Understanding knowledge creation in the context of knowledge-intensive business processes

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Received 13 November 2015
Revised 22 March 2016
3 July 2016
Accepted 7 July 2016

Abstract

Purpose – *This paper aims to investigate knowledge creation in the context of knowledge-intensive business processes (KIBPs) and seeks to identify the challenges and opportunities associated with this phenomenon.*

Design/methodology/approach – *This study used a grounded theory approach to develop a framework based on 30 interviews across three different types of organizations.*

Findings – *The findings argue knowledge creation in the context of KIBP is negatively influenced by the lack of support for process-competency requirements within knowledge-intensive (KI) processes. These process-competency requirements center on the ability to effectively engage with the process, develop reasoning skills to handle KIBP and gain a higher-level perspective of the KIBP within the organization.*

Practical implications – *For practitioners, the opportunity exists to explore their organizational influences on the process-competencies to reduce the negative impact of any gaps identified within their KIBPs.*

Originality/value – *Although previous studies explore knowledge creation in a broad sense, this paper examines the phenomenon specifically within the context of KIBPs and analyze the potential for organizations to enhance their knowledge creation initiatives in this context.*

Keywords *Knowledge creation, Knowledge management, Grounded theory, Knowledge-intensive business processes, Social competencies*

Paper type *Research paper*

Introduction

Organizations have been increasingly working to understand their knowledge assets within their boundaries. As such, organizations also seek to have their knowledge management (KM) strategies align with their business process management (BPM). Developing the alignment between these two areas becomes more essential when considering knowledge-intensive business processes (KIBPs) that represent core (and often complex) processes within the organization. These processes serve an important role in the organization and the knowledge required often adds value to the processes directly (Gronau *et al.*, 2005). As the complexity of a process increases, knowledge-intensity levels also potentially increases (Marjanovic and Seethamraju, 2008). Examples of such processes include loan approval activities, investment inquiries, and also customer service areas. In general, however, knowledge-intensive (KI) processes can be found across many, if not all, functional areas in organizations.

> **"Organizations have been increasingly working to understand their knowledge assets within their boundaries."**

A KIBP can be defined as a process that requires an individual's judgment based on that individual's experiences and knowledge obtained through a variety of sources such as knowledge repositories or experts (Schymik *et al.*, 2007; Marjanovic and Freeze, 2011). KIBPs can be viewed as a collection of related and often interdependent activities that cannot be fully predetermined, as they often entail innovation on the part of the individual, involve further complex tasks, require extended time to learn the process for effective and efficient enactment and are dependent on factors that influence the organizational environment (Bhat *et al.*, 2007; Eppler *et al.*, 1999).

In the context of KIBP and KM, the activity of knowledge creation is viewed as a continuous process occurring through the interactions between individuals and their environment (Nonaka *et al.*, 2000). The process of knowledge creation, as modeled by Nonaka and Takeuchi (1995), leads to the development of new knowledge in the organization to be used by individuals and organization. Theoretical explanations as to why knowledge creation occurs within organizations have been offered through multiple studies (Brown and Duguid, 1991; von Hippel, 1994; Alavi and Leidner, 2001; Nonaka *et al.*, 2006). However, existing studies stop short of exploring in greater detail how knowledge creation occurs, especially in the context of KIBP, given their distinct characteristics such as level of innovation of the knowledge worker, contingency on environmental influence, short half-life of knowledge within processes and longer time to learn and acquire skills for task completion (Eppler *et al.*, 1999; Marjanovic and Seethamraju, 2008).

Building on extant knowledge creation frameworks, this study focuses specifically on the knowledge creation phenomenon in KIBP. Through data collection and analysis based on a grounded theory approach, we uncover a set of KI process competencies (task engagement, task perspective and task reasoning) that are an aggregation and abstraction of certain individual knowledge worker characteristics. These KI process competencies are argued to be necessary conditions for fostering knowledge creation in KIBP. Just as Nonaka and Takeuchi's (1995) model indicates a spiraling outward motion involving the socialization, externalization, combination and internalization activities, the KI process competencies of individuals identified in our study also continue to evolve as the individuals' involvement with KIBP increases over time. Knowledge creation occurs when organizational data are manipulated to become information and ultimately knowledge that is interpreted and used by individuals (Kalpic and Bernus, 2006). Knowledge creation in KIBP occurs when individual experiences and knowledge are disseminated across the organization through mechanisms that support fostering KI process competencies.

