Competitive Advantage of KIBS Providers: Influence of Knowledge Processes

By

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Abstract

KIBS providers are organizations that perform knowledge intensive business activities mainly for other organizations and in the present age have become key components of industrialized economies. The primary purpose of KIBS providers is to deliver customized solutions to clients through the implementation of three core knowledge processes: knowledge acquisition, knowledge recombination, and knowledge diffusion. Existing research has predominantly focused on understanding the importance of these providers in creating a competitive edge for their clients. However, little is known in terms of how such providers can create an improved competitive position for themselves. This research helps to understand whether the use of knowledge processes influences the competitive advantage of KIBS providers. A guiding framework developed from literature posits that such generic knowledge processes may provide competitive advantage for a given provider if they are transformed into valuable, rare, inimitable, and well-exploited resources (VRIO). The study follows a holistic multiple case research design of three IT service providers to refine the existing theory on the influence of knowledge processes on the competitive advantage of KIBS providers. Data was collected through interviews of employees occupying different roles in a company to provide their perspectives on the various parts of the framework. The findings of this study reveal that participants perceive knowledge processes to provide competitive advantage to their companies. However, data analysis using the VRIO framework indicates that knowledge processes do not confer competitive advantage by themselves, but rather through an emerging theme called delivery. Findings also indicate that delivery influences other factors of competitive advantage. The study contributes to the existing literature as it leads to a refined understanding of the relationship between

knowledge processes and competitive advantage by highlighting the importance of delivery as a dynamic capability. The study has practical implications for managers as it informs them that delivery improves brand name, reduces costs, and helps to achieve client satisfaction.

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1. Introduction

1.1. Background

This study explores the influence of knowledge processes on the competitive advantage of knowledge intensive business service (KIBS) providers. KIBS providers consist of organizations whose primary activities involve accumulating, creating, and disseminating knowledge to develop a customized service for clients (Bettencourt, Ostrom, Brown, & Roundtree, 2002). They are typically contracted by other firms for the delivery of specific services of which knowledge forms an important component. For example, a healthcare company might outsource its IT-related activities to an IT service provider organization since they may lack adequate knowledge in IT. Clients contract out this work to service providers either within the same country or offshore to other countries after analysing the benefits and challenges of each context.

Statistics from the International Standard Industrial Classification show that over 30% of the total value added from services in USA and UK come from knowledge intensive services. IT growth has made communication in the professional setting simple, enabling organizations to collaborate without disruptions and this helps KIBS providers to effectively carry out business since they need to interact with clients from different locations (Fei, 2005). In Canada, the knowledge intensive services industry sector generated $18.9 billion in operating revenue in 2014, up 7.8% from 2013. KIBS providers in Canada have also increased steadily since 1980 to 2006 from 11.2 to 18.1% of the GDP. Accordingly, the use of knowledge intensive outsourced arrangements is significant and the trend is expected to continue.

1.2. Research Gap

The success of KIBS providers lies in their ability to carry out tasks assigned by clients that enables success for the latter (Kotabe & Murray, 2004). Therefore, research on KIBS providers has focused primarily on understanding the implications of providing services from a client perspective (Gallouj, 2002; Lee, 2001). While KIBS providers play an important role in supporting their clients to become more competitive, the ways in which providers gain competitive advantage is not well-understood. KIBS providers need to continuously improve their knowledge base to remain competitive (Desmarchelier, Djellal, & Gallouj, 2013). This is a key part of their knowledge acquisition process which is one of the knowledge processes that they rely on to create customized solutions that meet client needs (Muller & Zenker, 2001). Research shows that transfer of knowledge is important to gain competitive advantage for firms, which is an essential part of all three knowledge processes used by KIBS providers to acquire, recombine, and diffuse knowledge (Argote & Ingram, 2000). These knowledge processes are important since knowledge is a dominant source of competitive advantage (Jansen, Van Den Bosch, & Volberda, 2005). However, at present the link between knowledge related activities and the strategic objectives of KIBS providers appear to be missing (Perrin, Vidal, & McGill, 2006).

There has thus been a call to explore knowledge processes and their strategic impacts on KIBS providers (Marjanovic & Seethamraju, 2008). The resource-based view claims that well exploited, valuable, rare, and inimitable resources (VRIO) generate competitive advantage (Barney, 1995). Hence, to understand the influence of competitive advantage on KIBS providers we need to understand if and how these providers' knowledge processes constitute VRIO resources.

1.3. Research Objective & Question

The objective of this study is to understand how KIBS providers may achieve competitive advantage from their knowledge processes. To achieve the research objective, the study will seek to answer the following research questions:

1) Do knowledge processes influence the competitive advantage of KIBS providers?

2) In which way do the knowledge processes influence the competitive advantage of KIBS providers?

3) How important are knowledge processes relative to other factors in creating competitive advantage?

The first research question seeks to understand if KIBS providers' knowledge processes have a positive, negative, or neutral effect on their competitive advantage. The second research question intends to explore if the implementation of knowledge processes can provide competitive advantage to KIBS providers. From the literature we learn that knowledge processes are generic processes present in every knowledge intensive service provider organization (Muller & Zenker, 2001) and that to provide competitive advantage; processes should be valuable, rare, inimitable, and well exploited by the organization (VRIO) (Barney, 1995). Thus, the second question aims to investigate how generic knowledge processes may be transformed by KIBS providers into resources that possess VRIO attributes, so that they may provide them with competitive advantage. Finally, the third question aims to identify the importance of knowledge processes relative to other factors in creating a competitive advantage. For example, the brand value of an organization may be perceived as more important than its knowledge processes for competitive advantage. This question plays

the role of rival explanation in the study and helps to increase the confidence of this study (Yin, 2011).

1.4. Methodology

To achieve the objective of this study, a literature review has first been conducted to provide an initial framework articulating how knowledge processes relate to the competitive advantage of KIBS providers. Thereafter, the research questions have been answered by conducting a holistic multiple-case study (Yin, 2013). Specifically, three global IT service provider organizations were selected. The company selected for the first case offers solutions to telecom operators, whereas, the company selected for the second case is a general IT service provider with clients in various domains. The company selected for the third case handles the business processes of a specific department for a client, e.g., payroll division. The data collection method adopted for this study was interviews with participants from each of the three companies. The study focused on IT service providers as a representative type of KIBS providers, to limit variability across contexts and hence facilitate cross-case analysis.

1.5. Results

The results of this case study are obtained by answering the three research questions. The findings for the first research question reveal that participants perceive that knowledge processes confer competitive advantage to KIBS providers. This perspective may be true since collected data show that implementation of these knowledge processes is not completely generic across cases. The findings for the second research question indicate that these knowledge processes may not confer competitive advantage when analyzed using a VRIO framework. The findings further suggest that the delivery capability formed by the

implementation of all knowledge processes confers competitive advantage to KIBS providers. Finally, the data from the third research question show that delivery supports other factors of competitive advantage like lower cost and brand name.

1.6. Contributions

Findings from this study help to extend the literature on KIBS by highlighting the importance of delivery as a capability to confer competitive advantage. These findings also have practical implications for managers who learn that effective delivery leads to competitive advantage and that delivery also influences factors such as brand name and cost. Future studies could validate the refined framework developed from the findings.

1.7. Summary of Chapters

The remaining part of the thesis has been divided into five chapters. Chapter 2 presents a review of the key concepts from literature for this research. These concepts include KIBS, knowledge processes, absorptive capacity and competitive advantage. Chapter 2 ends with a conceptual framework showing the influence of knowledge processes on competitive advantage, which is derived from the literature review. Chapter 3 explains the methodology followed to answer the research questions of this study. This chapter includes the research design, the sample being studied, and data analysis techniques. Chapter 4 presents the results of the study which begins with a summary of each case followed by the findings related to each research question. Chapter 5 situates the results of the study within extant literature and ends with a refined framework that links knowledge processes, delivery, other factors, and competitive advantage based on the finding of the study. Chapter 6 concludes the thesis by presenting its contributions, limitations, and avenues for future research.

1.8. Operational Definitions

Resources: Assets and capabilities that are available and useful in detecting and responding to market opportunities or threats (Barney, 1991; Wade & Hulland, 2004)

Assets: Anything tangible or intangible that can be used in the processes of an organization for creating, producing, and/or offering its products (goods or services) to a market. For example human, technical, or financial resources.

Capabilities: Actions following repeated patterns in using assets to create, produce, and offer services. Can include skills (e.g.-technical or managerial ability) and/ or processes (e.g.-systems development or integration).

Processes: Set of repeatable activities that lead to a specific output. Therefore, they are part of capabilities.

Competencies: Competencies are like capabilities without the value chain aspect. The value chain aspect discusses the ability to add value to a company through certain processes.

2. Literature review

This chapter reviews literature on KIBS providers and how they may gain competitive advantage. First, literature on KIBS is reviewed to gain a proper understanding of what such services represent, their roles and importance. Second, literature on knowledge processes is presented to identify the knowledge processes known to be core to KIBS and understand their importance for KIBS providers. Finally, the literature on competitive advantage from a resource-based perspective is presented to understand why organizations need to strive for competitive advantage while explaining how knowledge chain can categorize various

processes. This part also highlights the importance of absorptive capacity to provide competitive advantage to KIBS providers.

The literature on knowledge in organizations is broad and spans disciplines such as strategy, organizational theory, and organizational development. For example, the literature on organizational learning (March,1991; Brown & Duguid, 1991) seeks to understand how firms perform and learn from their past actions. Accordingly, there is an emphasis on knowledge creation and transfer. Similarly, the intellectual capital literature focuses on knowledge stocks and knowledge flows with some consideration of how to value firm knowledge (Cranfield, 2003). The present study does address some of these issues, but it relies on the absorptive capacity to understand knowledge processes in organizations as this construct is more widely used in the strategy literature. Intellectual capital can be viewed as an intangible resource since these terms are used interchangeably depending on the research tradition being followed.

The focus of this study is on the relationship of knowledge processes and the competitive advantage of KIBS providers. Although there is a large body of literature on knowledge management and its relationship to competitive advantage (e.g., Brown, & Duguid, 1998; Adams & Lamont, 2003), the concepts and frameworks it presents are mostly generic in terms of type of organization. Given that KIBS providers have been found to operate on knowledge processes that are specific to that sector (Muller & Zenker, 2001), literature on knowledge management in a general context has not been included as part of the review.

A conceptual framework developed from these reviews illustrates the link between knowledge processes and competitive advantage. The framework provides direction to the

study by guiding data collection and analysis. In doing so, it helps to develop a refined framework that better captures the relationship between knowledge processes and competitive advantage of KIBS providers.

2.1. Knowledge Intensive Business Services (KIBS) Providers

2.1.1. Understanding KIBS Providers

KIBS providers are an important part of the service sector based economy and is growing in importance with each passing day. The growth of KIBS results from the creation of a market dominated by knowledge (Antonelli, 1999). These providers differ from normal service based companies as the services they offer are heavily dependent on knowledge (Miles et al., 1995). Such providers need to work closely with their clients to provide knowledge-intensive solutions (Miles, 2005; Miles et al., 1995; Muller & Doloreux, 2009).

KIBS providers are organizations that depend on professional knowledge pertaining to a specific domain to perform business activities (Windrum & Tomlinson, 1999). They are identified as organizations providing knowledge-intensive inputs to economic activities of other organizations that result in creating, gathering, or diffusing knowledge (Miles, 1995). These organizations therefore use knowledge as input and produce knowledge as output (Gallouj, 2002). Such services offered by KIBS providers include IT, R&D, and engineering to name a few. These organizations have come into being with the objective of helping others deal with problems that require external knowledge (Miles, 2005). In other words, KIBS can be considered as a specific type of outsourcing service that relies heavily on professional knowledge to perform activities (Miles et al., 1995; Windrum & Tomlinson, 1999). They are also important since they provide solutions that are knowledge intensive.

2.1.2. Importance of KIBS Providers

KIBS providers play an important role in industrialized economies because they offer services improving the knowledge base of their clients belonging to a wide range of economic sectors (Miles et al., 1995). The importance of such services is clear since organizations often seek external help to perform certain activities (Miles, 1995). The reasons for hiring a KIBS provider vary across organizations. An important reason is acknowledging the fact that organizations do not possess the necessary knowledge required to perform the concerned activity. Another reason may be the need to focus on their core competencies and not be distracted by non-core activities, therefore these organizations will contract out to KIBS providers. Sometimes the reason can be a combination of both these factors (Miles, 2012). The importance of KIBS therefore lies primarily in performing knowledge intensive tasks to enable the smooth functioning of their clients' business processes (Miles, 1995).

2.2. Knowledge Processes

KIBS providers rely on three knowledge processes to acquire, recombine, and diffuse knowledge that helps to offer solutions to clients (Muller & Zenker, 2001). These knowledge processes are related to each other as they move from one process to another. To be more specific, new knowledge is acquired in the first process of knowledge acquisition (see figure 1). Next, in the knowledge recombination process, acquired knowledge is recombined with existing knowledge present within the KIBS provider organization. Finally, the recombined knowledge is shared with clients in the form of solutions in the knowledge diffusion process.

The next sections present each of the knowledge processes in more detail.

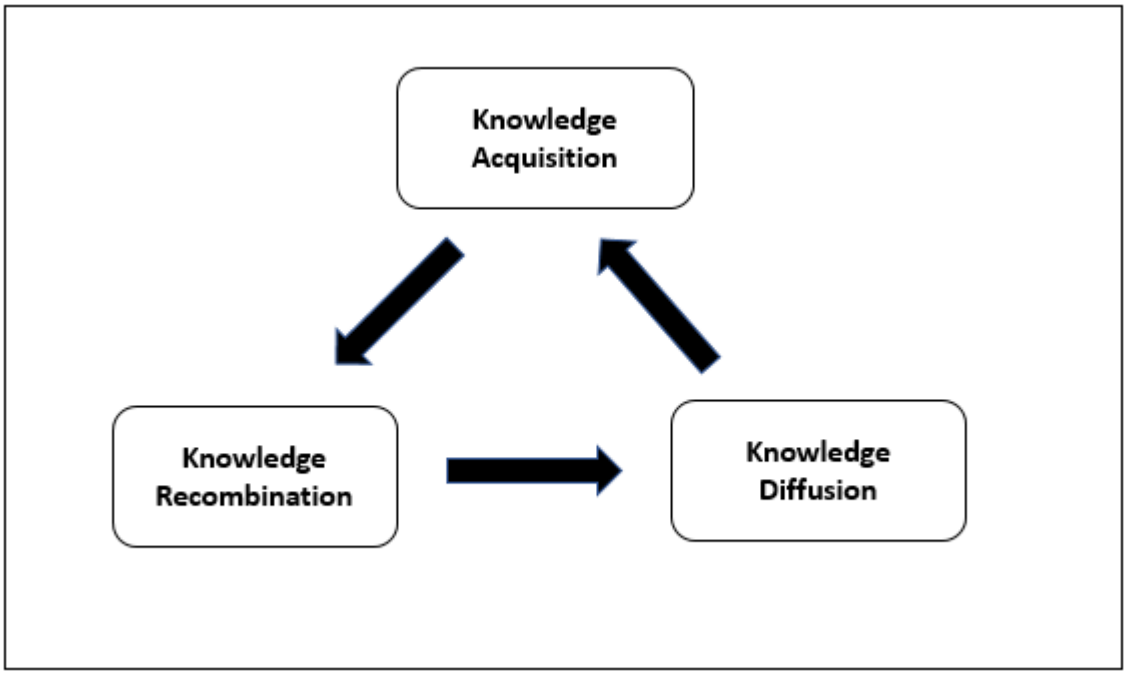

Figure 1: Knowledge Processes (adapted from Muller & Zenker, 2001)

2.2.1. Knowledge Acquisition

Knowledge acquisition refers to the process of acquiring external knowledge from clients and other sources. This process of knowledge acquisition occurs when providers acquire new knowledge from external sources to solve problems for clients. A key external source is the client that helps to acquire new knowledge. Learning from clients is important in an outsourcing strategy for KIBS providers mainly because clients serve as the most reliable source when it comes to providing information regarding their problems (Levina & Su, 2008). This transfer of knowledge is more effective, if there exists a common reference frame to interpret and integrate knowledge (Blumenberg, Wagner, & Beimborn, 2009). For example, having specific templates of how knowledge should be gathered increases the effectiveness of acquiring knowledge.

