on joint execution and outsource management, client organisation key resource involvement, as well as the identification of the key resource pool for vendor selection, the client organisation skills database and the outsource skills requirement assessment. Lastly, preparation included the finalisation of the client organisation knowledge repository and organisational documentation.
3. *Client organisation for implementing the IS outsourcing arrangement*: This theme referred to outsource vendor and outsource model intelligence, as well as a quantified business case with sufficient activity-based costing information, outsource benchmarks and outsource performance measures. It also included an outsource options analysis of which knowledge transfer is a key outsource deliverable.

With regard to the *engage* phase of an IS outsourcing arrangement, research participants shared the following comments:

> *Transparency of information be it through a shared online portal or other. This must be kept up-to-date at all times, and if any material is hidden, this should be stated clearly (where the gaps are), why, and who has access.*
> *Better, more complete documentation*
> *Culture of knowledge sharing*
> *Defined knowledge transfer channels, which are appropriately transparent, where stakeholders are kept up to date on the processes used and rationale for vendor selection and subsequent contract terms.*
> *Knowledge transfer of key benchmarking that is done i.t.o. best practises specific to industry common repository*
> *Access to a knowledge base of information*
> *Unpacking the key objective of knowledge transfer into measurable services and products to be included in the criteria for vendor selection and contract negotiation.*
> *We have access to a lot of knowledgeable people in the organisation. Internal research should be completed in terms of the expected outcomes and current best practice internationally. This way when selecting vendors etc., the internal resources already know what to expect and aren't so easily mislead.*

The analysis of the comments provided emerging themes for the *engage* phase in the following areas:

1. *Statement of work feedback:* This theme included a clear scope of the client organisation's negotiation position reflected in a comprehensive outsource request for proposal, with the control of knowledge management requirements included in the outsourcing arrangement governance process. Other comments included the formalisation of service level agreements, the definition of detailed and effective measures, as well as the establishment of a formal hand-over plan. Respondents indicated that outsource vendor to client organisation knowledge transfer mechanisms should be formally agreed to and that clear communication of timelines for service delivery by the client organisation is required.

2. *Outsource vendor selection*: This theme comments included the establishment of best practice procurement processes for outsource vendor evaluation and selection and the establishment of an expert cross-functional evaluation team and a common understanding of the outsourcing arrangement status between the client organisation and the outsource partner. Research participants highlighted the fact that client organisation knowledge-sharing sessions with outsource vendor customers should be conducted to obtain a view of vendor engagement and delivery.
3. *Outsource vendor commercials*: This theme refers to the definition of accurate performance measures and benchmarks for the outsourcing arrangement, the monitoring of benefit realisation within the outsourcing arrangement, and the clear communication of expectations. A dedicated team to manage the outsource vendor, with the support of an external specialist body, should be assembled in order to control the outsourced operational aspects. The monitoring capability and key skills that the client organisation requires to manage an outsource vendor relationship should be embraced or developed where required. In terms of organisational and contract design, knowledge of the supplier and customer organisational structures, knowledge of legislation that may affect the contents of the contract, and robust contracts with exit clauses as well as delivery benefits, are important.
4. *Outsource vendor hand-over*: This theme points to the availability of a client organisation operational knowledge repository, detailed client organisation documentation and the creation of a common knowledge repository shared by the client organisation and the outsource vendor. Respondents maintained that one team consisting of client organisation resources and the outsource vendor should be formed in order to facilitate wider collaboration with detailed documentation and direct access between the outsource vendor and business stakeholders. In addition, there should also be direct access to the business areas affected by the outsourcing arrangement. Formal focus group meetings, knowledge transfer workshops and outsource vendor subject matter expert knowledge sharing sessions should be conducted in order to create a formal training and coaching repository for the IS outsourcing arrangement. Knowledge of the time it takes for resources to be mobilised helps define resource mobilisation realistically. For implementation and transition, knowledge of systems (people, IS systems, processes) and planning as the outsourcing arrangement gains traction, is critical for reducing time to market.

For the govern phase of IS outsourcing, research participants shared the following comments:

> *Wider collaboration and transparency, with detailed documentation*
> *Shared office space between internal project resources and outsourced project resources, allotted hand over time, joint documentation responsibilities.*
> *Again, transparency of and ease of access to all relevant information; if certain information must be kept to within a restricted set of individuals, this should be clear to all, and why. This mitigates any problems with regard to assumptions and addresses gaps of information and understanding.*
> *Create a team that manages/monitors the outsourcers. They should not have to deal with the day to day running as well as there is not adequate time to do both*
> *Transparency, to appropriate level of management, so that consequences of actions/non-action is known up front.*
> *Determining key knowledge gaps in the organisation and formalising how the knowledge in these areas would be transferred is key.*
> *Better and more complete documentation*

Emerging themes based on the analysis of comments for the *govern* phase of IS outsourcing included:

1. *Relationship management*: This theme pointed to strong relationship management and relationship building between the client organisation and the outsource vendor. Respondents also emphasised transparency at the appropriate management level so that consequences of actions or non-actions are shared.