The expansion and use of knowledge across organizations relies on both formal and informal social processes through effective communication. Therefore, expanding the current models of knowledge conversion to provide a perspective within KI process competencies can be warranted to help identify organizational mechanisms through which knowledge can be shared and used in relation to KIBP. In addition to uncovering the KI process competencies themselves, this study also presents an interpretation of how these competencies impact knowledge creation in the context of KIBP with the intent to bridge the two previously unconnected topics within KM and BPM.

The following section reviews the extant literature and provides underlying concepts of KIBP and organizational factors influencing knowledge creation. Further sections provide a

discussion on the research method used along with the findings of the study resulting in a framework for knowledge creation associated with KIBP. Implications for practitioners and direction for future research are developed from the framework. Finally, conclusions and limitations of the study are provided.

Literature review

Knowledge-intensive business processes

Organizations across various industries (such as health care, manufacturing, financial, educational and government) can be described as having KIBP, and most will consider themselves to be knowledge-intensive, given their reliance on knowledge manipulation and creation to facilitate their tasks (Davenport and Grover, 2001). For example, health care organizations rely on KIBP in functional areas such as clinical (diagnosis), administrative (invoicing and billing) and financial segments (loan analysis). In addition, organizations with new product development often involve KIBP, given the need to provide cross-functional interactions (Ramesh and Tiwana, 1999). Organizations using KIBP need to implement strategies to align their KM practices with these processes to provide the necessary support and knowledge required within their business processes (Bhat *et al.*, 2007; Schymik *et al.*, 2007). With knowledge intrinsically connected to individuals, it becomes essential for organizations to view their knowledge resources as essential components for KIBP (Marjanovic, 2010).

Although studies have addressed KIBP, further understanding of how knowledge within KIBP effectively impacts organizational efforts is needed (Kalpic and Bernus, 2006). Initiatives and continued efforts to identify areas that foster knowledge creation activities within the KIBP strategies are also needed (Freeze and Robles-Flores, 2005). It has also been argued that the dynamics of business processes within organizations are dependent on knowledge, individuals and infrastructure (Consoli and Elche-Hortelano, 2010), thus emphasizing the need to explore the connections between these areas further. Knowledge has been equated to the information, skills, experience and personal attributes of the individuals involved in the business process (Kalpic and Bernus, 2006; Marjanovic, 2010; Woitsch and Karagiannis, 2003). It is the interconnection between individuals and their environment that assists in the development of the dynamic nature of knowledge creation (Nonaka and Toyama, 2003).

Organizational factors influencing knowledge creation

To effectively handle the KM processes, an organization must have an understanding of how these processes impact their organizational structures (Gold *et al.*, 2001). Further, the need exists to have organizations align their processes of knowledge creation with organizational strategies, supporting the argument to understand organizational factors impacting KIBP (Chen and Edgington, 2005). Supporting the need to build on the social competencies, organizational factors impacting knowledge creation are generally associated with people and processes (Choi and Lee, 2002). In general, organizational culture, infrastructure, strategy and purpose have influenced KM activities including knowledge creation (Kalpic and Bernus, 2006). However, it is often difficult to identify one specific area or factor that influences KIBP (Freeze and Robles-Flores, 2005).

Organizational environments influence the social practices among its individuals and supports the social structures which provide the means through which individuals interact

"It was evident that KI process competencies are key to effective enactment of KIBPs."

> **"Developing KM task engagement and KI task perspective enhances the opportunity for organizations to guide their employees toward handling KIBPs more effectively."**

with others (Nonaka and Toyama, 2003). It is these social structures which then influence the KM activities as well as developing trusting relationships between individuals and groups (Nelson and Cooprider, 1996). Understanding these dynamic social structures begins by studying the underlying social competencies of the individuals and groups connected with KIBP. Organizations can then expand their capabilities in knowledge creation and be in a better position to handle its dynamic nature of KIBP (Sun, 2008).

Knowledge creation is influenced through the ability of the organization to provide social network opportunities for its employees to support stronger connections (Smith *et al.*, 2005). Enhancing the commitment of its employees, organizations are able to provide opportunities for stronger knowledge creation capabilities and alignment with strategic goals. However, organizations need to be able to adapt its methods due to the dynamic nature of knowledge creation. Organizations need to understand and clarify how their KIBP routines and procedures allow for knowledge creation processes to become better incorporated into their current structures (Anand *et al.*, 2007). Thus, this provides organizations the opportunity to adjust their current policies and routines, given knowledge creation requirements.

Knowledge is directly connected to individuals and therefore should be explored as an essential part of any business process (Marjanovic, 2010) which can be defined as a set of activities which lead toward the transformation or change of organizational inputs into desired outputs through use of organizational resources. Within the context of KIBP, individuals use their knowledge obtained through skills and experiences developed through their interactions. The ability of individuals to navigate through KIBP and use knowledge is based on their connections to the social competencies, therefore indicating a need to further understand these connections. Within KIBP, it is the human ability to interpret the information obtained and transform the information to knowledge (Smith, 2001), thus providing the individual with the opportunity to further develop their own intuition and innovation based on KIBP experiences.