Another source of knowledge acquisition is knowledge acquired through experience. This knowledge is created within the organization through the knowledge gained from previous projects. Knowledge creation is the development of new knowledge or replacement of existing knowledge (Nonaka, 1994). Since this knowledge is created within the organization, it is therefore difficult to copy or imitate (Kase & Zupan, 2007).

2.2.2. Knowledge Recombination

Knowledge recombination refers to the process where recently acquired knowledge is integrated with expert knowledge existing within the service provider organization. The interaction of different units enables organizations to not only become more specialized in their existing domain, but also diversify their knowledge horizons and help them better integrate knowledge (Strambach, 2008). Diversity of knowledge helps organizations to improve their absorptive capacity, which leads to innovation within the organization. This innovation in turn can aid these organizations to integrate knowledge ahead of competition and gain competitive advantage (Castaldi, Faber, & Kishna, 2010; Cohen & Levinthal, 1990). Examples of knowledge recombination can include exchange of tacit knowledge from individuals to their peers. The recombined knowledge can be used to create customized solutions for clients. This process contributes to further transfer of knowledge within the organization and creates more value through face-to-face interaction (Chua & Pan, 2008).

2.2.3. Knowledge Diffusion

The process of knowledge diffusion signifies applying knowledge in the form of a new or more developed solution (Muller & Zenker, 2001). This process includes some transfer of knowledge from the provider to the client but primarily includes the application of knowledge to create solutions to clients' problems. The effective transfer of tacit knowledge is important

to create better solutions but involves more complications, and requires individuals to have a good understanding of the knowledge themselves to share it with others. Tacit knowledge transfer improves with the presence of better understanding and interpersonal relationships between provider and client (Blumenberg et al., 2009).

Thus, these knowledge processes represent a framework to acquire and recombine knowledge to create and diffuse solutions to their clients. The ability to effectively solve problems and offer solutions that are unique and add more value than those provided by competitors can serve to confer competitive advantage to KIBS providers.

2.3. Resource-based view (RBV) and Competitive Advantage

There are three important views that explain how competitive advantage can be achieved by firms. These views are the market-based view, the relational view, and the resource-based view. The market-based view states that firms can create competitive advantage through their own competitive position and external market orientation (Porter, 1980). The relational view argues that strong interorganizational resources are essential for competitive advantage of firms (Dyer & Singh, 1998). The resource-based view understands firms from the perspective of their internal resources and argues that these resources confer competitive advantage to firms (Wernerfelt, 1984; Penrose, 1959). Because of its focus on knowledge processes, which are internal resources of the firm, the resource-based view is taken to be the most appropriate for this study.

2.3.1. Knowledge Chain

The importance of managing knowledge-related activities has been considered by researchers and practitioners as a critical source of competitive advantage (Holsapple &

Singh, 2001). The knowledge chain introduced by Holsapple & Singh (2001) identifies and characterizes knowledge management activities. More specifically, it enables organizations to identify knowledge-based activities as primary activities that add value to the company and secondary activities necessary to sustain the former (Holsapple & Singh, 2001). The knowledge chain assumes that these activities are critical for organizations to improve their competitive position (Scarso & Bolisani, 2010). Therefore, in the context of this study, the primary activities are the three knowledge processes of knowledge acquisition, knowledge recombination, and knowledge diffusion classified as core knowledge processes. The knowledge chain classifies the secondary activities as supporting knowledge processes to these core processes like documentation. While the knowledge chain is useful to understand how companies add value through these processes it does not account for competitive advantage. Therefore, the study uses the resource-based view to explain the competitive advantage of KIBS providers.

2.3.2. Resource-Based View

The resource-based view attempts to understand firms from the perspective of resources (i.e. the inputs) and not the output (Wernerfelt, 1984). The resource-based view assumes that strategic resources are heterogeneously distributed across firms (Barney, 1991). These resources can be defined as tangible (e.g.- network infrastructure) or intangible assets (e.g.- IP regimes) associated with the firm that can be used in its processes for creating, producing, and/or offering its services to clients (Wade & Hulland, 2004, p. 109). Such assets can serve as both inputs to a process or as outputs as the result of a process (Wade & Hulland, 2004, p. 109). They may take the form of people, technology, financial, or strategic methods of that organization that helps to create capabilities (Barney, 1991; Barney, 1995). On the other hand,

capabilities can be defined as actions following repeated patterns in using assets to create, produce, and offer services. These capabilities may include both skills like technical or managerial ability and processes like development or integration of systems (Wade & Hulland, 2004). Capabilities differ from assets because they can transform inputs into outputs of greater value (Wade & Hulland, 2004).

2.3.3. Understanding Competitive Advantage

Competitive advantage is the state that puts an organization in a favourable situation in terms of brand value and profits earned among other important measures. It emerges from the way in which an organization acquires resources and implements strategies to optimize them (Barney, 1991; Grant, 1991). Competitive advantage can also be understood as the result of the implementation of a strategy that creates value for the company and is difficult for its competitors to copy (Barney, 1995).

Organizations need to adapt themselves to continuous change by developing resources that are valuable, rare, inimitable, and possess the ability to adapt to the dynamic environment and sustain competitive advantage (Barney, 1995).The integration of resources into productive routines constitutes the processes of the organization (Penrose, 1959). The focus of this study is knowledge processes since they are core to KIBS providers. Therefore, competitive advantage comes from the ability of an organization to exploit resources to make them valuable, rare, and inimitable (VRIO) (Barney, 1995; Penrose, 1959). This understanding is known as the VRIO framework. Since resources form the knowledge processes and these processes can be viewed as capabilities, the knowledge processes can be examined using the VRIO framework.

The first attribute of value (V) refers to the ability of utilizing resources to exploit opportunities or neutralize threats. An example of value addition by a resource would be a company's skill to create a new technology. The second attribute refers to rareness (R) of a resource, which states that a valuable resource must not be available to others in the market. An example of a rare resource may be access to information that is not available to others. The next attribute refers to the inimitability (I) of a resource; not only should a resource be valuable and rare, but it should also be difficult to imitate by competitors. For example, formalizing of a resource can make it inimitable. Finally, the last attribute necessary to confer competitive advantage to a firm is its ability to exploit these resources effectively (O). An example of this attribute is the presence of formal reporting structures in organizations that leverage the value of the resources and enable the organization to realize its full potential for competitive advantage. Therefore, the VRIO attributes confer competitive advantage by building on one another. Figure 2 below depicts the four attributes necessary to confer competitive advantage to a firm.

Figure 2: VRIO attributes for competitive advantage (adapted from Barney, 1995)

Among the four VRIO attributes, the most important one identified in the resource-based view (RBV) literature is inimitability (Newbert, 2007). This attribute has been operationalized in several ways of which causal ambiguity and social complexity require discussion owing to their importance (Newbert, 2007). First, causal ambiguity is a phenomenon that makes it difficult for competitors to easily copy the processes of a firm enjoying competitive advantage (Mata, Fuerst, & Barney, 1995; Reed & DeFillippi, 1990).

Such an ambiguity results when the link between resources and competitive advantage is not well understood (Barney, 1991). Causal ambiguity can prevent other firms from imitating the resources or capabilities if both are equally unaware of the ambiguity. Next, social complexity is the result of resources that are very complex social phenomena, which is beyond the ability of other firms to manage (Barney, 1991). These may include relationships between providers and clients or a firm's culture.

2.3.4. Absorptive Capacity

The role of absorptive capacity is to understand how knowledge processes may confer competitive advantage to KIBS providers. Absorptive capacity of an organization is the ability to acquire, assimilate, transform, and exploit new knowledge (Cohen & Levinthal, 1990). Absorptive capacity is also considered as the ability of an organization to use external knowledge in order to generate competitive advantage (Zahra & George, 2002). Research in absorptive capacity reveals that merely possessing prior knowledge resources do not provide an organization with competitive advantage. Organizations need to possess the ability to combine these resources effectively to create processes that lead to competitive advantage (Jansen et al., 2005). Thus, the literature on absorptive capacity highlights the importance of knowledge processes and presents the importance of effective knowledge process implementation to confer competitive advantage.

The basic processes that constitute absorptive capacity can be classified into monitoring and evaluating new knowledge, assimilating this new knowledge with existing knowledge, and finally applying the assimilated knowledge to meet customer needs (see figure 3) (Grandinetti, 2016). Absorptive capacity is embedded in these routine processes of the organization (Zahra & George, 2002) and is achieved through their formalization. Hence, it is

through this formalization of the knowledge processes into routine processes to acquire, recombine, and diffuse knowledge that KIBS providers can gain competitive advantage.

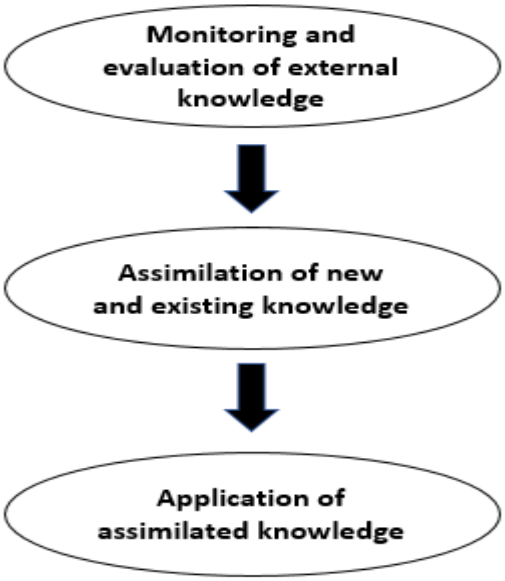

Figure 3: Basic processes of absorptive capacity that formalize knowledge processes (adapted from Grandinetti, 2016)

2.4. Conceptual Framework

The review of literature on KIBS, knowledge processes, absorptive capacity, and competitive advantage allowed the development of a conceptual framework guiding the remainder of this study. The framework illustrated in Figure 4 shows that the knowledge processes comprising of acquisition, recombination, and diffusion influence the competitive advantage of KIBS providers. The framework first captures the three core knowledge processes and the supporting knowledge processes to present that they are related to competitive advantage by examining resources into those that are core to knowledge processes or complement them. It also captures the absorptive capacity construct not explicitly mentioned in this framework that helps to routinize the knowledge processes.

Finally, competitive advantage depicted in the framework is based on the resource-based view and Barney's VRIO framework.

Hence, the framework suggests that knowledge processes and supporting knowledge processes when exploited effectively are valuable, rare, and inimitable and confer competitive advantage to KIBS providers. It is important to note that this is a high-level framework aimed at guiding data collection and analysis. It is important to note that the framework does not stand as a testable theory, but can guide the exploration of the relationship between knowledge processes and KIBS providers' competitive advantage.

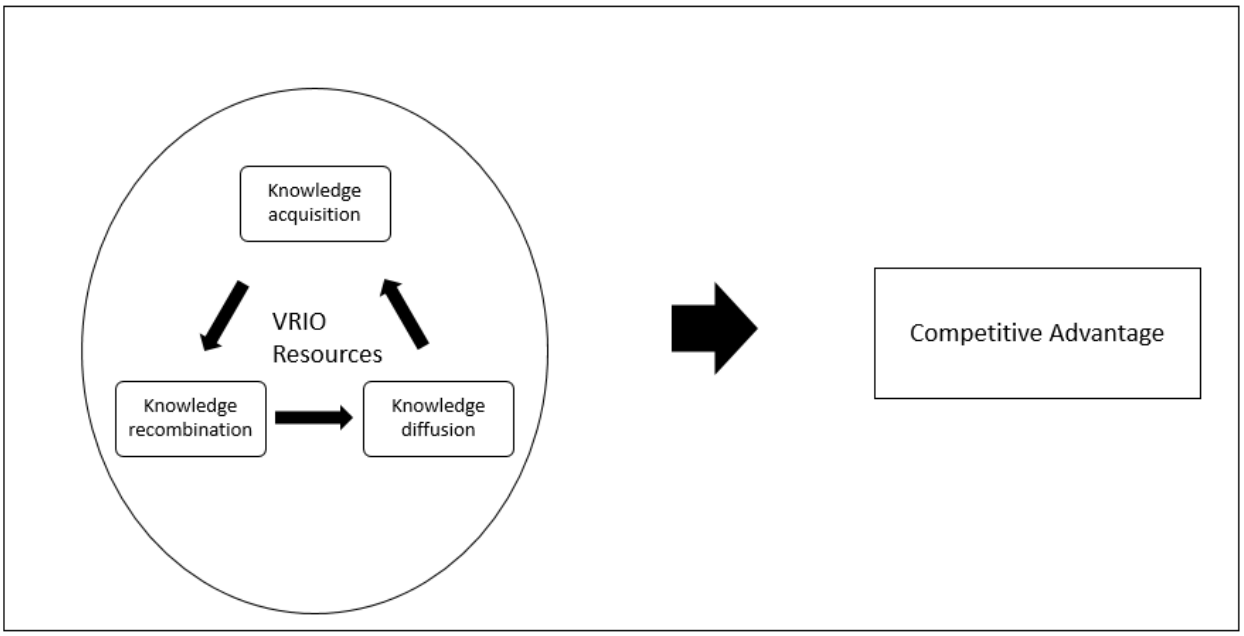

Figure 4: Initial Framework developed from literature review

2.5. Chapter Summary

This chapter reviews the key concepts related to this study, specifically knowledge intensive business services (KIBS), knowledge processes, and competitive advantage. The concepts lead to the development of a conceptual framework relating these concepts in a manner that provides an initial explanation about how KIBS providers may create competitive

advantage for themselves through their knowledge processes. This conceptual framework is useful as it provides a focused approach to answer the research questions of this study. The next chapter explains the methodology followed to answer the research questions of this study.