2. *Deliverable and commercial management*: This theme highlighted the understanding of industry norms and trends, an outcome-based analysis of the usability of the end product, a mandated and knowledgeable decision-making body and the management of the scope size of the outsource requirement and the implementation cycles. Outputs are monitored by well-defined and measureable business processes, key performance indicators, service level agreements and requests for key performance indicators sets, as well as by knowledge transfer into measurable services and products. The research participants indicated that a reference model knowledge base and the application of the reference models in a proof of concept should be considered.
3. *Communication and change management*: This theme included integration sessions across the outsourcing arrangement work streams, iterative detailed updates to all team members, joint documentation responsibilities and joint execution between outsource vendor and client organisation resources. Respondents indicated that shared office space and a joint team war room facilitate operational integration, expectation-sharing sessions and outsource stage alignment sessions. An inclusive stakeholder plan, including stakeholder feedback, is required for client organisation stakeholder communication and expectation management.
4. *Knowledge application*: This theme consisted of industry best practice and benchmarking knowledge transfer, access to a lessons-learnt and previous experience knowledge base, as well as an outsource vendor selection framework that is shared with client organisation business stakeholders. Expertise was shared by means of a cross-functional team that defined and drove the process.
5. *Knowledge sharing*: This theme included access to a client organisation knowledge management repository, a client organisation process documentation knowledge base and a vendor subject knowledge and experience knowledge base. Research participants indicated that key expert knowledge can be formally utilised through consulting and that the outsourcing arrangement should optimise outsource vendor capability and experience.

General Comments

Research participants made several general comments regarding the knowledge management framework for an IS outsourcing arrangement. Respondents maintained that a knowledge management framework should be agreed on early in the outsource process, knowledge transfer buy-in should be obtained from both parties and collaborative tools for knowledge sharing and transfer should be identified. The client organisation should build capability for outsource vendor management, should be trained in joint execution, and the client organisation key man dependencies should be eliminated. A culture of knowledge sharing should be fostered over and above the availability of a client organisation's requirement document repository and secure knowledge repository. The client organisation should use the outsource process to acquire knowledge and, in turn, knowledge transfer should form part of outsourcing arrangement governance.

Research participants also commented on the impact of knowledge transfer on outsourcing models, including onsite, offsite, offshore, near-shore and hybrid on- and offshore.

- Respondents maintained that the *onsite* outsource model is the best approach, as direct engagement can take place. As teams from both the client organisation and the outsource vendor are onsite, it is easier to keep control and ensuring that knowledge transfer objectives are met is more straightforward.
- The *offsite* outsource model requires more discipline to achieve the objectives, but it is often required in order to accommodate skills shortages and complexity. However, when using the offsite model, knowledge sharing may be limited or lacking.
- Research participants indicated that the *offshore* model does not work in the African context, as it has an impact on certain efficiencies such as the increased time required to manage the arrange-

ment. Furthermore, it presents a quality risk, communication is a challenge and there is a lack of knowledge sharing.

- In the use of the *near-shore* model communication presents a challenge and knowledge sharing may not be optimal.
- The *hybrid on- and offshore* model allows a core team to manage offshore when accountability transfers from the onshore team; this frees up the onshore team for other activities and reduces risk. However, communication is vital to ensuring that this model works together with joint execution.

Findings

The way in which knowledge is transferred beyond organisational boundaries in the context of IS outsourcing was highlighted in the outcomes of the study. Patterns of interaction included interactions within the client organisation and within the outsource vendor teams, as well as those between the client organisation and the outsource vendor teams. In order to deliver the business value intended by the IS outsourcing arrangement, this team interaction requires both formal and informal processes in order to create shared knowledge from individual team knowledge.

With the aim of reporting the knowledge requirements collected, a framework reflected in Figure 4 was created by using the knowledge spiral for organisational learning shown in Figure 2 combined with the contents of knowledge created as depicted in Figure 3. The framework reflects the four modes of knowledge conversion and the interaction between tacit and explicit knowledge. Furthermore, the content of knowledge created such as experiential knowledge, conceptual knowledge, operational knowledge and systemic knowledge, are expanded by inserting descriptive detail illustrating knowledge conversion between tacit knowledge and explicit knowledge, as well as the contents of knowledge created (adapted from [Nonaka & Takeuchi, 1995]). These knowledge processes are relevant in the knowledge requirements between the client organisation and the outsource vendor [Al-Salti, 2009; Aydin & Bakker, 2008].