Past studies have shown knowledge creation to be an important aspect for organizational KM development influenced by varying factors. At the same time, organizations are using KIBP for handling many aspects of operational practices. Given the importance of knowledge creation and KIBP to support organizational structures, it becomes essential to explore the connection between these two areas. Whereas previous studies have explored these two areas individually, this study attempts to contribute to the literature by focusing on knowledge creation within the context of KIBP to bridge the gap between the areas.

Research methodology

Research design

For this research, a grounded theory approach was selected to develop a framework based on the data and analysis rather than testing previous theories or hypothesis. This method seeks to explain and interpret the connections within the phenomenon. The grounded theory approach was adopted due to:

- the structure it provides for analyzing processes in the environment directly (Charmaz, 2005);

- the assumption that individuals within the environment are actively constructing the reality in which they work, which in turn guides them toward future objectives (Isabella, 1990); and
- its dynamic approach to theory development for relatively new perspectives for a research agenda (Suddaby, 2006).

Traditional approaches to grounded theory suggest that no *a priori* knowledge should be obtained through a literature review or the development of research questions to avoid any preconceived ideas of the phenomenon. However, for this study, a basic review of literature was conducted to provide an understanding of prior KM and KIBP research contributions and gaps in framing the boundaries of the study, but not used to build a theoretical framework (discussed later and illustrated in Figure 2) prior to the investigation.

For the study, three organizations representing three industries (health care, financial and education) were explored due to their different approaches to strategic mission and objectives. Whereas the health care and financial institution represented a profit-based business model, the educational institution was identified as a non-profit organization. Each organization was based within the state of Iowa; however, the health care institution was represented across eight major regions in both Iowa and Illinois spanning over 280 clinics and 29 hospitals. This provided a unique opportunity to examine KIBP within one key area of the institution impacting multiple areas across the organizational structure. The financial institution represented the smallest of the three organizations; however, the size of the institution allowed for more interactive sessions and observations to occur. Despite its small size, the financial institution provided a wide variety of services to individuals and businesses across its community including personal banking, agriculture financing, real estate services, insurance and wealth management. All three organizations were well established in their industries and have demonstrated the ability to adapt to their changing environments either through changes in procedures, policies or through available services to their targeted populations.

These organizations were approached with the idea of conducting a research study, and each agreed to allow employees to participate in interviews. Despite the different KIBP that were involved in each organization, the common thread between these organizations was their viewpoint that KM and KIBP methods and strategies are an important aspect of their organization's functioning and productivity. In addition, through initial review of the organizational structures, it was noted that each organization provided differing levels of training and resources across their organization. For this study, this arguably provided varying perspectives on organizations' approach to KM initiatives. Thus, studying three different types of organizations provided an opportunity to develop a more generalized framework. With each organization demonstrating different perspectives on their KIBP and KM strategies, the potential existed to have rich and more diverse range of data collected.

Research context

The research focused on interviews with 30 participants from the three organizations. An equal number of participants were selected from each organization. Participants represented full-time employment ranging from less than one year to over 35 years in the industry. The age range for the participants was also diverse including individuals from early 20s to retirement age. As such, participants did demonstrate different levels of experiences and backgrounds. Each interview was conducted in private with one of the authors and lasted approximately an hour in duration. The interviews involved individuals representing different managerial and staff levels within the organizations. Individuals selected within the organizations included:

- upper level managers able to provide long-term perspectives on organizational strategies;

- mid-level managers directly involved with day-to-day operations; and
- lower-level staff members where functional perspectives of handling KIBP occur on a daily basis.

The interviews provided the rich primary data to learn about the employee perceptions, concerns, observations and reactions to KIBP in their areas.

The health care institution was a regional medical center and teaching hospital providing services in cancer treatment, cardiac care, maternity, emergency and other programs with over 4,000 employees. Given the size of the institution, the study focused on one particular area involving patient admittance and clinical testing areas. The financial organization represented a regional bank providing personal, commercial and farming services including loans, insurance and investments. The financial organization was the smallest of the three organizations with about 30 employees across four branches. The educational institution was a private, liberal arts college offering undergraduate and graduate program with over 200 employees in faculty and staff positions.