3. Methodology

3.1. Research design

This study adopts a multiple case study using qualitative data (Yin, 1981a). Since a case study is useful in refining theory, it is an ideal research design to adopt for this study. The exploratory nature of the conceptual framework helped to answer the research questions better by guiding the data collection and analysis (Yin, 1981b). Multiple cases enable researchers to extend an initial framework better than a single case by examining different perspectives and therefore support theoretical replication by covering different conditions (Yin, 2011).

KIBS providers belong to different industries and are divided into two main categories; P-KIBS and T-KIBS (Miles et al. 1995). The first category of P-KIBS includes companies in traditional professional services like marketing/ advertising, legal services, and accounting and bookkeeping. The other category of T-KIBS includes new technology based services such as information technology, management consulting, and technical engineering. Therefore, these two types of KIBS providers vary since one offers traditional professional services while the other provides solutions based on new technology (Miles et al., 1995). To limit the variability among cases, this study focuses on IT service providers, a specific type of T-KIBS.

Each company selected for this study present a holistic case (Yin, 2011). Multiple participants recruited from these companies helps to collect rich and varied data, which is

useful for a better understanding of each case. This is true since different participants may give importance to certain parts of the framework and ignore others. Therefore, recruiting multiple participants from different teams can help minimize this risk. A letter of approval was obtained from the review and ethics board (REB) of University of Ottawa before undertaking the case study (see Appendix 1 for ethics approval letter). The research design followed is presented in table 1.

Component	Strategy adopted
Cases	3 IT service provider organizations.
Unit of analysis	Knowledge processes as perceived by individual employees.
Participants	10 employees in mid-management and executive roles in the organizations.
Data Collection	Semi-structured interviews
Data analysis	Descriptive data matrices for within and cross-case analysis

Table 1: Research Design

The study is exploratory in nature in the sense that the initial framework developed from literature serves to guide data collection without restricting results to its concepts. The data collected revealed details regarding the framework that were unknown before conducting the study. While its nature is mainly that of an exploratory case study since the framework guiding this study serves as a guide rather than as a theory to be tested, it also draws from characteristics of explanatory case studies since it aims to establish how knowledge processes may influence competitive advantage in the context of KIBS providers (Yin, 2011).

3.2. Cases

Three cases of IT service providers were selected for this study. This selection of cases in the same industry reduces potential confounding effects of different industries. These

companies are all global companies with offices around the world and participants from the same companies worked at different locations.

3.3. Participants

The criterion used to select participants is based on recruiting participants from specific types of KIBS business model like IT service providers who are well experienced in their field and therefore have a better understanding of the overall process. Participants from different teams were recruited since they may be more informed about a given part of the framework based on their hierarchy and position. For example, a client representative may know more about knowledge acquisition, while an IT developer and a Project Manager may know more about knowledge recombination. Similarly, a Solution Architect may be better equipped to answer questions on knowledge diffusion and a Sales or Marketing representative will have more knowledge about strategies to gain competitive advantage. Four participants were recruited for two of the cases and two participants for one of the cases. Although the intended number of participants was not reached in the third case, the two participants recruited had sufficient experience having worked in different teams to provide valuable insights on multiple parts of the framework (see Table 3: Participant Information Matrix in the Results chapter).

3.4. Data collection

The primary method of data collection is through in-depth semi-structured interviews. The advantage of semi structured interviews is that they offer the ability to ask probing questions to the informants primarily to gather more insights for questions that interviewers feel have not been well addressed (Patton, 2002). An added advantage is that semi-structured

interviews follow an informal conversation approach that provides for deeper questions to be asked, enhance interviewer-interviewee personalization, and offer more flexibility for participants to open up and answer freely during interviews (Patton, 2002). This approach was useful since it provided a rich source of information and led to the emergence of an important theme that was not considered during the literature review.

An interview guide was prepared to keep the interviewer focused on the objectives of the study (see Appendix 2 for full interview guide). An interview guide is beneficial since the interviewer can manage time judiciously for each subject as necessary. This ensures comprehensive and systematic interviews of people which are rich in data (Patton, 2002). For example, if the interview goes off track, the interviewer can bring it back by following the interview guide. Interviews with participants lasted approximately an hour and were recorded on multiple audio recording devices with prior consent of the participants.

The questions in the interview guide were developed from the initial conceptual framework, in order to ensure that the data collected could answer all the research questions of this study and prevent collection of unnecessary data (Miles & Huberman, 1994). The questions were divided into five main parts: knowledge acquisition process; knowledge recombination process; knowledge diffusion process; competitive advantage; and, other factors of competitive advantage (see Appendix 2 for the full interview guide).

3.5. Data analysis

Data analysis was conducted using the software, Dedoose[1], an open source software useful for qualitative data analysis. A coding scheme developed deductively from the

[1] http://www.dedoose.com/

conceptual framework was first entered in Dedoose as a code tree (see table A3.1 and A3.2 in Appendix 3 for full coding scheme). However, data analysis later revealed an emerging theme that was added to the existing code tree. Inter-coder reliability for the deductive codes were calculated using the formula

Reliability (in %)= (number of agreements)/ (total number of applications (agreement+ disagreement)) * 100

Four different rounds of coding were undertaken as part of data analysis for this study. Such an approach was necessary since the conceptual framework developed brings together two different existing frameworks with conceptual overlaps. The first round of coding was useful to answer the first research question, while the second and third rounds helped to answer the second question and the fourth round aided answering the third question (see Table 2: Summary of data analysis). The data analysis processes including the different rounds of coding and the inter-coder reliability in relation to each research question are presented below.

3.5.1. First research question

The first research question was answered through the application of a coding scheme related to knowledge processes (i.e., knowledge acquisition, knowledge recombination, and knowledge diffusion) (see table A3.1 in appendix 3 for coding scheme for knowledge processes). Inter-coder reliability was measured by having two coders independently apply the coding scheme to the same transcript. This was followed by coding another transcript by one of the coders. A code application test was created for this transcript on Dedoose, which allows a different coder to take the test by applying codes present in the coding tree to

selected excerpts and ensure inter-coder reliability. The resulting 86% agreement was deemed sufficient to continue with the coding process on other interview transcripts. Data matrices were created to summarize the data on the influence of knowledge processes on competitive advantage (see tables 5,6 and 7 in the Results chapter) and the way in which knowledge processes were implemented in each case (see tables A4.1, A4.2, and A4.3 in Appendix 4). The use of a descriptive meta matrix helped to aggregate the data from each case for a display of data across cases (Miles & Huberman, 1994) (see table A5 in Appendix 5).

3.5.2. Second research question

The second research question was answered through the application of a coding scheme related to different types of resources (human, technical, financial, and organizational) (see table A3.2 in appendix 3 for coding scheme for resources). Another round of coding was followed by applying the scheme related to the VRIO attributes to check if evidence of any of the four attributes are present in the data. This coding scheme was developed from literature on the resource-based view (Barney, 1995). Inter-coder reliability was measured in the same manner as previously. The resulting 100% agreement for the first round was deemed sufficient to move forward with coding of the remainder of the transcripts. Another round of coding involved coding for VRIO attributes of resources, the definitions of each of these attributes are quite distinct from each other and a reliability test was deemed unnecessary. Data matrices were created to summarize data on the resources identified and evidence of the VRIO attributes available from these resources (see tables A6.1, A6.2, and A6.3 in Appendix 6). A new theme that emerged during data collection called delivery was presented for each case (see tables 10,11 and 12 in the Results chapter). Descriptive meta-matrices created by putting together the data on the resources from each case (see Table 8: Summary of KPs,

resources, and VRIO attributes across cases) and the data on delivery across cases (see table A7 in appendix 7).

A new theme that emerged while analyzing the collected data was delivery as a lot of the collected data could not be coded with the existing coding scheme. Delivery was analyzed using the VRIO framework because of its importance to organizations from the emphasis placed on it by participants.

3.5.3. Third research question

The third research question was answered through the application of the coding scheme using the code concerning other factors of competitive advantage. Inter-coder agreement was not checked for this round of coding, since it involved simply searching for keywords within sections of data and labelled with the code "other factors". The data for this question was summarized using data matrices, which makes it simple to capture other factors of competitive advantage mentioned by participants (see tables 13,14 and 15 in Results chapter). A descriptive meta-matrix was created by combining the data gathered from each case for a cross case display of data.

3.6. Validation

Validation is critical to judge the quality of a qualitative study (M. B. Miles, Huberman, & Saldana, 2014). This is important since researchers want to make sure that their results are correct and do not publish an inaccurate account (Creswell, 2013). The quality of a study can be judged through four different criteria: confirmability, reliability, credibility and transferability (Miles & Huberman, 1994). The remaining part of this section explains how each criterion was addressed for the study.

3.6.1. Confirmability

Confirmability refers to the identification of the explicit biases that exist for the phenomenon being studied to ensure that the conclusions are based on the subjects and the settings rather than the researcher's perspective (Miles & Huberman, 1994). Several steps have been taken to address confirmability. First, detailed descriptions of the data collection and analysis techniques have been provided, so that they can be replicated to verify conclusions. Second, evidence supporting the results have been provided in the form of quotes from participant interviews. Finally, the data presented in matrices and meta-matrices allow others to reanalyze the data.

3.6.2. Credibility

Credibility refers to identifying if the study makes sense by verifying if the results of the study are credible to the people being studied as well as the readers (Miles & Huberman, 1994). Credibility for this study was addressed by including rich descriptions of the cases in the results chapter. Another approach to strengthen the credibility of the study is to consider rival explanations (Miles & Huberman, 1994). The third research question, on the relative importance of other factors of competitive advantage is used to examine rival explanations. The credibility of the study is further strengthened by linking the findings to prior theory in the discussion chapter (Miles & Huberman, 1994).

3.6.3. Transferability

Transferability of the study refers to identifying the extent to which the conclusions of the study can be generalized to other contexts (Miles & Huberman, 1994). The potential transferability of the findings for this study are increased by focusing on IT service providers

since that limits variability in the context of the cases. Next, rich descriptions of the findings in the results chapter enable readers to assess the potential transferability to their own settings. The transferability of this study was moreover increased by explaining the possible threats to generalizability in the limitations section. Finally, the different types of IT service providers selected for this study encourages theoretical replication of the findings such as the importance of dynamic capabilities in conferring competitive advantage (Yin, 2011).

3.6.4. Reliability

The reliability of the study refers to consistency in the process of the study so that it remains stable over time and across researchers (Miles & Huberman, 1994) ensuring the ability of obtaining similar results by repeating the same approach. The reliability for this study was improved by providing explanations in the report for the research questions to remove confusion. Another approach was using inter-coder reliability for the deductive codes (Miles & Huberman, 1994). The inter-coder agreement was measured using the following formula:

Reliability (%)= (number of agreements)/ (total number of applications (agreement+ disagreement)) * 100

Two coders (researcher and supervisor) coded a section representing about ten percent of the data collected. The Cohen's Kappa value achieved for the two reliability tests were 86% (for knowledge processes) and 100% (for resources) which represents a strong correlation. After inter-coder agreement was reached, it was decided to proceed with the coding of the remaining data. However, inter-coder reliability could not be calculated for the

category delivery, identified through inductive coding. Hence, this category was reviewed by supervisors and agreed upon before being used to improve reliability.

	Coding	Analysis	Validity
Research Question 1	Knowledge processes coding scheme	• Data matrices created for each case for within case display by summarizing the data when participants mention relationship between knowledge processes and competitive advantage. • Application of knowledge processes coding scheme to identify different knowledge process activities. • Data matrices created to summarize data for each case for within case display by summarizing the knowledge processes. • Descriptive meta matrices created to collate data from each case for across case display of data.	Reliability- Inter-coder agreement on knowledge processes: 86% Confirmability- Creating matrices and meta matrices.
Research Question 2	Resources coding scheme+ VRIO coding scheme	• Application of resources coding scheme to identify different types of resources. • Application of VRIO coding scheme on resources to check for evidence of VRIO attributes. • Organizational resources classified into categories that are core to knowledge processes and those that support knowledge processes. • Data matrices created to summarize data for each case for within case analysis of resources. • Descriptive meta matrices created to aggregate data from each case for cross case analysis. • Application of VRIO coding scheme on delivery to check for evidence of VRIO attributes. • Descriptive meta matrix created to collate data from each case for across case display of data on delivery.	Reliability- Inter-coder agreement on resources- 100% VRIO- Not applied. Confirmability- Creating matrices and meta matrices
Research Question 3	Other factors coding scheme	• Application of other factors coding scheme. • Data matrices created to summarize data for within and cross case display of other factors mentioned by participants. • Descriptive meta matrix created to collate data from each case for across case display of data on other factors.	Reliability- Inter-coder agreement on other factors: Not applied. Confirmability- Creating matrices and meta matrices. Credibility- Rival explanations

Table 2: Summary of data analysis

4. Results

This chapter presents the findings of the study that was conducted following the methodology presented in the previous chapter. The research questions are stated below to serve as a reminder for readers.

1. Do knowledge processes influence the competitive advantage of KIBS providers?

2. In which way do the knowledge processes influence the competitive advantage of KIBS providers?
3. How important are knowledge processes relative to other factors in creating competitive advantage?

The remainder of the chapter is structured as follows. First, a summary of each case investigated in this study is summarized. The findings for the first research question are then presented, starting with within case findings and followed by cross case findings. Findings answering the second and third research questions follow in turn, with the same within-case and cross-case structure. The chapter concludes with a summary of the findings that serve to answer the research questions of the study.

4.1. Description of Participating Organizations

This section provides a summary of the three cases investigated in this study. The study focuses on IT service providers as one type of KIBS providers to limit variation among context. The first case presents a company that focuses on providing services to telecom operators. The second case focuses on a company that targets all types of clients, e.g., healthcare, banking etc., and is not restricted to a specific domain. The third case is of an IT service provider company that takes over an entire process and handles the same for clients, for example, payroll services. Despite the differences between the cases, interviewees provide valuable insights on the knowledge processes and their relationship towards achieving competitive advantage. Multiple participants were interviewed from each company working in different roles (see Table 3: Participant Information Matrix). The participants possess required experience and knowledge working in different roles and for several years in the IT industry to answer questions pertaining to the complete framework. KIBS provider

organizations used as cases for this study enjoy a competitive advantage in their respective markets, at least from the subjective perspective of their employees. The Solution Architect from TeleCo said "TeleCo is well entrenched in telecom infrastructure systems", which demonstrates the competitive advantage of TeleCo in their domain. Public data were however not available to confirm this perception however.

Knowledge process	TeleCo (4 participants)	GenCo (4 participants)	BpoCo (2 participants)
Knowledge Acquisition	Practice Area Lead (Consulting)	Senior Manager (Client Location)	Consultant
Knowledge Recombination	Project Manager	Business Analyst (Manager)	QA Lead
Knowledge Diffusion	Solution Architect (Manager)	Solution Architect (Manager)	QA Lead
Competitive Advantage	Lead consultant (Sales)	Senior Manager (Sales)	Consultant
Note: The same participant (Consultant)was interviewed for Knowledge acquisition and competitive advantage while the same participant (QA Lead) was interviewed for knowledge recombination and knowledge diffusion.			