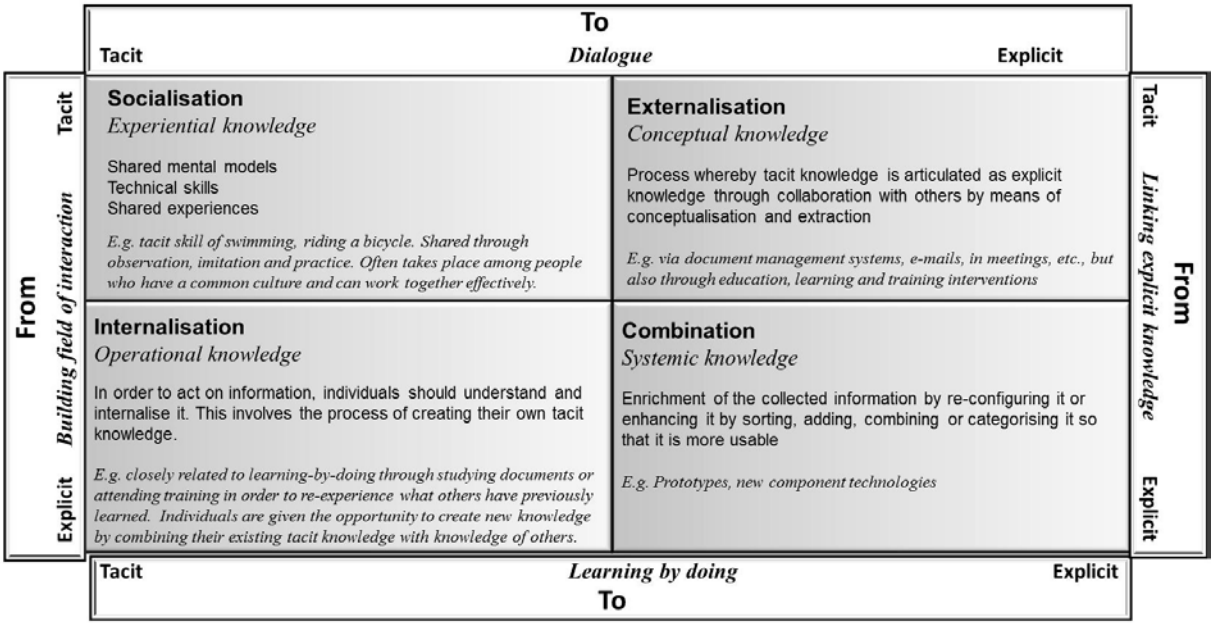

Figure 4: Four modes of knowledge conversion and contents of knowledge created (adapted from [Nonaka & Takeuchi, 1995])

Table 5 presents the summary of emerging knowledge requirement themes from the data collected reported by the outsourcing lifecycle steps. For each theme, the content of knowledge created is indicated based on the framework depicted in Figure 4.

Table 5: Summary of emerging themes for knowledge requirements for IS outsourcing

Lifecycle	Knowledge requirements for IS outsourcing	Knowledge content
Architect phase	Identification and documentation of client organisation intellectual property	Conceptual
	Market knowledge	Operational
	Knowledge of client organisation environment, strategic objectives as communicated by top management	Experiential
	Knowledge of client organisation structures in order to engage with the correct people Views must be considered in context of the stakeholders' area as well as the organisation as a whole	Conceptual
	Knowledge of the operations in order to derive operational type benefits which can also be lifted up to a strategic level	Operational
	Knowledge sharing session with outsource partner	Operational
	Knowledge of the various cost factors must be considered in terms of development/deployment costs & ongoing costs with a specific emphasis on licence costs, human resource costs, hardware infrastructure costs, etc	Operational
	Understanding of sensitivity around local shareholder and staff expectations	Experiential
	Knowledge of risk related to chosen outsource model e.g. offshore data is a key concern, risk of loss of intellectual property	Experiential
Engage phase	Negotiation knowledge and skills	Conceptual
	Identification and documentation of client organisation intellectual property	Conceptual
	Records management	Conceptual
	Define model for retaining key knowledge and skill in organisation	Conceptual
	Create knowledge repository for organisational key knowledge	Conceptual
	Knowledge of the client organisation is key & ensuring integrity of information is paramount	Conceptual
	Knowledge of SLAs	Operational
	Knowledge of outsourcing processes as inherent knowledge and business relationships take time to develop as does the internal cultural requirements of the organisation	Experiential
	Knowledge of the objectives and mutual benefits of the parties involved	Systemic
	Knowledge of the areas that are core and that need innovation	Operational
	Supplier knowledge & their ability to evolve & offer better services	Systemic
	Knowledge of systems (people, IS systems, processes)	Conceptual
	Planning as gaining traction is critical to reduce time to market	Operational
	Knowledge of the supplier and customer organisational structures	Conceptual
	Knowledge of legislation that may affect the contents of the contract	Operational
	Facilitate wider collaboration by creating one team consisting of client organisation resources and the outsource vendor enabling direct access between the outsource vendor and business stakeholders	Systemic
	Knowledge of the support constructs required from the client organisation perspective	Conceptual
	Knowledge of roughly the time taken for resources to be mobilised helps define this criterion reasonably	Systemic
	Knowledge of the effects that certain actions may have, thereby taking the correct mitigating actions	Operational
Govern phase	Contract management knowledge and skills	Operational
	Financial and cost management knowledge and skills	Operational
	Knowledge of internal policy and procedures of client organisation	Conceptual
	Learning by doing	Experiential