The interviews conducted included participants deemed to be directly involved with KIBP activities in their department or organization. Given the characteristics of KIBP with attention given to the length of time needed to acquire knowledge for KIBP, participants selected had been with the organizations for multiple years. Across the three organizations, participants (86 per cent) had experiences with KIBP for six or more years. Some participants (14 per cent) had been in their current positions for less than five years.

Data collection

The interviews were conducted through a semi-structured format to allow for both static and dynamic questioning to be used. Interviews were recorded for reference and transcriptions to be created. Interview questions used were based on obtaining:

- a foundation of the participants' perspective on organizational factors and KIBP;
- an examination of factors and behaviors related to KIBP; and
- an appropriate ending to the interview.

The semi-structured format was used to provide a consistent structure for each interview and was developed to allow flexibility in the questions as needed based on participant responses. Following the analysis of the interviews and transcripts, six individuals were selected for follow-up discussions to clarify and validate their responses.

Data analysis

Through subjective interpretation, data that are systematically collected can be analyzed to build an understanding of the phenomena within the context of the study (Carroll and Swatman, 2000; Orlikowski and Baroudi, 1991). Therefore, the underlying objective behind the approach was the development of a framework through data collection and interpretation. As each interview was completed and transcribed, data analysis involving initial coding provided an understanding of the corresponding organizational environment. Codification of the transcriptions was conducted on a line-by-line basis to detect similarities or differences between the transcripts. Codes used reflected the perceived action from the responses along with identification of any gaps observed. By identifying gaps, subsequent interviews were refocused to ensure interviews were centered on knowledge creation and KIBP. The initial codification of the transcripts resulted in 102 concepts including, but not limited to "building understanding", "interacting with others", "data requirements for tasks", "socialization activities" and "identification of tasks". The process of coding was flexible to allow the codes to accurately reflect the data rather than attempting to code the data to fit any preconceived category. For example, one participant mentioned the discussion of actions within an office in response to a question regarding what was discussed during

meetings involving several individuals. This led to a concept regarding the identification of task procedures. Throughout the initial coding stage, codes were compared to explore common responses. One example includes responses from two individuals:

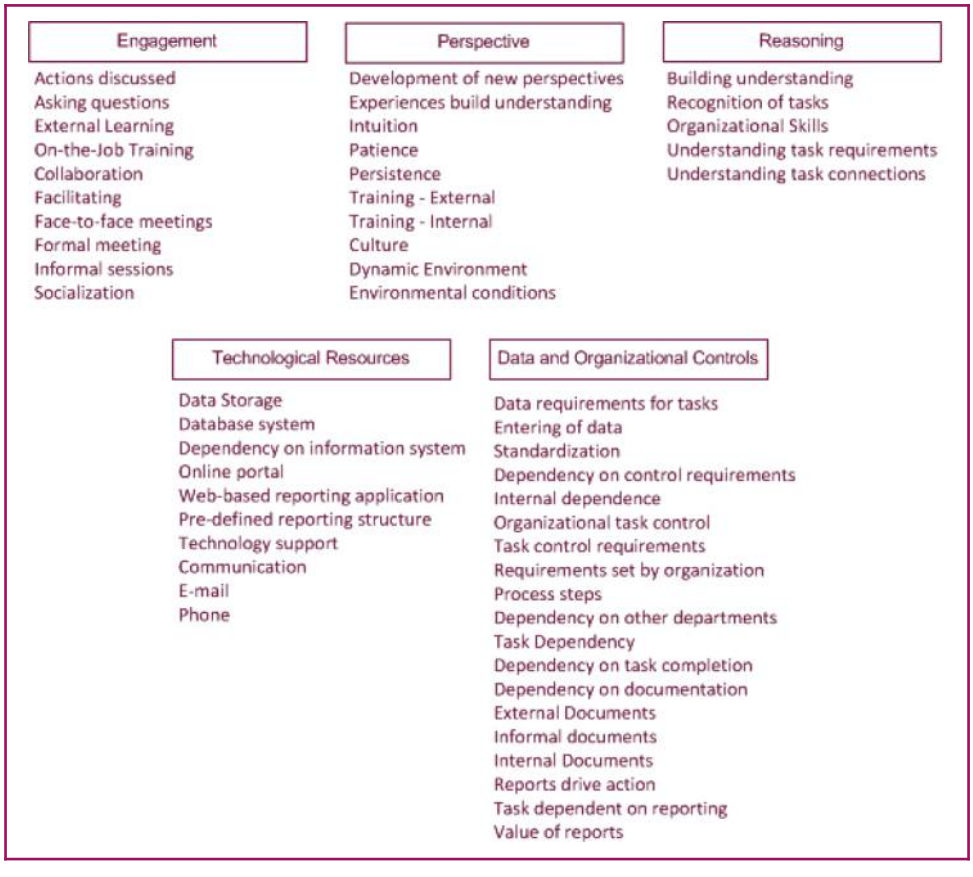
> There are so many touch points with the information which triggers responses from different areas. As staff members communicate with others, new knowledge can be developed because of changes in the regulations or polices. This knowledge is then brought back into the organization and can impact our own policies – Participant, Healthcare.