Table 3: Participant Information Matrix

4.1.1. Case 1: TeleCo

The organization selected for the first case is an IT service provider organization that primarily deals with providing services to telecom companies, hereinafter referred to as TeleCo for the ease of identification. TeleCo is a large sized publicly listed company operating in over 150 countries across the world (see Table 4: Information on participating companies).

Four participants specializing in different areas were recruited for the case (see Table 3: Participant Information Matrix). The first participant recruited for this case is a Practice Area Lead. The participant's role in the organization is to acquire knowledge from clients to create customized solutions for the latter. The person is responsible for planning and analysing the

client's problems and coming up with probable solutions. Therefore, this participant specializes in the knowledge acquisition process.

The second participant is a Solution Architect. The participant's role in the organization is to prepare the solution designs to meet client needs. This participant can provide additional insights on the knowledge diffusion process in TeleCo than the other participants.

The third participant is a Lead Consultant. The participant's role in the organization is to work closely with the sales and marketing team to identify the best way to market their solutions and help to create competitive advantage. This enables them to reach out to customers and explain the solution in a manner that is easy for clients to comprehend. Hence, this participant is suited to elaborate on the competitive advantage aspect of the framework.

The fourth participant is a Project Manager. The participant's role in the organization is to manage the integration of the new knowledge acquired from clients with the existing IT expertise and create solutions. Thus, this participant helps to provide valuable inputs on the knowledge recombination process of TeleCo.

4.1.2. Case 2: GenCo

The organization recruited for the second case is an IT service provider. It works with clients from various domains like Healthcare, Banking, telecom etc., and is striving to become an expert in every domain. This company will be henceforth called GenCo for the ease of identification. GenCo like TeleCo is also a large sized publicly listed IT service provider and operating in more than 120 countries (see Table 4: Information on participating companies).

Four participants, specializing in different areas, were recruited for the case (see Table 3: Participant Information Matrix). The first participant recruited for this case is a Project

Manager. The participant's role in the organization is to acquire new knowledge from clients with the main objective to provide customized solutions. As such, this participant helps to better answer questions related to knowledge recombination.

The second participant is a Senior Manager. The participant's role is to improve business by marketing their solutions and building strong relationship and bonding with clients. Therefore, this participant helps to provide valuable insights on the part of the framework focused on competitive advantage.

The next participant is a Solution Architect. The participant's role in the organization is to prepare the solution design that can be most effectively implemented to meet client needs. Hence, this participant helps to provide better perception on GenCo's knowledge diffusion process.

The fourth participant is a Business Analyst Manager. The participant's role in the organization is to transfer the functional knowledge gained from clients into a form that is easily understood by the technical team. Therefore, this participant has a strong understanding of knowledge recombination.

4.1.3. Case 3: BpoCo

The organization selected for the third case is different from traditional IT service providers. This company will henceforth be known as BpoCo for the ease of identification. BpoCo offers solutions to clients by assuming responsibility of a specific business process. For example, they can handle the payroll function for their clients. BpoCo is a medium sized organization operating in more than 50 countries around the globe (see Table 4: Information on participating companies).

Two participants in different roles were selected from the organization. Since the two participants possess sufficient related experience, it was sufficient to recruit only two participants to gather the necessary information to explain the initial framework (see Table 3: Participant Information Matrix). The first participant recruited for this case is an Implementation Consultant. The participant's role in the organization is to understand the problems and offer the best solution to clients. This person is also responsible for strengthening relationship with clients and help in ensuring improved business for the company. Therefore, this participant possesses the knowledge to answer questions on knowledge acquisition and competitive advantage parts of the framework.

The second participant is a QA Lead. The participant's role in the organization is to oversee that the solutions created are free of errors or defects. Therefore, the participant has knowledge regarding how the solution is created from integration of new and existing knowledge. BpoCo does not have separate teams to deploy solutions in client teams and therefore this person has expertise in knowledge recombination as well as knowledge diffusion.

Company	Type	Size	Location
TeleCo	Publicly listed	Large	around 150 countries
GenCo	Publicly listed	Large	around 120 countries
BpoCo	Private	Medium	around 50 countries

Table 4: Information on participating companies

4.2. Influence of Knowledge Processes on Competitive Advantage

The first research question is answered by identifying if the knowledge processes have a positive, negative, or a neutral influence on the competitive advantage of KIBS providers. The answer to this question considers participants' perceptions and is answered in two parts. The

first part shows that participants perceive the implementation of knowledge processes to influence competitive advantage. The second part explores the ways in which each organization acquires, recombines and diffuses knowledge. This allows for understanding of the ways in which these generic knowledge processes are implemented in each case and provides support to participants' perceptions.

4.2.1. Knowledge Processes and Competitive Advantage

The data for this research question come from a direct question present in the interview guide aimed to understand if the solutions provide competitive advantage to KIBS providers, since the solutions are the direct result of the knowledge processes. The collected data from each case is summarized and the section concludes by explaining the influence of knowledge processes on competitive advantage across cases. In general, participants from all three companies believe that knowledge processes provide competitive advantage by acquiring knowledge, offering solutions that build reputation, understanding client problems, and learning from current projects.

Participants interviewed for TeleCo believe that the solutions offered to the clients created by implementing knowledge processes enable them to gain new knowledge in the respective domain to provide solutions in the future and thereby increase their competitive advantage (see Table 5: TeleCo data on influence of KPs on CA). Participants also perceive that solutions that are better than their competitors increase their company's reputation providing it with competitive advantage. The Solution Architect directly stated, "You obviously get a competitive advantage from knowledge processes". In summary, it appears that TeleCo employees perceive knowledge processes to have a positive influence on competitive advantage

Company	Participant	Quote
TeleCo	Practice Area Lead	If the client is very happy with the kind of deliverable that we have produced so definitely this is a positive thing and in future, you can give these references as well as there is a chance of repeated business, this is the basics of any management
	Solution Architect	TeleCo is well entrenched in telecom infrastructure systems
	Solution Architect	You obviously get a competitive advantage from knowledge processes
	Lead Consultant (Sales)	Oh, yes it does! I mean the more and the better we deliver there is something called customer goodwill and nowadays goodwill is recorded in our balance sheet. So, goodwill gives a lot of benefit to any service provider and then the reputation increases, so yes there is a definite advantage in delivering solutions better or at least better than our competitors
	Project Manager	Quite obviously, because you generate collaterals for a particular solution that you have implemented in the market

Table 5: TeleCo data on influence of KPs on CA

In the GenCo case, participants believe that they have proved their ability through the delivery of successful solutions by implementing knowledge processes which gives them a competitive position (see Table 6: GenCo data on influence of KPs on CA). One of the participants believe that they are leaders in understanding clients' problems and that this strength provides them with advantage over competitors. As per another participant, developing solutions is very important for competitive advantage. Finally, according to one participant, GenCo gains competitive advantage from knowledge processes, however the effect is not immediate and takes time to show improvements. Therefore, the participants perceive a slow indirect effect of knowledge processes on GenCo's competitive advantage since the effect is not immediate and competitive advantage is a result of delivery through knowledge processes.

Company	Participant	Quote
GenCo	Manager (Client location)	Spending time, energy and money on people asset and training them is very important and IT Service Provider 2 does that very well and it definitely gives you a competitive advantage
	Manager (Client location)	The prices are very good, the quality is good and the brand value is good so nothing stops IT Service Provider 2
	Senior Manager (Sales)	Since we are a big global delivery network with our presence in almost every country, it becomes easier to network
	Senior Manager (Sales)	From a business standpoint. I think we are leaders in understanding business so that helps
	Solution Architect	Yes, it will be an advantage. The effect on competitive advantage is not very immediate though.
	Solution Architect	So, developing solutions is very important for providers for competitive advantage
	Business Analyst	The client knows our position and that we are really good at our work...that increases our competitive advantage.

Table 6: GenCo data on influence of KPs on CA

In the third case, BpoCo participants said that all projects are considered as consulting projects and not simple development projects (see Table 7: BpoCo data on influence of KPs on CA). This helps to think about the future and learn from existing projects and apply it later and creates an advantage over competitors by making it easier to prepare solutions in the future. BpoCo employees also provide their customers with solutions that continuously exceed expectation and which they believe adds value and makes them more competitive. Hence, it can be concluded that from a participant perspective knowledge processes appear to directly affect the competitive advantage of BpoCo.

Company	Participant	Quote
BpoCo	Consultant	Now, the customer is a big advocate for us, so he can vouch about our capabilities with many other clients in the pharma industry, so that in turn became a competitive differentiator for us. It is how we add value to the clients and then how we go above and beyond their expectations. They contracted for X but we try to do X++ and they do not expect that from a traditional software technology service provider. I see that this lacks with many many competitors and why they are not able to do it is because of the lack of knowledge and it is because of the lack of that experience, that if you do this the customer is going to treat you as a trusted advisor
	QA Lead	This company is now the second largest company in North America so there is competitive advantage

Table 7: BpoCo data on influence of KPs on CA

Synthesizing data across cases, it can thus be stated that knowledge processes have a positive influence on the competitive advantage of service providers, at least from their own subjective perception (see table A5 in appendix 5 for summary of data across cases for influence of KPs on CA). This influence is at times perceived to be direct and at times indirect or gradual in time.

4.2.2. Implementation of Knowledge Processes

The specific methods used to implement knowledge processes may confer competitive advantage since each organization would use different approaches for gathering knowledge from clients and assimilating and recombining the same. The process of knowledge acquisition has been divided into two different categories based on the source. The first is acquiring from external sources, while the second pertains to acquiring knowledge from experience. This is important since the findings indicate that the knowledge acquired from experience is critical to confer competitive advantage to KIBS providers.

Knowledge acquisition at TeleCo occurs through the collection of background information on their clients and on their competition (see table A4.1 in appendix 4 for summary of knowledge acquisition from external sources). This knowledge is acquired by

sending questionnaire to clients and the use of follow-up questions to gather further information to understand the problem from different angles (infrastructure, technology etc.,). This process is formalized within the organization. For example, the Practice Area Lead working closely with clients says that they follow a specific format that is suggested in audit trails.

Beyond acquiring external knowledge, TeleCo has instituted measures to ensure that knowledge gained through each project is assimilated and integrated within the organization. This is achieved by creating proper documentation (see table A4.1 in appendix 4 for summary of knowledge acquisition from experience). Portals and repositories are used to store these documents and artefacts from previous projects so that those can be reused. The Solution Architect says that TeleCo uses portals in the following way, “There is a component reuse portal within TeleCo where components created in past projects are harvested and kept so that they can be reused”. This is an example of the methods used to store and share assets within TeleCo.

Knowledge recombination at TeleCo is done by sharing knowledge between different teams within the company and preparing several documents like design documents and requirement documents (see table A4.1 in appendix 4 for summary of knowledge recombination). Business analysts play an important role in recombining knowledge as they can translate the functional aspects in a form that is understandable by other teams. TeleCo employees use several tools to support this process of knowledge recombination.

Knowledge diffusion at TeleCo follows an agreed upon template to simplify the process of creating and sharing solutions with clients which facilitates knowledge diffusion (see table A4.1 in appendix 4 for summary of knowledge diffusion). Once a solution has been

created for a client, a team comprising of solution architects and a Project Manager from TeleCo meet the client team to share the solution using a defined release management technique to maintain acceptable quality of solutions. The final deployment is done at client site after all issues are fixed.

Knowledge acquisition at GenCo from external sources, is primarily achieved with the use of background research on clients (see table A4.2 in appendix 4 for summary of knowledge acquisition). To aid the process of acquiring new knowledge, GenCo recruits people from within the team who have discovery sessions with clients at the client's location. GenCo employees also use brainstorming sessions to scope the requirements and obtain a clear understanding of the problem.

To acquire knowledge from experience, employees at GenCo remove client sensitive information from client documents and store documents in repositories (see table A4.2 in appendix 4 for summary of knowledge acquisition from experience). The process of knowledge acquisition from experience is strengthened, since employees create special documents containing information about existing applications and a checklist to track all the available documents. The method used to recreate the process followed in previous projects to offer solutions to clients is maintained using checklists.

Knowledge recombination at GenCo takes place through knowledge transfer sessions (see table A4.2 in appendix 4 for summary of knowledge recombination). The Manager in a client facing role says subject matter experts (SMEs) transfer knowledge in the following way "Once a set of SMEs from GenCo get that knowledge, they would further dissipate that knowledge to other members in the team and there could be multiple ways of transferring this knowledge". This is an example of how knowledge is integrated within GenCo. Each team is

responsible for creating documents, for example requirement documents are created by Business Analysts and design documents are created by the Design team. To aid the process of recombination, a Project Manager is assigned the task to explain to the different teams how to proceed and a Business Analyst to integrate functional and technical knowledge. The documents and artefacts created during this process are stored in repositories

Knowledge diffusion in GenCo is through presentations to explain the solutions to clients (see table A4.2 in appendix 4 for summary of knowledge diffusion). To diffuse the solution, a team would seek approvals from all stakeholders to first test the solution and make it available to clients for use. This method of verifying the solution before applying it ensures quality of the product. Several methods seem to be used by employees at GenCo to aid the diffusion of knowledge and these include the use of automation tools, different levels of testing and documentation of the process. The GenCo management also keep clients aware of progress being made in meeting deadlines and that helps to achieve customer satisfaction.

Knowledge acquisition at BpoCo from external sources is realized by hiring the best talent in the domain to acquire new knowledge for their organization (see table A4.3 in appendix 4 for summary of knowledge acquisition from external sources). The Implementation Consultant says that the company acquires knowledge about competition in the following way, “we get competitive intelligence from our competitive intelligence department. So, they tell us maybe a certain company is doing so and so and we need to use the same principle”. This is an example of how external knowledge is acquired by BpoCo. To aid discovery sessions, employees use an interactive software to gather information from clients. A method that is used to ensure effectiveness and agreement between client and their internal teams is to bring in a product team to review client requests.

Another method of acquiring knowledge is a result of learning from prior experience, for which BpoCo employees use commentaries from customers on how satisfied they are with the solutions (see table A4.3 in appendix 4 for summary of knowledge acquisition from experience). In addition, employees use feedback and surveys to learn from present solutions to improve in the future. To aid the acquisition of knowledge, BpoCo employees create documents and videos to store information from present projects in portals. These documents are updated regularly after completion of each project by Expert Learning Consultants who are part of a designated team assigned for the very purpose.

Knowledge recombination in BpoCo takes place through a problem diagnosis phase to formulate probable solutions (see table A4.3 in appendix 4 for summary of knowledge recombination). The recombination process is aided through increased interaction among teams on the project. The method used to ensure that this process maintains acceptable quality is relying on the use of a knowledge sharing tool used by the team. A prototype of the solution is created and tested during this knowledge recombination process that provides a tangible vision of the final solution.

Knowledge diffusion in BpoCo is achieved by showing a demo version of the solution to clients to make sure they agree with the solution that BpoCo intends to provide. A team of BpoCo employees also present client specific scenarios in which the solution can be used which show the value that the solution brings to clients. Once the solution is created, it is shared with clients through notifications. The methods used by BpoCo employees to create good quality solutions and effectively share them with clients include formal meetings, online meeting tools, and automation tools (see table A4.3 in appendix 4 for summary of knowledge diffusion).