Lifecycle	Knowledge requirements for IS outsourcing	Knowledge content
	Project management knowledge and skills	Operational
	Maintain knowledge repository for organisational key knowledge eg business requirements	Conceptual
	Delivery traceability matrix	Conceptual
	Plan and manage knowledge transfer to operational (support) team	Experiential
	Knowledge of the intricate details held within the contract including products, services, boundaries at which you are allowed to operate	Operational
	Strict contract management (rules of the game), governance re commercials, milestones and performance	Conceptual
	Knowledge of service level agreements	Operational
	Knowledge of escalation paths within the supplier organisation for problem resolution	Conceptual
	Create joint documentation accountability	Systemic
	Conduct formal focus group meetings, knowledge transfer workshops and outsource vendor subject matter expert knowledge sharing sessions in order to create a formal training and coaching repository for the IS outsourcing arrangement	Systemic
	Knowledge of critical metrics in relation to the operational environment to measure performance	Operational
	Knowledge to set clear concise objectives for meetings	Operational

Table 5 indicates that the main focus of knowledge content during the *architect*, or initiation phase of an IS outsourcing lifecycle is on articulation of tacit knowledge, creation of a shared vision and translating external knowledge to what it means for the internal process. During the *engagement* phase of the lifecycle, the process of creating explicit knowledge between the client organisation and outsource vendor is reflected, as well as some skills transfer and creation of new tacit knowledge between the two, creating a common understanding between client organisation and outsource partner. In the *govern* phase of the IS outsourcing lifecycle, more emphasis is placed on the enrichment of joint knowledge towards realising the business case benefits of the IS outsource arrangement.

Survey respondents maintained that the knowledge management framework should be agreed on and documented at the start of the outsourcing arrangement. This is a prerequisite, since working on extremely large, complex and transversal projects makes it difficult to outsource the work completely. Accordingly, there is a need for an internal organisational team to be responsible for joint execution, to ensure that the organisation's needs and governance are always considered and that the organisation's risks are mitigated. Templates should be generated for this team and the organisation’s core staff should be trained to manage outsourcing arrangements.

Outsource partners usually consider getting the outsourced work done within timelines, irrespective of the damage that may be caused when all requirements are not taken into account. This often leads to rework and incomplete work, which ultimately results in additional costs for the client organisation that erode the savings realised by outsourcing. It also leads to a lack of succession planning within the organisation, as well as a lack of specific skills, which ultimately ends up costing the organisation more.

Participants indicated that one of the biggest challenges was best practice knowledge of the procurement process and the time it takes to conclude outsourcing negotiations and arrangements. A significant challenge was the effort, time and knowledge needed to manage an outsource vendor properly.

FUTURE RESEARCH POSSIBILITIES

The data for this study was collected at a telecommunication organisation in South Africa in order to create the knowledge requirement description. Further research is needed to generalise the knowledge elements contained in it in order to support outsourcing arrangements in general. Another issue accentuated by this research is the applicability of the knowledge requirements for IS outsourcing in industries other than telecommunication and in outsourcing projects other than IS outsourcing.

Client organisation and outsource vendor team members participated in this research and the responses for the two groups varied. The different requirements of such two groups within the IS outsourcing lifecycle and in the context of knowledge sharing, could be researched further.

CONCLUSION

This chapter contributed to the theoretical body of knowledge on IS outsourcing and how organisations deal with managing knowledge in outsourcing situations, by presenting input on knowledge requirements in an IS outsourcing arrangement based on a case study conducted in a telecommunication company in South Africa. The knowledge requirements for all three IS outsourcing lifecycle phases namely the architect phase, the engage phase and the govern phase, were addressed. The knowledge requirements presented can be used as a checklist for an organisation to determine what knowledge is required in the organisation, what knowledge is required by the outsource vendor, and what knowledge should be shared between the two when outsourcing IS or components thereof. By considering and planning for these knowledge requirements, an organisation may mitigate the risk associated with an IS outsource arrangement.

Knowledge requirements are relevant at different levels of abstraction and apply from the IS outsourcing arrangement level right down to the individual phases of IS outsourcing and the operational level in the client organisation. Knowledge required for each of these phases must be considered in order to assist organisations to deal with managing knowledge in IS outsourcing situations.

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