> The task or procedures drive what we do. We do have certain aspects which need to be covered [. . .] so we need to follow what is set by the organization – Participant, Financial.

The key points revealed in these two responses indicated not only the "importance of having task procedures" but also "procedures linked to organizational policies". Comparing codes obtained through the interviews against each other led to a more focused coding scheme where redundant codes were eliminated due to similar processes or actions. The remaining concepts were then grouped under abstract headings based on patterns and relationships reflecting the perceived actions (Figure 1).

The "Six C's" coding family (context, conditions, causes, consequence, contingencies and covariance) introduced by Glaser (1978) provided a structure for exploring the relationships of the groupings for further refinement and to define the core category. One aspect of the coding family, covariance, was not incorporated, given the limited access within the organizations and lack of enough information to determine how changes in the areas impacted the various components of the model. Through the analysis, the core category, *KI process competency-requirement gap*, emerged through common associations. The conceptualized framework provided a general interpretation that

Figure 1 Recurring themes forming categories



knowledge creation opportunities are negatively influenced when a lack of KI process competency opportunities for employees exist within organizations.

Knowledge-intensive process competency-requirement gap

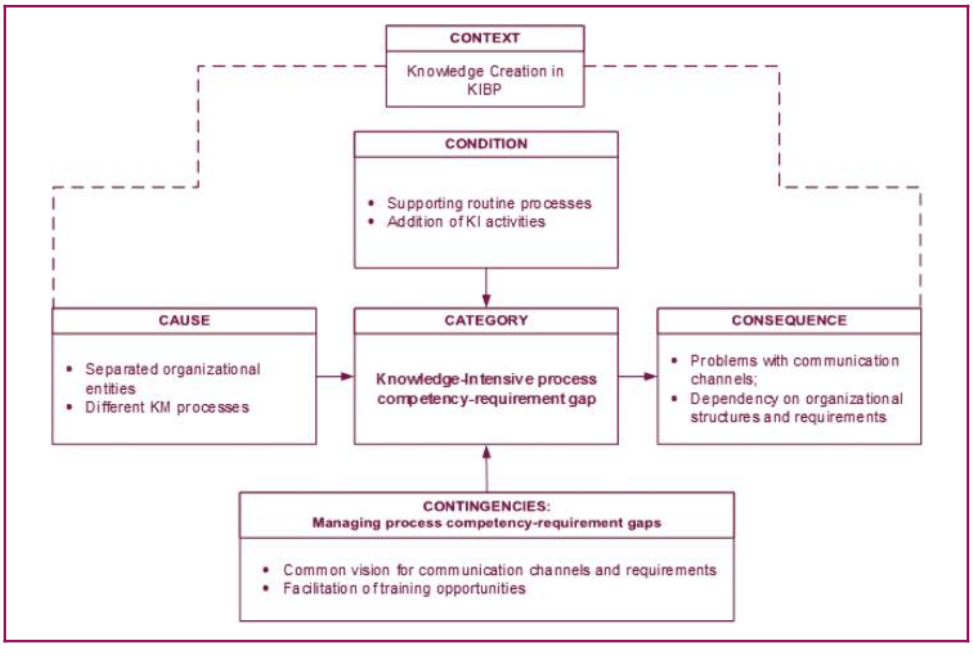
The emergent conceptual framework is shown in Figure 2. It shows the core category of *KI process competency-requirement gap* in relation to the context, conditions, causes, consequence and contingencies. The framework provides a unique lens to understand KI process competency-requirement gaps influencing knowledge creation opportunities in the context of KIBP. Whereas previous studies emphasized the organizational factors and influences, the emergent framework from this study identifies the need to enhance the process competencies of knowledge workers to positively influence knowledge creation activities within KIBPs.

The KI process competencies identified from the analysis do not always refer to physical traits, but were seen through the ability of the employees to positively handle their own beliefs, goals and overall perceptions of KIBP and consequently influence knowledge creation in the organization. It is through these competencies, employees are able to build new representations of their environment and develop their own cognitive abilities to be used toward productively contributing to KIBP and knowledge creation. The coding analysis described earlier revealed that KI process competency manifest in three key subcategories that build on each other in an incremental manner. First, *task engagement*, refers to knowledge sharing-oriented actions facilitating knowledge creation. Building on this, *task perspective* refers to developing deeper understanding and internalization of complex tasks in KIBPs. Finally, *task reasoning* refers to actions such as critical thinking and adaptation to perform KI processes productively. These aspects of KI process competency requirements are elaborated next, followed by the context, conditions, causes, consequence and contingencies.