A cross case comparison of Knowledge Processes

The findings show that organizations may have different approaches to acquire knowledge. For example, TeleCo employees use a questionnaire to acquire data from clients. GenCo management sends employees to client locations to gather knowledge and BpoCo as an organization hires the best talent in the domain which acts as a method of acquiring knowledge for their organization.

However, all three companies seem to follow similar methods to recombine knowledge which involves having a business analyst or a designated person who acts as a link between provider and client for the recombination of knowledge. This person is called business analyst in TeleCo and GenCo.

The methods adopted to diffuse knowledge to clients vary between organizations, since TeleCo employees go to the client location and deploys the solution on client location, whereas GenCo employees create presentations to diffuse the knowledge to the client and BpoCo organizes a meeting to diffuse the solution created.

The findings therefore, indicate that there are variations in the way knowledge acquisition and knowledge diffusion processes are implemented while there appear to be similarities in the way knowledge recombination is implemented across cases. This suggests that knowledge processes are not completely generic and the resource-based theory states that competitive advantage comes from resources that possess four key attributes, viz., Value, Rareness, Inimitability and Organizational ability to exploit resources (VRIO) (Barney, 1995). Therefore, knowledge processes that are not generic could be the reason for competitive

advantage of KIBS providers from a resource-based view since these processes are which are formed by using resources.

4.3. Influence of KPs on CA using VRIO framework

The answer to this research question intends to find if knowledge processes influence the competitive advantage of KIBS providers from a theoretical perspective. To understand this influence the knowledge processes are examined using the resource-based view specifically the VRIO framework (Barney, 1995). This analysis is dependent on understanding the link between knowledge processes and the resources of a firm. The resources identified from collected data have been classified based on literature into four categories that include human, technical, financial, and organizational. The organizational resources were further classified into three categories: resources core to knowledge processes, resources that support specific knowledge processes and, those that support all knowledge processes. All these resources were then analyzed using the VRIO framework to see if there is evidence of the four attributes, which would indicate that the knowledge processes confer competitive advantage to KIBS providers. This research question was answered based on data collected through questions from the interview guide directed towards understanding the value, rareness, inimitability, and the organization's ability to exploit knowledge processes.

This section is divided into two subsections. The first subsection focuses on knowledge processes as resources and analyzes them using VRIO attributes. The second subsection looks at the new theme of delivery that emerged from data. It also looks for evidence of VRIO for this new theme. This division is useful to show that knowledge process related resources themselves do not confer competitive advantage and reveal the missing link of routine supporting processes that are part of the delivery capability leading to competitive advantage.

4.3.1. Knowledge Processes and VRIO

Processes are defined as a set of repeatable activities that lead to a specific output. In the previous section, we have seen that the three organizations use different approaches for their knowledge processes. These approaches are created through activities, some that are core to the knowledge process itself and some that support these knowledge processes (see Table 8: Summary of KPs, resources, and VRIO attributes across cases). This classification is derived from the knowledge chain, a model adapted from Michael Porter's well-known value chain (Holsapple & Singh, 2001). As discussed earlier these activities, because of their repeatable nature, would be considered as capabilities and therefore can be treated as resources under RBV. The initial assumption guiding this study was that it would be sufficient to classify collected data as resources core to knowledge processes. Therefore, human, technical, financial, and organizational resources (Barney, 1991) were identified from collected data. The findings reveal that in each case the human, technical, and financial resources are valuable in the way that it is implemented by the participating firms and not merely by their presence.

Knowledge chain link	Resource	Company	Relation to KPs	VRIO attributes
Part of knowledge processes (KPs)	Gather knowledge from client through direct interaction	1,2,3	KA	$V_{(123)}O_{(12)}$
	Transfer new knowledge within the team	1,2,3	KR	$V_{(13)}O_{(12)}$
	Share/ Implement solutions	1,2,3	KD	
Supporting all KPs	Use of tools	1,2,3	Support all KPs	$V_{(3)}O_{(3)}$
	Use of tools for communication	1,2,3	Support all KPs	$V_{(23)}R_{(2)}O_{(12)}$
	Use of repositories	1,2,3	Support all KPs	$V_{(123)}$
	Documentation	1,2,3	Support all KPs	$V_{(12)}O_{(13)}$
	Training	2,3	Support all KPs	$V_{(2)}O_{(23)}$
	Assign teams	1,2,3	Support all KPs	$V_{(123)}O_{(12)}$
	Agile process	1,2,3	Support all KPs	
Supporting specific KPs	Create reusable assets	1,2,3	Supports KR	$V_{(12)}R_{(2)}O_{(12)}$
	Use of Subject Matter Experts	1,2,3	Supports KA and KR	$V_{(23)}O_{(2)}$

Table 8: Summary of KPs, resources, and VRIO attributes across cases

Legend: $V_{(123)}R_{12}I_{(23)}O_{(13)}$ - Evidence of value in companies 1,2, and 3, evidence of rareness in companies 1 and 2, evidence of inimitability in companies 2 and 3, and evidence of organizational ability in companies 1 and 3 for a resource

These resources identified were analyzed using the VRIO framework. The first category deals with resources that are core to knowledge processes. This means that these activities are core to how KIBS providers acquire, recombine, and diffuse knowledge to offer solutions to their clients. For example, 'gathering knowledge from the client through direct interaction' from data available in the first two cases may be core to the knowledge acquisition process. The second category is based on resources that support all knowledge processes and hence are complementary assets to the core activities. 'Documentation' is one such example from data collected from each case, which may be considered as resources supporting all knowledge processes to try and create competitive advantage. The final category groups resources based on activities that support specific knowledge processes. This classification of resources that support all knowledge processes and those that support specific knowledge processes was based on collected data while describing specific knowledge processes. For example, the resource 'Creating reusable assets' from collected data from all the cases supports knowledge acquisition but lacks evidence for knowledge recombination and knowledge diffusion.

4.3.1.1. VRIO attributes of Knowledge Processes for each case

Knowledge Processes from TeleCo were based on categorizing resources from collected data and their relationship to knowledge processes. The findings suggest that technical, human and organizational resources were present, however, no financial resources were identified. The organizational resources were further classified based on the knowledge chain into core knowledge processes, resources that support knowledge processes and those that support specific knowledge processes. All the resources identified were then analyzed using the VRIO framework. The analysis reveals that technical and human resources do not have any of the four VRIO attributes. The analysis of the organizational resources reveals (see

table A6.1 in appendix 6 for full list of resources). The resources ‘gathering knowledge from the client through direct interaction’, ‘creating reusable assets’, ‘transfer of new knowledge within the team’, ‘documentation’ and ‘assigning teams’ are valuable and have the organizational ability to exploit resources attributes.

Knowledge Processes from GenCo were found by grouping resources based on their relationship to knowledge processes. There exist technical, human, financial, and organizational resources, which are useful to find if and how these resources relate to knowledge processes. The organizational resources were then classified based on the knowledge chain into three different categories to show how they relate to knowledge processes. These resources were then analyzed using the VRIO framework which reveal that the technical, human and financial resources do not have any of the VRIO attributes. However, most of the organizational resources were found to be valuable and exploited through organizational capabilities. like ‘training’ (see table A6.2 in appendix 6 for full list of resources). In addition to the value and organizational ability attributes some of these organizational resources were also found to be rare. An example of one such resource is ‘using tools for communication’.

Knowledge Processes from BpoCo were classified by sorting resources from collected data based on their relationship to knowledge processes. The findings reveal the presence of only three of the categories of resources mentioned by Barney (1995). As such, only technical, human and organizational resources were identified in this case, but no financial resources were identified from collected data (see table A6.1 in appendix 6 for full list of resources). Like the previous two cases, the organizational resources were classified into the three different categories based on the knowledge chain to show their relationship to

knowledge processes. When analyzed using the VRIO framework, the technical and human resources have none of the VRIO attributes. However, most of the organizational resources appear to be valuable and exploited effectively by the organization.

4.3.1.2. Cross-case comparison of VRIO analysis of knowledge processes

A cross-case comparison reveals that the technical, financial and human resources did not possess any of the VRIO attributes. The organizational resources seem to be valuable and have the organizational ability to exploit the resources, however, they do not appear to be rare or inimitable. Therefore, the findings suggest that these resources that were classified into organizational resources do not confer competitive advantage to KIBS providers either. However, the next section offers a different explanation through the analysis of an emerging theme, delivery.

4.3.2. Delivery

4.3.2.1. Definition: Delivery

A new theme emerged from the collected data called delivery. Delivery can be defined as the capability to provide solutions to clients developed by the joint application of specialized competences between the provider and the client through planning, development, operation, and maintenance (Sun, Fang, Lim, & Straub, 2012). Analysis of data revealed that mere presence of knowledge processes that comprise knowledge acquisition, knowledge recombination, and knowledge diffusion is not sufficient to confer competitive advantage. These processes need to become specialized competences through proper structure in the form of planning, development, operation, and maintenance which develops the delivery capability that can offer useful solutions for clients. These stages of planning, development, operation, and maintenance presented below are seen to be constant but specific changes within each

might be introduced to continually adapt to customer requirements as well as to changes in the technologies involved.

Planning is a customer-centric stage where preparation regarding applications and infrastructure components that need to be put in place are decided. Deadlines and resource allocation along with the standards that need to be met and the scope of projects are determined in this stage (Wheatcroft, 2007). It is important to acquire knowledge about or from clients to have an effective plan that successfully accomplishes the above tasks. An example of the planning stage from the multiple-case study was provided by the Senior Manager in Sales from GenCo: "As soon as the contract starts, initially for new projects we will take the first three months as discovery or analysis phase, where I will have my people go to the client site, understand the application and everything…" (see Table 9: Data on stages of delivery). This quote highlights that the knowledge acquisition process is part of the planning stage through interaction with the clients.

The development and operation stages refer to developing a new product or service and using the product to serve clients respectively. In the context of KIBS providers, these two stages are difficult to separate since solutions development and operation are simultaneous stages that work in synergy. These two stages can accommodate necessary changes when faced with issues and can be recorded to aid future projects thereby increasing efficiency by avoiding issues already encountered. Therefore, the changes would serve to help avoid issues in the present delivery of solutions and improve delivery in the future (Wheatcroft, 2007). An example of these stages and how they are improved was provided by the Solution Architect from TeleCo:

> "to get the best resources we hunt for them globally within our pool and that is how we try to get the best talent and there are global discussion forums, there are global monitoring and follow up reviews that are done where people from different parts of the global TeleCo map are asked to come in and review the solutions and if there is a problem in some project people are mobilised from all over the world to get the project functioning again." (see Table 9: Data on stages of delivery).

This example emphasizes that the development and operation stages include knowledge acquisition when knowledge is acquired from previous projects. Moreover, when TeleCo employees hold monitoring and review sessions to resolve issues, it shows that the development and operations stage also comprise the knowledge recombination process. The knowledge diffusion process is also part of these stages since the solution is finalised in these stages. These stages are therefore important as most of the knowledge acquisition and recombination occurs in this stage along with the knowledge diffusion.

The data collected in this study suggest that the development and operational stages form a basis to consider delivery as a dynamic capability. This can be seen since these two stages allow the service provider to sense, seize, and reconfigure how the delivery capability operates. Sensing occurs when KIBS providers gather and analyze information about or for clients; seizing occurs by addressing these sensed opportunities and reconfiguration happens when KIBS providers reconfigure their resources to accommodate the seized opportunities. It can be seen from the above example that TeleCo sense opportunities using their global network, seize these opportunities through monitoring and review sessions and reconfigure by mobilising people around the world to change the existing solution implementation as well to help in future implementations. Therefore, the KIBS provider, based on the knowledge gained

during the development and operation stages adjusts current and future solutions. The examples from data on development and operation stages mentioned in table 9 establishes a two-way relationship where the knowledge processes not only develop the delivery capability but through delivery the knowledge processes can be improved.

Company	Planning	Development & Operation	Maintenance
TeleCo	"we try to understand the departments involved during requirement gathering for a change to see who are primary and who are secondary stakeholders. For this we create a stakeholder matrix."	"But to get the best resources they hunt for them globally within their pool and that is how they try to get the best talent and there are global discussion forums there are global monitoring and follow up reviews that are done where people from different parts of the global IT Service Provider 1 map are asked to come in and review the solutions and if there is a problem in some project people are mobilised from all over the world to get the project functioning again."	No evidence
GenCo	"As soon as the contract starts, initially for new projects we will take the first three months as discovery or analysis phase, where I will have my people go to the client site, understand the application and everything"	"We are a big global delivery network with our presence in almost every country, it becomes easier to network. If there is a problem in a particular country and some of our clients want help we have local presence. We have people who do consulting work, we will go understand the problem, come back and then there will be another country where it may be designed, another country where it may be developed and some other country may test it, so I will use the best possible resources in my organization to ensure the client gets the best"	No evidence
BpoCo	"Client may say that I need this kind of functions in the system. So, they are all you say the product already exists. The customer can come and say, hey I want x feature in the product and that is what the portal is all about. That is how we get it, so we are using a software, we are using a technology to gather information."	"So, the solution that I talked about when it comes to redesigning performance management for that pharmaceutical company. If you see a traditional HR technology solution provider trying to implement performance management they just treat it like a software implementation. It is like, you have this process, we will try to automate it for you using our system. When they do that, they say off you go customer but in this case the knowledge that I acquire be it through my internal network, external network, industry research or my own professional experience, I use that and I start treating that project not just as a typical software implementation but as a strategic consulting assignment coupled with technology and that went a long way."	No evidence

Table 9: Data on stages of delivery

The stage of maintenance may or may not be handled by the same provider. Nevertheless, it deals with ensuring that the solutions continue to perform at the desired level. For example, clients give the maintenance of the project to the service provider usually if the development and operational stages were successful. However, data on maintenance were not available since the primary focus of interview questions were on knowledge processes that are primarily part of development and operation stages.

Therefore, delivery refers to the capability developed by the core knowledge processes and supporting knowledge processes based on which solutions are created and shared with clients. The supporting processes have been identified as resources that support knowledge processes such as ‘training’ and ‘assigning teams’. It is important to note that during the data collection phase the term delivery was used to understand how the knowledge diffusion process was implemented. When analyzing delivery from a VRIO perspective, it was seen that all the participating companies present evidence of all four VRIO attributes.

4.3.2.2. Delivery and VRIO

In the **TeleCo** case, the data suggest that the delivery capability is valuable since they continuously update the processes to offer the best possible solutions (see Table 10: Delivery and VRIO for TeleCo). The rareness of this capability is ensured since the processes can be easily updated before others as they are pioneers in their domain. Next, the inimitability of delivery is achieved through security measures and NDAs (non-disclosure agreements). Finally, the company has structured step-by-step processes to ensure that they can exploit the capability effectively.