Knowledge-intensive process competency requirement: task engagement

As an initial stage, task engagement is associated with the opportunities provided to employees through informal or formal activities which allow for interactions to occur between individuals. As stated by two participants:

Figure 2 Core category: KI process competency-requirement gaps



> We come from different offices, but have a good understanding of how the organization operates. Bringing this knowledge to the meeting and then combining it with what we do provides a good opportunity to build new knowledge – Participant, Financial.

> I think verbal communication is important and makes us a more cohesive office. Sometimes we find a solution simply by talking through the issue and through going the situation – Participant, Educational.

As such, these activities provide knowledge sharing to understand what would be required for KIBP. Viewed as an important first stage for knowledge creation, organizations need to support and encourage both informal and formal sessions. Engagement activities provide a key step in moving knowledge from one person to another which enables the knowledge creation activities to occur through dynamic methods (Thompson and Cavaleri, 2010; Alavi and Leidner, 2001). Individuals are then able to build on their knowledge and develop common understandings or objectives based on the integrative efforts of each person (Sitterle and Kessler, 2012). Therefore, higher levels of engagement provide the ability to exchange both tacit and explicit types of knowledge essential for knowledge creation.

Knowledge-intensive process competency requirement: task perspective

Characteristics associated with KIBP can be defined as entailing activities which cannot be fully predetermined and require innovation, includes additional complex tasks and an extension of time required for learning processes (Bhat *et al.*, 2007; Eppler *et al.*, 1999). As such, developing a deeper understanding of KIBP becomes essential and requires individuals to move beyond task engagement opportunities. Knowledge can be obtained through engagement activities; however, participants commented on the need for additional internal and external training opportunities through which knowledge could be applied and new knowledge could be obtained. Participants emphasized the importance of these mechanisms to internalize the nuances and create their own mental model of complex knowledge-intensive tasks. One participant noted:

> Through discussions with others, it is apparent that each person has a different perspective on the situation. They are using information and knowledge provided to them [. . .] as needed according to the situation – Participant, Healthcare.

Participants expressed the value added through enhancing their understanding of the KIBP itself and the pertinent knowledge required to accomplish it. Having a better perspective on the purpose and nuances of the KIBP led participants to be able to envision potential variations and scenarios within the KIBP and the knowledge sources required (Knoll and Horton, 2011). By having this understanding, participants commented that they were able to make adjustments to how KIBP would be handled but still maintain the organizational requirements. Participants noted feeling competent to be able to handle KIBP more effectively:

> I think it comes down to a willingness to learn. If some is close minded or doesn't see the need for the interactions, then that person isn't going to learn as much as someone who is asking questions and speaking to others – Participant, Financial.

> Any time you are involved in training, people are able to explain to others what your job duties are and how they may be handled, why we do it, and what is important to us – Participant, Healthcare.

Previous studies (Gold *et al.*, 2001; Pee *et al.*, 2010) also support the need for developing task perspectives. Knowledge workers need to leverage existing knowledge to develop new knowledge. This often requires individuals to be engaged with each other to develop shared mental models as new knowledge. Through these engagements, individuals are able to develop new perspectives based on the associations between previous knowledge. Knowledge creation can occur based on how well current knowledge is interpreted and understood (Chen *et al.*, 2010).

Knowledge-intensive process competency requirement: task reasoning

Reasoning skills provide the opportunity to develop new knowledge by drawing appropriate inferences, judgments or conclusions through participation in KIBP. The development of task reasoning skills provides opportunities to examine KIBP and explore how they can be enhanced or altered to meet the dynamic need of the organization:

> I think it helps to have people step out of their own areas and recognize what others go through. Then, they have a better understanding of what may be needed – Participant, Educational.

Previous experiences and interactions help shape an individual's task reasoning skills. Through reasoning, individuals learn how to ask relevant questions, work through complex situations and infer knowledge from multiple sources (Safi and Burrell, 2007; Nissen, 2005). However, building reasoning skills can be seen as a challenge:

> This is not something that can be readily trained in others. There are people with different backgrounds, attitudes, and thought processes. I want someone who understands the whole picture. You become less valuable to the organization if you can't ask questions about why we do that or ask if there is a better way to do that [task] – Participant, Financial.

Employees need to be supported and encouraged to rely on their intuition and build inferences in regards to how KIBP are handled and what knowledge is needed. By increasing levels of task engagement and perspectives, task reasoning skills can be developed to allow for critical-thinking and problem-solving capabilities leading employees to provide a higher perceived value for the organization (Grant, 1996; Hussi, 2004).

Context

Knowledge creation within KIBP serves as the overarching context and backdrop against which the core category of KI process competency-requirement gap emerges from the data. It is key to understand this setting of knowledge creation perspective, particularly focused on business processes that are characterized by medium to high levels of knowledge intensity. It allows us to situate the relationships observed between the core category and other aspects.

Conditions

Two conditions can be considered essential for emergence of the concept of KI process competency-requirement gap within the aforementioned context. They are:

- availability of enterprise resources focused on supporting routine processes; and
- addition of KI activities to its otherwise conventional routine processes.

In this research, several processes within the organizations were identified as routine based on the nature of how these processes were conducted as well as lack of a need for deeper understanding of the process on the part of the employee for successful process completion. For example, some tasks were focused on data entry or notification processes and required little knowledge, experience or background to complete.

Based on the analysis, it was found that organizations often use structured, rigorous and better support (such as training opportunities) for routine processes, while support for KI processes is lacking. Also, a one-size-fits-all approach is taken where organizations use same strategies in supporting KIBP as those for routine processes. As such, although participants had knowledge to complete routine processes, they had a perception of being unprepared for the more complex and challenging KIBP processes. Whereas training for the routine processes was viewed as being adequate, training sessions to handle KI processes were not beneficial as noted by one participant:

> Training sessions were often "one-way" sessions where managers would provide information without much interaction. We didn't learn as much in these types of sessions – Participant, Healthcare.

Practitioners need to consider the need for additional support, such as training, to provide employees the opportunity to gain skills related to KI process competencies. In addition, providing technological resources to support KI activities was also viewed as an important aspect by participants. Technology provides the means for sustaining the knowledge required (Overby, 2008); however, the organization is then required to place value on the utilization of technology among its employees. Several resources were noted by participants; however, it was the utilization of information systems, databases and intranet portals which received attention:

> The reports are handled through our web-based system allowing a person to generate reports for individual or group use. It is directly connected to our database system so the data pulled is actually the most up-to-date available – Participant, Educational.

> The [online] portal is commonly used. I know people are using the portal as a means to share information – Participant, Financial.

The use of technological resources provides a mechanism from which knowledge can be handled and therefore lends itself directly to supporting knowledge creation within KIBP. By improving the connection between information technologies and individuals, a more effective working environment can be developed, thus increasing the understanding of how these resources can support KIBP (Nelson and Cooprider, 1996). Information technologies enable employees to access a larger set of knowledge, and as this aspect increases, knowledge creation opportunities can also increase (Alavi and Leidner, 2001).

Causes

In regards to the causes for KI process competency-requirement gap, within each organization, participants noted the two major causes. This includes the silo nature of organizational entities that pertain to KIBP and the use of multiple distinct processes for their KM.

Participants mentioned that face-to-face interaction was the preferred method when handling or discussing KIBP. However, these types of interactions were not supported as an option, given time commitments or geographic constraints preventing such communication. Employees then relied on electronic methods such as e-mail, phone or online conferencing for discussions. Although these technologies were made available, employees perceived these methods as being slow, inconsistent or unreliable:

> There is a lot of information. We do try to get information out to people as quickly as we can because it is a dynamic environment – Participant, Healthcare.

> This is a very dynamic environment and there is a great need to make sure all of the information is available to share with others regardless of their department – Participant, Financial.

When knowledge and information is not disseminated as needed, KIBP will be impacted negatively, as knowledge required is not provided or available. The challenge, as mentioned by a participant, is the lack of immediate responses between individuals. However, other participants noted:

> Training is always updated. Employees will go through additional training sessions. We're all open and willing to share. No one wants to keep information from someone – Participant, Financial.

Employees also commented on their use of various documents to maintain knowledge. In essence, these documents served as means for future reference by an individual or group:

> Many of the employees will have their own reference books containing the knowledge they need to recall. Often, they will have this knowledge referenced in this way since there is so much information going around – Participant, Healthcare.

However, other participants indicated their frustrations with a lack of communication regarding document creation. It was found that often reports and the reference materials

which may have been developed as a result of the KIBP were not shared. Therefore, any documents (either formal or informal) containing knowledge regarding KIBP needs to be part of the overall awareness of the organization.

Consequences

The analysis explored the effects of the KI process competency-requirement gaps. In the context of knowledge creation within KIBP, the lack of alignment between KI process competencies and the requirements was found to impact two critical areas negatively in the sense of knowledge creation. This included:

1. problems with the communication channels between individuals/groups; and
2. dependency on organizational structure and requirements.