Company	Value	Rareness	Inimitability	Organizational
TeleCo	The delivery process constantly integrates new changes to create the best possible solution and that keeps clients happy-P4	Being a market leader in the domain helps to create a difference since they can easily update the process faster than others-P1	Security measures and NDAs ensure that the process cannot be copied by their rivals-P4	A structured step by step process is followed where everyone is aware of their responsibilities-P4

Table 10: Delivery and VRIO for TeleCo

The findings from the **GenCo** case also indicate that delivery possesses all four VRIO attributes. Delivery is valuable since GenCo employees create trust and credibility through their delivery capability (see Table 11: Delivery and VRIO for GenCo). GenCo employees adopt the latest technology faster than others thereby making the capability rare. The processes involved in the delivery capability are internalized by customizing them to suit GenCo's objectives, consequently making it difficult for competitors to imitate. Finally, GenCo has a large global network and therefore effectively maintain its delivery capability.

Company	Value	Rareness	Inimitability	Organizational
GenCo	They build trust and credibility with clients only by delivery and not by any other way-P1	Being quick to adopt the latest technology ensures a delivery process different from others-P1	They internalize the technology they use, which makes it difficult to copy-P2	They are a big global delivery network with presence in almost every country, it becomes easier to effectively deliver-P2

Table 11: Delivery and VRIO for GenCo

Findings from the **BpoCo** case suggest that delivery is valuable and is a result of client referencing (see Table 12: Delivery and VRIO for BpoCo). BpoCo employees are always quicker than their competition to implement the latest technology to deliver better solutions. Next, BpoCo employees offer the best solutions at the cheapest price, which makes it difficult

for others to copy. Lastly, the delivery capability is effectively exploited by hiring the best available talent, thereby giving BpoCo the ability to deliver effectively.

Company	Value	Rareness	Inimitability	Organizational
BpoCo	Successful delivery ensures that clients will recommend them to other prospective clients-P2	They are faster than others in implementing the latest technology and processes-P2	They make sure to achieve more than expected of them and yet remain profitable, which is something others cannot copy-P1	They hire the best people to make sure that the delivery process is successful-P1

Table 12: Delivery and VRIO for BpoCo

4.3.2.3. VRIO analysis of delivery across cases

Service providers' delivery capability is found to possess each of the four attributes of VRIO across cases. The delivery capability may be able to confer competitive advantage to KIBS providers (see table A7 in appendix 8 for cross-case display of VRIO information on delivery). However, these attributes are realized differently by each organization. For example, TeleCo employees use security measures and non-disclosure agreements (NDAs) to ensure the delivery capability cannot be copied by rivals, while GenCo employees internalize the technology they use by making it specific to their organization which makes it difficult to copy. The delivery capability thus appears to confer competitive advantage to KIBS providers from a resource-based perspective.

4.4. Importance of Other Factors

The third research question attempts to identify the importance of other factors such as price or reputation in creating competitive advantage relative to knowledge processes. It is also answered from the perspective of participants, since objective data regarding the presence and importance of these other factors were not available for this study. This section is divided

into two parts: the first part presents other factors of competitive advantage within each case; while the second part interprets the findings across cases.

4.4.1. Other factors of competitive advantage for each case

This section presents factors that do not qualify as resources of a company as they are external to it, but can be considered important towards conferring competitive advantage to a firm. This question is answered based on data collected through two interview questions asking participants to identify such factors and state the relative importance of these factors compared to knowledge processes. Among the several factors mentioned by participants, the three most important factors based on the frequency of usage are cost, brand name, and customer satisfaction.

The three important factors of competitive advantage identified from the data on TeleCo as mentioned previously are cost, brand name, and customer satisfaction (see

	TeleCo			
Other factors	Practice Area Lead	Solution Architect	Lead Consultant	Project Manager
Price	Even Cost does not confer an advantage in the present day	No evidence	The balance between the standard of the solution and price is important.	If the price of the product is different it creates a difference
Brand name	Brand name is created by the quality of the solution	Brand name is one of the factors to get a new project	No evidence	The brand name plays a big part in creating competitive advantage.
Customer satisfaction	Keeping clients happy will create more business through referencing	Keeping clients happy will help keep the existing clients	Keeping clients happy will help maintain business	If the client is happy and trusts you they would not want to go to another vendor.
Innovation	Companies need to constantly innovate to maintain competitive advantage.	No evidence	No evidence	No evidence
Customer base	The reference of clients can provide more business.	No evidence	No evidence	No evidence

Table 13: Other factors of competitive advantage for TeleCo). TeleCo participants seem to think that happy customers would mean more business through referencing and keeping existing clients. The Practice Area Lead in a client facing role mentions that cost alone is not enough to confer competitive advantage, but the Project Manager says that price is a differentiating factor. The participants also believe that brand name is created by the quality of the solution and plays an important role in creating competitive advantage for them. Therefore, it shows that the delivery capability influences these other factors of competitive advantage.

	TeleCo			
Other factors	Practice Area Lead	Solution Architect	Lead Consultant	Project Manager
Price	Even Cost does not confer an advantage in the present day	No evidence	The balance between the standard of the solution and price is important.	If the price of the product is different it creates a difference
Brand name	Brand name is created by the quality of the solution	Brand name is one of the factors to get a new project	No evidence	The brand name plays a big part in creating competitive advantage.
Customer satisfaction	Keeping clients happy will create more business through referencing	Keeping clients happy will help keep the existing clients	Keeping clients happy will help maintain business	If the client is happy and trusts you they would not want to go to another vendor.
Innovation	Companies need to constantly innovate to maintain competitive advantage.	No evidence	No evidence	No evidence
Customer base	The reference of clients can provide more business.	No evidence	No evidence	No evidence

Table 13: Other factors of competitive advantage for TeleCo

When looking at the data available from GenCo on these factors, the same three factors; cost, customer satisfaction, and brand name appear to be the most important, having been mentioned by many of the participants (see Table 14: Other factors of CA for GenCo). The participants agree that cost plays an important role in creating competitive advantage since

most clients are more concerned about the cost of the solution. Participants consider brand name to be important as well and it is something GenCo as a company strives to maintain. One participant says that the brand name is created through effective delivery. Participants from GenCo also appear to consider building a strong relationship with clients to be important and they can do that by continuously delivering successfully. Therefore, the findings indicate that these other factors are the result of delivery since delivery helps create strong customer relations and brand name for GenCo.

	GenCo			
Other factors	Manager (Client location)	Senior Manager (Sales)	Solution Architect	Business Analyst
Price	Clients are cost conscious so offering cheaper products creates a difference	if the price is less clients will be interested in the product	cost is the most important factor in creating competitive advantage	No evidence
Brand name	Brand name is built by properly delivering solutions.	Brand name is very important and they put in a lot of effort to maintain that name	No evidence	No evidence
Customer satisfaction	No evidence	No evidence	Through repeated cycles of successful delivery clients and providers build a good relationship.	Building a strong relationship with clients is important.
Innovation	Company 2 sets trends and drives a lot of innovation.	No evidence	No evidence	No evidence
Global delivery network	No evidence	Being a global delivery network means access resources across the world and improve delivery.	No evidence	Client is not affected because they are a global network and work in different time zones.
Ethics	No evidence	No evidence	No evidence	They are ethical in their approach and adhere strictly by the rules.

Table 14: Other factors of CA for GenCo

The data collected from BpoCo on the other factors of competitive advantage also consider price to be important and hence strive to keep the prices of their solutions to the minimal possible (see Table 15: Other factors of CA for BpoCo). Another important factor mentioned was building a strong customer base which is linked to customer satisfaction. The QA Lead thinks that they already have a lot of existing clients who can vouch for them and thereby help to bring in more customers. Therefore, the existing customer base can also be considered as the result of customer satisfaction. The findings suggest that the delivery capability supports these factors in conferring competitive advantage to BpoCo, since the delivery capability is associated with the quality of the solution.

	BpoCo	
Other factors	Consultant	QA Lead
Price	They strive to keep their prices as low as possible	No evidence
Strategy	"Strategy is very important to focus on achieving company objectives and thereby create competitive advantage.	No evidence
Customer base	The clients can vouch for them that will help them get more business	They have an advantage as they already have many existing clients.

Table 15: Other factors of CA for BpoCo

4.4.2. Other factors of Competitive Advantage across cases

In summary, from a participant perspective, the three most common factors of competitive advantage across cases are price, brand name and customer satisfaction (see table A8 in appendix 8 for summary of data across cases for other factors of competitive advantage). While only limited data are available since the interviews focused more on knowledge processes, the data show that participants have varying views regarding the importance of some of these factors. For example, the Solution Architect from TeleCo said that brand name is one of the factors that helps them to get new projects and create competitive advantage whereas the Project Manager from TeleCo says that brand name plays an important role in creating competitive advantage, indicating that one of them perceive it to be one of several factors while the other person believes it is an important factor of competitive advantage.

The findings also suggest that these other factors of competitive advantage and delivery may be interlinked and not mutually exclusive in conferring competitive advantage to KIBS providers. This link between delivery and other factors is apparent since one of the participants mention that brand name of their company is a result of the quality of the solution, which is ensured by an effective delivery capability.

Chapter Summary

This chapter presents the findings of the study as follows. It presents that participants perceive knowledge processes to influence the competitive advantage of KIBS providers. The findings also suggest that the knowledge processes of these providers are not fully generic and therefore may confer competitive advantage and proceeds to examine the knowledge processes using the VRIO framework. Findings further indicate that while participants believe that knowledge processes confer competitive advantage, there is no evidence to suggest the same from a VRIO perspective. This chapter also discusses the emergence of a new theme of delivery as a capability and indicates that it is this capability that confers competitive advantage to KIBS providers. Finally, the chapter concludes by presenting that delivery influences other factors of competitive advantage such as brand name, cost and customer satisfaction.

5. Discussion

This chapter first provides a tentative explanation of participants' perception that their organizations' knowledge processes can directly confer competitive advantage by exploring the concepts of causal ambiguity and social complexity. Secondly, the importance of delivery as a dynamic capability able to confer competitive advantage is discussed using Barney's VRIO framework (1995). Finally, a refined framework developed from the finding of this study is presented, along with the proposition that it better captures the influence of knowledge processes on competitive advantage for KIBS providers.

5.1. Causal Ambiguity & Social Complexity

Participants perceived knowledge processes to confer a competitive advantage to their organizations. However, data analysis of knowledge processes using the VRIO framework indicated that these processes are not a direct source of competitive advantage. The literature on the VRIO framework claims that causal ambiguity creates competitive advantage if neither rivals nor the firm itself is aware of the cause of the advantage (Barney, 1991). The notion of causal ambiguity may help to explain why participants were unable to clearly articulate the link between knowledge processes, delivery, and competitive advantage.

The concept of social complexity helps to explain why there may exist causal ambiguity in articulating the link between knowledge processes, delivery, and competitive advantage. The findings suggest that the responsibilities for the implementation of knowledge processes are handled by several teams within a KIBS provider. Therefore, it may be possible that these teams interact in different ways that is difficult for individuals from other teams to comprehend. This notion, referred to as social complexity in the VRIO framework, proposes that a complex relationship between members of teams may be difficult to copy or substitute by rivals (Barney, 1991). Social complexity is useful to explain causal ambiguity since the complexity of the relationships is difficult to understand even by members of different teams within the same organization.

In summary, participants may have been unable to clearly articulate the link between knowledge processes and delivery in conferring competitive advantage because of the causal ambiguity and social complexity resulting from their organizational context. The concepts of causal ambiguity and social complexity may have prevented participants from identifying the importance of the delivery capability to confer competitive advantage.

5.2. Dynamic Capabilities and Competitive Advantage

As mentioned in the previous section, the findings indicate that knowledge processes when analyzed using the VRIO framework are not fully VRIO, so they may not be able to confer competitive advantage to KIBS providers. The reason for this, as mentioned by the Practice Area Lead from TeleCo may be due to a common practice for employees to leave and join rival companies carrying with them the knowledge learnt from the company. This can be explained by looking at the literature on knowledge-based resources, which states that knowledge and its assets are tough to contain and preventing leakage is difficult (Miles et al., 2016). Such knowledge-based resources as identified in the collected data may not be rare or inimitable and hence, unable to confer competitive advantage to KIBS providers from a VRIO perspective. Therefore, it may be useful to consider additional theories like dynamic capabilities that can help to explain all the VRIO attributes.

Delivery is a capability formed by planning, developing, operating, and maintaining the knowledge processes of KIBS providers. The findings on delivery indicate that the development and operational stages make it a dynamic capability since employees gain knowledge and adjust solutions accordingly. This new knowledge then helps to change the existing development and operation stages. It further helps to modify all the stages of future solution delivery. This aligns with the proposition that mere implementation of knowledge processes is not adequate and companies need to effectively manage these processes to create improved quality solutions to gain competitive advantage (Teece et al, 1997).

Absorptive capacity can be used to explain how delivery is viewed as a dynamic capability. The concept of dynamic capability has been used to not only identify the capabilities of the firm, but also to explain how to maintain resources (Teece, Pisano, &

Shuen, 1997). Since absorptive capacity justifies the use of prior related knowledge to improve the position of the organization, it explains how maintaining resources from previous projects to modify future projects can make delivery a dynamic capability. Therefore, a strong absorptive capacity enables organizations to learn from previous projects and update their processes in the future, which may lead to a successful dynamic delivery capability that confers competitive advantage. This can be seen from the findings which show that the participating organizations rely on creating reusable assets to benefit in future projects.

It can therefore be argued that the competitive advantage of these companies might be difficult to identify, since a snapshot at any point in time would not be able to capture the dynamic aspect of the firm. Therefore, a more dynamic approach of competitive advantage that analyzes the delivery capability over a greater length of time and not just at one specific point in time may help to show the competitive advantage of KIBS providers.

5.3. Revised Framework

The initial conceptual framework presented in Section 2.5 shows the linkage between knowledge processes of KIBS providers and competitive advantage implicitly explained by absorptive capacity. As mentioned before in the literature review chapter, the definition of competitive advantage for this study is based on Barney's VRIO framework. While the findings of the study reveal the importance of knowledge processes from a participant perspective, analysis of the data suggests that the knowledge processes themselves do not influence the competitive advantage of KIBS providers. The analysis of the new theme of delivery as a capability using the VRIO framework indicates that it confers competitive advantage to KIBS providers. These findings lead to a refined framework that better explains

the relationship existing between knowledge processes, absorptive capacity, delivery, and competitive advantage (see Figure 4).

The findings show that organizations effectively implement core knowledge processes with the help of supporting knowledge processes. The resultant capability created by the implementation of core and supporting knowledge processes is delivery. The findings further suggest that delivery supports other factors of competitive advantage such as brand name, cost, and customer satisfaction. Finally, it can be inferred from the findings that delivery acts as a dynamic capability and so delivery has been depicted as a dynamic capability in the revised framework. The figure below implies that developing (D) and operating (O) the knowledge processes of KIBS providers develops the dynamic delivery capability. However, planning (P) and maintaining (M) are crucial to delivery and may have a role to play in its dynamic nature. The bi-directional arrow between delivery and the knowledge processes indicates that the capability learns from the existing solution delivery and applies it to improve the delivery capability in the present as well as the future. As a result, delivery becomes a dynamic capability able to confer competitive advantage to KIBS providers. The illustration below presents the refined framework developed from the findings and the analysis of collected data.

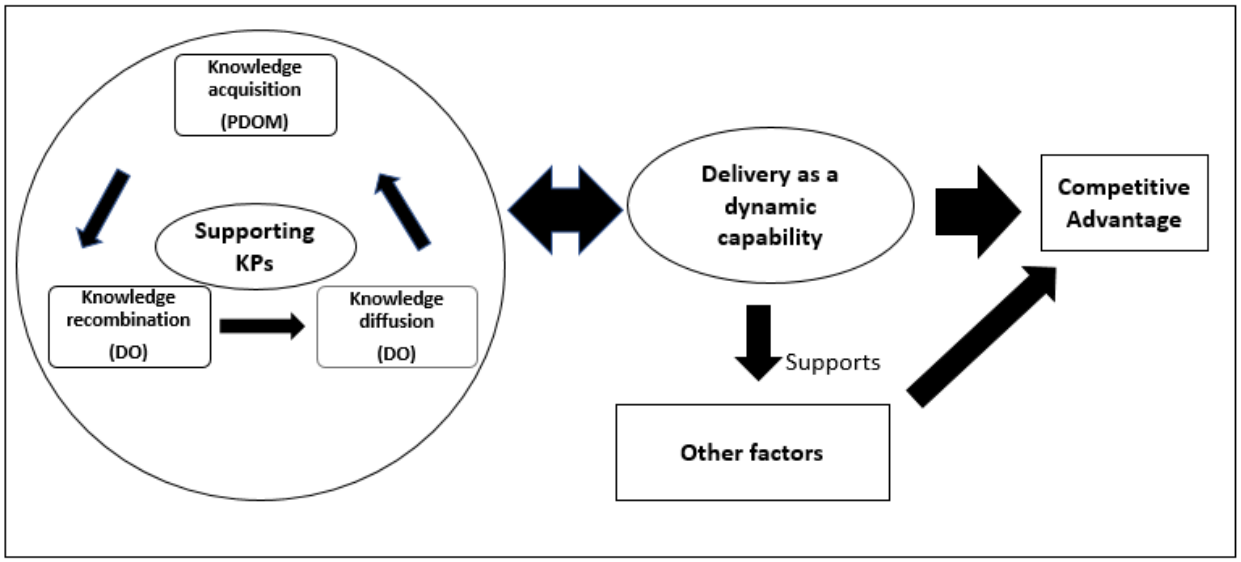

Figure 2: Revised Framework

A key finding from the collected data reveals that participants perceive knowledge acquired from experience to be a source of competitive advantage. This knowledge is presented in the revised framework as the transfer of knowledge from the knowledge diffusion to the knowledge acquisition process and is essentially the creation of new knowledge within the organization. This is supported by existing literature which states that knowledge creation occurs within the organization making it difficult to copy or replace and can therefore confer competitive advantage to KIBS providers (Kase & Zupan, 2007).

Chapter Summary

This chapter presents the interpretation of the findings from the study. The findings from the first and second research question that indicate competitive advantage to be a direct effect of delivery and not knowledge processes. This inability to articulate the clear link between knowledge processes, delivery, and competitive advantage may be a result of causal ambiguity and social complexity in the way different teams interact within the same

organization. The analysis of delivery revealed that it possessed characteristics of a dynamic capability and confers competitive advantage to participating organizations. This argument may be justified since organizations can confer competitive advantage if they continuously adapt to the changing market. The findings also indicate that delivery supports other factors of competitive advantage like cost and brand name. Based on these findings, a refined framework is developed in this chapter that depicts the relationship between the different concepts discussed in this study.

6. Conclusion

This chapter first summarizes the findings of the study and their significance. It then presents the conceptual and practical contributions made by the study. Finally, it points out the limitations of the study and concludes with directions for future research.

6.1. Summary of findings and their significance

The objective of the study was to understand the influence of knowledge processes on the competitive advantage of KIBS providers. This was achieved by conducting a holistic multiple-case study where participants having different roles within each company served to provide different perspectives on their organizations. Data gathering and analysis was guided by an initial framework developed from literature on knowledge processes and the resource-based view of competitive advantage.

Findings first show that participants believe that their organizations' knowledge processes confer competitive advantage. However, when analyzed using the VRIO framework, these knowledge processes do not appear to confer competitive advantage owing to the lack of evidence for all four attributes necessary to confer competitive advantage.

Indeed, knowledge processes were found to be valuable and well-exploited by organizations, but neither rare nor inimitable. However, the emerging theme of delivery, also analyzed using the VRIO framework, did appear to possess all four attributes of competitive advantage. Moreover, findings suggest that the delivery capability of KIBS providers support other important factors of competitive advantage such as cost and brand name.

The findings indicate that the causal ambiguity and social complexity makes it difficult for organizations to clearly articulate how knowledge processes confer competitive advantage to KIBS providers. The findings further suggest that the VRIO framework developed by Barney under the resource-based view is not adequate on its own to explain the influence of knowledge processes on the competitive advantage of KIBS providers. The dynamic capabilities construct may therefore be necessary to better understand the competitive advantage of KIBS providers through delivery (Teece, 2012). Finally, the findings lead to a refined framework from the initial conceptual framework that presents how competitive advantage may be achieved in KIBS providers.

6.2. Conceptual contributions

This study contributes to literature in three important ways. First, it contributes to the understanding of KIBS by focusing on the relationship between KIBS providers' knowledge processes and their competitive advantage, rather than on the way these providers serve their clients (Kotabe & Murray, 2004). Findings extend the literature on knowledge processes of KIBS providers by highlighting the importance of these processes since they show an indirect influence on competitive advantage through their support to providers' development of a dynamic delivery capability.

Second, this study supports the literature regarding the potential limitations of applying the resource-based view in the context of KIBS where intangible resources play a key role (Wade & Hulland, 2004). The boundaries of such intangible resources are difficult to clearly define either being too narrow or too broad, making it difficult to find evidence of VRIO in contexts such as KIBS.

Third, the findings reveal that it is not just the internal resources of firms that are important and a relational view of the firm (Dyer & Singh, 1998) might better explain how competitive advantage is generated in KIBS providers. This can be seen since the knowledge processes are co-created through interactions between provider and client. It is especially the case for acquisition and diffusion processes as well as the idea that dynamic delivery capability requires continual capture and application of knowledge. Therefore, an integrated view that uses both the resource-based as well as the relational view would be useful to analyse firms.

6.3. Practical Implications

The findings of this study are useful to managers as it highlights the importance of the delivery and provide insights to measure the delivery capability of their organization. The importance of doing so goes beyond delivery itself, since other factors of competitive advantage like brand name appear to be dependent on the delivery capability of organizations. This study underscores the importance of knowledge processes and supporting knowledge processes that lead to delivery which creates competitive advantage for their organizations. Thus, an important implication to managers is that mapping their knowledge processes and supporting knowledge processes to see if it leads to delivery may be useful. Mapping of knowledge processes helps to identify the important processes as well as the processes that

are not efficient and hinder effective delivery. Therefore, mapping of knowledge processes can be useful to identify issues in the existing delivery capability and invest resources to improve the capability.

6.4. Limitations

There are several limitations that may affect the findings of the study. The first one is the small number of cases analyzed for this study that may lead to the possibility of insufficient data from a statistical point. The use of multiple IT service providers, a specific type of KIBS provider helps to achieve theoretical generalization, which is the purpose of a multiple case study.

A second limitation concerns the use of qualitative methods, which have been criticized for their potential lack of rigor in the analysis of data. This limitation was mitigated by maintaining a structured and transparent process while collecting and analysing data. The use of an interview guide helped to ensure consistency across participants and cases. The use of a coding scheme, its implementation in a data analysis software, the creation of within-case and cross-case data displays and the achievement of acceptable inter-coder reliability levels ensure that the data analysis process was rigorous.

Another limitation related to the use of qualitative data is the possibility for participants' perceptions to be biased or partial. Indeed, participants were asked to reflect on processes implemented by other teams. Participants may not have been aware of the duties, responsibilities, and methods followed by others. This was controlled by interviewing multiple participants who belong to different teams as well as recruiting people with enough experience to provide insights on the complete framework.

Finally, variations among cases in terms of different types of IT service provider organizations that specialize in offering solutions of varying nature to clients may limit the generalizability of this study. Such a difference may mean that these service providers perform differently. This limitation was mitigated by providing detailed and clear descriptions of the cases.

6.5. Future research

This study provides the basis for future research that aims to further understand the strategic impacts of knowledge processes in KIBS providers. The link between knowledge processes and competitive advantage is a relatively untapped area. To build on this study, future research could aim to validate the framework with a larger sample of service providers, using quantitative methods such as surveys. The new theme delivery shown to positively influence competitive advantage, would benefit from stronger theoretical foundations. Future research could thus seek to theorize the concept of delivery and its strategic impacts, perhaps through a more refined explanation of delivery as a dynamic capability.

Since this study does not show a direct influence of knowledge processes on competitive advantage, it suggests that in complex sectors that rely on knowledge to deliver services, dynamic capabilities are important to confer competitive advantage. This study was unable to fully capture the effects of delivery since data collection, focused on knowledge processes, generated limited data on this theme. Further studies focusing on delivery and competitive advantage using the lens of dynamic capabilities could provide a better understanding of the effects of delivery on competitive advantage.

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Appendix 1. Ethics Approval letter

File Number: 10-16-15 **Date (mm/dd/yyyy):** 12/13/2016

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

Ethics Approval Notice

Social Sciences and Humanities REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

First Name	Last Name	Affiliation	Role
Lysanne	Lessard	School of Management	Supervisor
Gregory	Richards	School of Management	Co-Supervisor
Soumya	Roy	School of Management	Student Researcher

File Number: 10-16-15

Type of Project: Master's Thesis

Title: Competitive Advantage of Knowledge Intensive Service Providers: The Influence of Knowledge Processes

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
12/13/2016	12/12/2017	Approval

Special Conditions / Comments:
N/A

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Appendix 2. Interview Guide

1. **How do you acquire new knowledge to offer solutions to clients' problems?**

1.1. Is this process formalized, if yes then how? If no, then why?

1.2. How do you transfer acquired knowledge to the team that creates solutions for the clients?

1.3. Can you give me an example where the transfer of acquired knowledge to the people who create solutions for the clients was carried out successfully?

1.4. Can you give me an example where the transfer of acquired knowledge to the people who create solutions for the clients was not successful?

2. **When developing solutions for clients' problems, how do you combine the new knowledge with the existing knowledge within your organization?**

2.1. Is this process formalized, if yes then how? If no, then why?

2.2. How do you transfer the solutions to the team that delivers the solutions to the clients?

2.3. Can you give me an example where your organization successfully transferred the solution to the solution delivery team?

2.4. Can you give me an example where your organization was not successful in transferring the solution to the solution delivery team?

3. **How are the solutions shared with the clients?**

3.1. Is this process formalized, if yes then how? If no, then why?

3.2. How do you ensure that the knowledge gained from delivering solutions to the clients helps in knowledge acquisition in the future?

3.3. Can you give me an example where your organization successfully delivered solutions to the clients?

3.4. Can you give me an example where your organization was not successful in delivering solutions to the clients?

4. **Do you think successfully delivering solutions to clients creates competitive advantage for your organization? If yes, then how? If no, why?**

4.1. To what degree do you think these processes generate value for your organization?

4.2. Do you ensure that knowledge processes are different from those used by your rival organizations? If yes, how? If not, why?

4.3. Do you ensure that the knowledge processes cannot be copied by your rival organizations? If yes, how? If not, why?

4.4. Do you ensure that your organization has the ability to exploit knowledge the resources effectively? If yes, how? If not, why?

4.5. What is the importance of each of the factors as compared to knowledge processes in creating a competitive advantage?

5. Do you think that the proposed framework accurately depicts the link between knowledge processes and competitive advantage?

5.1. Would you make any changes that can improve the framework?

Appendix 3. Coding Scheme

Table A3.1 presents the coding scheme related to knowledge processes to acquire, recombine, diffuse, and acquire knowledge from experience while table A3.2 presents the coding scheme related to resources.

Code	Description	Example
KA	Knowledge acquisition refers to the process of acquiring external knowledge from clients and other sources. This helps in identifying and acquiring externally generated knowledge useful to create solutions for the clients of KIBS providers through informal or formal approaches (Muller & Zenker, 2001).	We have briefing sessions with the clients where they inform us about their problems (Hakanen, 2014, p. 5). We watch videos, attend conferences, read magazines to keep in touch with the latest developments (Hakanen, 2014, p. 5). "Web-based work spaces (e.g. extranets) are in use to ease the acquisition and exchange of knowledge within the group." (Hakanen, 2014, p. 5)
KR	This refers to the integration of newly acquired knowledge from the clients and other external sources with the existing knowledge that is present within KIBS providers (Muller & Zenker, 2001). This benefits the KIBS provider by contributing simultaneously towards specialisation and diversification which in turn leads to creation of better solutions (Strambach, 2008). This process could be implemented by formal or informal approaches.	Knowledge integration takes place by having business analysts and software developers meet with each other for knowledge transition sessions. (Participant 1 IT Service Provider 2). The use of collaboration tools ensures that the knowledge is properly integrated (Participant 1 IT Service Provider 2).

Code	Description	Example
KD	The process of knowledge diffusion signifies applying the knowledge in the form of a new or more developed solution (Muller & Zenker, 2001). This process could be achieved through the implementation of formal and informal approaches.	The code that has been tested in the lower environments is deployed in the production environment and once deployed all the stakeholders are informed through an email. They have a call scheduled which is attended by both clients and providers during which the solution is implemented in the client network and some quick tests are performed to ensure there are no issues in the production environment (Participant 3 IT Service Provider 2).
KD-KA	This refers to the possibility of improving knowledge bases and ways that lead to new possibilities of interactions (Muller & Zenker, 2001).	They have knowledge repositories to store the knowledge gained from clients after removing the client sensitive information (Participant 1 IT Service Provider 2).

Table A3.1: Coding scheme related to knowledge processes

Code	Description	Example
R-H	This refers to the identification of people as attributes of KIBS providers whose services create a competitive advantage for themselves (Penrose, 1959; Barney, 1995). These people may be new joinees, trained professionals, managers with individual insights (Barney, 1991)	We hire **new people** if we feel we do not have the required expertise (Participant 1 IT Service Provider 2). **SMEs** help to resolve any issues that may arise while creating the solution (Participant 1 IT Service Provider 2).
R-F	This refers to the identification of financial assets such as financial capital of the firm as attributes of KIBS providers whose services create a competitive advantage for themselves (Penrose, 1959; Barney, 1995).	If we do not have the expertise we **invest** to obtain the knowledge (Participant 2 IT Service Provider 2).
R-T	This refers to the identification of physical technology such as equipment, location and access to raw materials (Barney, 1991). In the case of KIBS providers these resources would include software, tools and documents whose services create a competitive advantage for themselves (Penrose, 1959; Barney, 1995).	The **collaboration tools** that are used help to ease transfer of knowledge (Participant 1 IT Service Provider 2). We have **automated software** to speed up our delivery time (Participant 2 IT Service Provider 2).
R-O	This refers to the the identification of approaches/steps taken by KIBS providers that may create a competitive advantage for themselves (Barney, 1991). These resources include the firm's formal reporting structure, controlling and coordinating systems, maintaining relationships and informal planning (Barney, 1991).	Our company is quick enough to recruit new people (Participant 1 IT Service Provider 2). We hire external trainers (Participant 1 IT Service Provider 2). We rely on the offshoring and onshoring model of work (Participant 3 IT Service Provider 2).

Table A3.2: Coding scheme for resources

Appendix 4. KP implementation for each case

Tables A4.1, A4.2, and A4.3 summarize information on how each company recruited for the case study acquires, recombines, and diffuses knowledge.

KA from external sources	KA from experience
• Use of background research to gather information from clients and competition. • Use of questionnaire to collect information from clients regarding the problem • Understanding the problem from different angles like infrastructure, process and technology etc. • Forming a team comprising of Business Analysts and Solution Architects to meet with clients and ask follow up questions and clarify any doubts they have from the answers to the questionnaire. • Following a specific audit trail format, recording questions using requirement traceability matrix (RTM) and maintaining checklists to ensure efficiency.	• Creating documents and articles from the product during the present project. • Use of documents as knowledge base for future projects. • Storing documents in repositories. • Storing artefacts from development phase. • Use of knowledge portals for employees to put in their experiences and answer questions from others in the company. • Creating reusable assets using several tools. • Use of component reuse portal to reuse solutions in future projects.

KR	KD
• Use of gathered information to create as-is, to-be and acceptance criteria documents. • Creating functional and non-functional requirements by business analysts and sometimes requirement analysts depending on the size of the project. • Preparing use cases and the high and low level design documents by solution architects. • Development of solution by developers and team leads from the development team. • Testing of solution (Integration and User Acceptance testing). • Use of tools for designing, developing and testing. • Use of checks to ensure quality. • Use of learning and training (L&T) and knowledge sharing sessions to integrate knowledge.	• Use of specific template agreed upon during project kick-off meeting. • Drawing of the whole ecosystem. • Use of release management technique to share the solutions with clients and follow standardised processes. • Meeting with client by the solution architect team or the manager to share the solution. • Deployment of solution by delivery team in production environment after UAT testing, migration of data from old system and fixing of bugs.

Table A4.1: Implementation of KPs in TeleCo

KA from external sources	KA from experience
• Use background research to understand clients' business. • Recruit people from within the team to acquire knowledge from clients. • Have a discovery phase of 3 months to collect information from clients about their problems. • Use meetings and interviews as brainstorming sessions to scope and prepare a problem statement. • Use calls between business analyst and solution architects to understand problem statement and what clients need. • Get client approvals to ensure correct solutions for clients. • Use processes, checklists and guidelines to ensure quality.	• Scrub client sensitive information from client documents • Create source documents for information about existing applications. • Use repositories to store documents to easily share and be available to others. • Use KT document checklist to keep track of available documents. • Use checklists to help recreate the process in future.
KR	KD
• Use knowledge transfer sessions with subject matter experts • Use Requirement traceability matrix (RTM) to map requirements to design and test cases to help track in case of any issues. • Elicit requirements and creating specification document by business analysts. • Create design specification document (high level and low level). • Describe how to proceed by Project Managers. • Share documents with testing team. • Take approvals from every team. • Use reverse KT to ensure effective learning. • Use calls, meetings and collaboration tools for sharing of knowledge. • Use documentation, mapping and tools to ensure quality.	• Use presentation by manager to explain the solution to clients. • Raise internal tickets to deploy solution to keep track. • Use different environments like system and integration in which code is deployed to ensure multiple levels of quality check before solution is applied. • Use automation tools to reduce human error. • Conduct User Acceptance Testing, solution is deployed in production environment. • Use calls to keep clients aware of progress during diffusion of knowledge. • Use documentation to ensure quality.

Table A4.2: Implementation of KPs in GenCo

KA from external sources	KA from experience
• Use talent acquisition for primary source of external knowledge. • Use background research on the competition. • Use discovery sessions for gathering information from clients • Use interactive software for gathering information from clients. • Review client request by product team. • Use customer touchpoints to ensure correct and quality solutions.	• Use commentaries from customers on customer satisfaction. • Use feedback and surveys to learn from present solutions and improve in the future. • Use documents, videos to help learn from experience. • Use expert learning consultants to update documents. • Use portal to store documents and videos. • Share learnt knowledge within company.
KR	KD
• Have a problem diagnosis phase to come up with solution. • Use increased interaction between teams to help develop effective solutions. • Create a prototype of solution. • Use tools to share knowledge by creating reward system for employees sharing knowledge.	• Use formal meetings during implementation kick off. • Use online meeting tools to present solutions. • Use “day in the life scenario” instead of User Acceptance testing to show immediate value of solutions. • Use tools to show demo • Use release suites that contain documents and videos to aid with explaining solution to clients and its deployment. • Use notifications to deploy new solution.

Table A4.3: Implementation of KPs in BpoCo

Appendix 5. Data table presenting influence of KPs on CA across cases

This table contains all the quotes from participants across cases that indicate their perceptions of the influence of KPs on CA. It includes each company, the participants, and their respective quotes.

Company	Participant	Quote
TeleCo	Practice Area Lead	If the client is very happy with the kind of deliverable that we have produced so definitely this is a positive thing and in future, you can give these references as well as there is a chance of repeated business, this is the basics of any management
	Solution Architect	TeleCo is well entrenched in telecom infrastructure systems
	Solution Architect	You obviously get a competitive advantage from knowledge processes
	Lead Consultant (Sales)	Oh, yes it does! I mean the more and the better we deliver there is something called customer goodwill and nowadays goodwill is recorded in our balance sheet. So, goodwill gives a lot of benefit to any service provider and then the reputation increases, so yes there is a definite advantage in delivering solutions better or at least better than our competitors
	Project Manager	Quite obviously, because you generate collaterals for a particular solution that you have implemented in the market
GenCo	Manager (Client location)	Spending time, energy and money on people asset and training them is very important and IT Service Provider 2 does that very well and it definitely gives you a competitive advantage
	Manager (Client location)	The prices are very good, the quality is good and the brand value is good so nothing stops IT Service Provider 2
	Senior Manager (Sales)	Since we are a big global delivery network with our presence in almost every country, it becomes easier to network
	Senior Manager (Sales)	From a business standpoint. I think we are leaders in understanding business so that helps

Company	Participant	Quote
GenCo	Solution Architect	Yes, it will be an advantage. The effect on competitive advantage is not very immediate though.
	Solution Architect	So, developing solutions is very important for providers for competitive advantage
	Business Analyst	The client knows our position and that we are really good at our work...that increases our competitive advantage.
BpoCo	Consultant	Now, the customer is a big advocate for us, so he can vouch about our capabilities with many other clients in the pharma industry, so that in turn became a competitive differentiator for us. It is how we add value to the clients and then how we go above and beyond their expectations. They contracted for X but we try to do X++ and they do not expect that from a traditional software technology service provider. I see that this lacks with many many competitors and why they are not able to do it is because of the lack of knowledge and it is because of the lack of that experience, that if you do this the customer is going to treat you as a trusted advisor
	QA Lead	This company is now the second largest company in North America so there is competitive advantage

Table A5: Data table showing influence of KPs on CA across cases

Appendix 6. VRIO attributes of resources linked to KPs.

The tables A6.1, A6.2, and A6.3 are used to present the evidence of the four attributes of value, rareness, inimitability, and organization to various resources related to knowledge processes identified from the data collected from the participating companies. Table A6.1 contains data for Case 1, table A6.2 for case 2 and table A6.3 for case 3.

Legend.

X- Evidence of attribute from data
NE- No Evidence: This is mentioned when there was no evidence found from data regarding an attribute.
NA- Not applicable: This is mentioned when the knowledge chain link could not be applied to a certain resource. As such the knowledge chain was applicable to organizational resources only since it can only be applied to actions and not applicable to the other types of resources which are human, technical and financial assets.

Resource	Relation to KPs	Value	Rare	Inimitability	Organization
R-O					
Gathering knowledge from the client through direct interaction	KA	X	NE	NE	X
Creating reusable assets	Supports KA	X	NE	NE	X
transfer of new knowledge within the team	KR	X	NE	NE	X
Integration of knowledge	KR	NE	NE	NE	X
Documentation	Supports all KPs	X	NE	NE	X
Use of Repositories	Supports all KPs	X	NE	NE	NE
Assigning teams	Supports all KPs	X	NE	NE	X
Recruiting	Supports all KPs	NE	NE	NE	NE
using tools	Supports all KPs	NE	NE	NE	NE

Resource	Relation to KPs	Value	Rare	Inimitability	Organization
using tools for communication	Supports all KPs	NE	NE	NE	X
using teams	Supports all KPs	X	NE	NE	NE
using SMEs	Supports KA and KR	NE	NE	NE	NE
writing a contract	No relation	NE	NE	NE	NE
R-T					
Repositories	NA	NE	NE	NE	NE
Documents	NA	NE	NE	NE	NE
KP Tools	NA	NE	NE	NE	NE
Communication tools	NA	NE	NE	NE	NE
R-H					
Teams	NA	NE	NE	NE	NE
Designated roles	NA	NE	NE	NE	NE
SMEs	NA	NE	NE	NE	NE
R-F					

Table A6.1: VRIO attributes of resources for TeleCo

Resource	Relation to KPs	Value	Rare	Inimitability	Organization
R-O					
writing a contract	No relation	X	X	NE	X
Gathering knowledge from client through direct interaction	KA	X	NE	NE	X
transfer of new knowledge within the team	KR	NE	NE	NE	X
using tools for communication	Supports all KPs	X	X	NE	X
using presentations to diffuse knowledge	KD	NE	NE	NE	NE
Creating reusable assets	Supports KA	X	X	NE	X
Assigning teams	Supports all KPs	X	NE	NE	X
Documenting the process	Supports all KPs	X	NE	NE	NE
Recruiting	Supports all KPs	NE	NE	NE	X
Training	Supports all KPs	X	NE	NE	X
using tools	Supports all KPs	NE	NE	NE	NE
using SMEs	Supports all KPs	X	NE	NE	X
Use of Repositories	Supports all KPs	X	NE	NE	NE
Agile process	No relation	NE	NE	NE	NE
R-T					
Repositories		NE	NE	NE	NE
KP Tools		NE	NE	NE	NE
Communication tools		NE	NE	NE	NE
R-H					
Teams		NE	NE	NE	NE
Designated roles		NE	NE	NE	NE
SMEs		NE	NE	NE	NE
R-F					
Investments		NE	NE	NE	NE

Table A6.2: VRIO attributes of resources for GenCo

Resource	Relation to KPs	Value	Rare	Inimitability	Organization
R-O					
Talent acquisition	KA	NE	NE	NE	NE
Gathering knowledge from client	KA	x	NE	NE	NE
Gathering knowledge from publicly available data	KA	X	NE	NE	NE
using tools	Supports all KPs	X	NE	NE	X
transfer of new knowledge within the team	KR	X	NE	NE	NE
using tools for communication	Supports all KPs	X	NE	NE	NE
Creating reusable assets	Supports KA	NE	NE	NE	NE
Documenting the process	Supports all KPs	NE	NE	NE	X
Assigning teams	Supports all KPs	X	NE	NE	NE
Training	Supports all KPs	NE	NE	NE	X
using SMEs	Supports all KPs	X	NE	NE	NE
Agile process	No relation	X	NE	NE	NE
R-T					
Repositories		NE	NE	NE	NE
Documents		NE	NE	NE	NE
KP Tools		NE	NE	NE	NE
Communication tools		NE	NE	NE	NE
R-H					
Teams		NE	NE	NE	NE
Designated roles		NE	NE	NE	NE
SMEs		NE	NE	NE	NE
R-F					

Table A6.3: VRIO attributes of resources for BpoCo

Appendix 7. Data display of VRIO for Delivery across cases

This table summarizes how the four key attributes of value, rareness, inimitability, and organizational ability to exploit resources are exhibited for delivery.

Company	Value	Rareness	Inimitability	Organizational
TeleCo	The delivery capability constantly integrates new changes to create the best possible solution that keeps clients happy.	Being a market leader in the domain helps to create a difference by easily updating the process faster than others.	Security measures and NDAs ensure that the process cannot be copied by rivals.	A structured step by step process is followed where everyone is aware of their responsibilities.
GenCo	It builds trust and credibility with clients only by delivery and not by any other way	Being quick to adopt the latest technology ensures a delivery process different from others.	It internalizes the technology they use and makes it difficult to copy.	They are a big global delivery network with presence in almost every country, it becomes easy to effectively deliver
BPOCo	Successful delivery ensures that clients will recommend BPOCo to other prospective clients.	BPOCo is faster than others in implementing the latest technology and processes	BPOCo makes sure to achieve more than expected of it and yet remain profitable which is something others are unable to achieve.	BPOCo hires the best people to make sure that the delivery process is successful

Table A7: Cross-case display of VRIO information for delivery

Appendix 8. Cross case display of other factors

Table A8 presents a cross case display of list of different factors that influence the competitive advantage of KIBS providers found in data and paraphrases of what participants from each company mention about these factors.

Legend

* NE: No evidence

	TeleCo				GenCo				BpoCo	
Other factors	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2
Price	Even Cost does not confer an advantage in the present day	NE	the balance between the standard of the solution and price is important	if the price of the product is different it creates a difference	Clients are cost consciou s so offering cheaper products creates a differenc e	if the price is less clients will be intereste d in the product	cost is the most importan t factor in creating competit ive advantag e	NE	They strive to keep their prices as low as possible	NE

	TeleCo				GenCo				BpoCo	
Other factors	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2
Brand name	Brand name is created by the quality of the solution	Brand name is one of the factors to get a new project		The brand name plays a big part in creating competitive advantage.	Brand name is built by properly delivering solutions.	Brand name is very important and they put in a lot of effort to maintain that name	NE	NE	NE	NE
Customer satisfaction	Keeping clients happy will create more business through referencing	Keeping clients happy will help keep the existing clients	Keeping clients happy will help maintain business	If the client is happy and trusts you they would not want to go to another vendor.	NE	NE	Through repeated cycles of successful delivery clients and providers build a good relationship.	Building a strong relationship with clients is important.	NE	NE

	TeleCo				GenCo				BpoCo	
Other factors	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2
Innovation	Companies need to constantly innovate to maintain competitive advantage.	NE	NE	NE	Company 2 sets trends and drives a lot of innovation.	NE	NE	NE	NE	NE
Customer base	The reference of clients can provide more business.	NE	NE	NE	NE	NE	NE	NE	The clients can vouch for them that will help them get more business	They have an advantage as they already have many existing clients.

	TeleCo				GenCo				BpoCo	
Other factors	P1	P2	P3	P4	P1	P2	P3	P4	P1	P2
Global delivery network	NE	NE	NE	NE	NE	Being a global delivery network means access resources across the world and improve delivery.	NE	Client is not affected because they are a global network and work in different time zones.	NE	NE
Ethics	NE	NE	NE	NE	NE	NE	NE	They are ethical in their approach and adhere strictly by the rules.	NE	NE

Table A8: List of other factors for cross case display