Active communication channels between individuals and groups were perceived to be crucial for employee development. Participants expressed the desire and need for effective communication; however, participants also expressed varying levels of frustration with how or when communication occurred. It was noted that employees often felt unsure of who to talk to regarding KIBP, where to find knowledge or even when it was appropriate to discuss issues surrounding KIBP.

Although multiple communication methods were described, it was the face-to-face interactions which were desired by the participants when dealing with KIBP:

> We often talk about new information face-to-face. I think the personal communication is the best so any questions can be answered. Talking to someone is a faster method – Participant, Educational.

> Through open discussions, each of us was able to gain a new information in regards to the topic at hand leading toward new personal knowledge – Participant, Healthcare.

Participants often mentioned their interactions with each other as being a key impacted factor due to a gap between KI process competencies and requirements. To alleviate this issue, participants commonly referred to the need for a dynamic environment requiring faster response times, learning opportunities and an environmental culture supporting the KIBP and their own perceived needs to accomplish the KIBP.

Training opportunities, both formal and informal, were viewed as being an important aspect for the employees to engage in communication. These sessions allowed for a deeper understanding of how KIBP were connected to other areas beyond their own organizational boundaries:

> If we have a difficult situation that needs some help, we always ask each other. As a team, we can then discuss ideas and thoughts about how to continue. We share our thoughts and ideas – Participant, Healthcare.

Understanding how KIBP are interconnected across multiple functional boundaries, and what knowledge is available allows a common broader perspective of the organization. As a result, the engagement between individuals can be increased and boundaries between organizational entities can be reduced.

The analysis reflects that each of the organizations relied on different forms of organizational controls associated with data requirements, policies and external requirements. Data requirements served as a means of initiating certain KIBP tasks and influenced how or when subsequent tasks could continue or be initiated. Other controls included defined policies through both internal and external environments. These controls often provided guidance to employees as to what or where knowledge could be found to assist in the completion of KIBP.

The study revealed various organizational controls, which are defined by the organizations themselves based on their policies and procedures established. These controls were noted to dictate how knowledge is collected, accessed and maintained. Essentially, the controls

not only provide descriptions of task roles, responsibilities and resources but also state the policies and procedures for task completion and handling (Gold *et al.*, 2001). Given the importance of KIBP within the organizations, several participants noted they "needed to follow the guidelines established":

> We do have certain aspects which need to be covered so we follow what is set by the [organization]. Any new knowledge which might result can impact how we proceed with a task. If anything, it would likely impact how we handle the task the next time – Participant, Financial.

Further, it was noted by many of the participants, the need for their organizations to be adaptive in nature when working with processes; however, it was mentioned the ability to make adjustments was not also perceived as quick. It was recognized to be adaptive in their KM strategies, but the organizational perspective on how to implement potential changes to these strategies was not always evident. Therefore, the structure for developing, evaluating and altering organizational controls is important to be established across the entire organization to support the organization's KM strategies.

Contingencies: managing knowledge-intensive process competency-requirement gaps

The data gathered from the participants revealed two common themes that can potentially help alleviate the KI process competency-requirement gaps. These include:

1. supporting a common vision for communication channels; and
2. engaging in multiple approaches for training opportunities.

These emergent strategies noted from the participants' comments who work closely with KIBP on a regular basis can inform management and practitioners in how to manage the KI process competency-requirement gaps, and in turn facilitate knowledge creation in KIBP.

Supporting common vision for communication channels. By supporting and encouraging the opportunities for interactions, the organization can help enable the flow of information and knowledge across the departments. As employees understand how KIBP are connected and who is involved, information flows more efficiently and new knowledge can be developed:

> I think new knowledge was created when the staff member understood the task through a different perspective. This perspective allows staff to make adjustments and handle the task differently if needed – Participant, Financial.

As we are able to learn more about each of our areas a bit more, we are able to take that information and learn from it. We were able to take that information and then create knowledge based on our new perspectives on each of the areas involved.

The use of technological resources and support of these resources were seen as a key part of the overall structure to provide many aspects of the communication channels. With technology being made available and supporting KI process competencies, employees are not only able to contribute to the general collection of knowledge but also lend their own perspectives to knowledge creation. Technological resources are then viewed as a moderator which allows employees to engage and interact with others. Thus, technological resources need to be monitored to authenticate the activities associated with KIBP and overall processes to ensure its benefit is being achieved (Overby, 2008).

Multiple approaches to training opportunities. It was evident that the organizations placed value on their KIBP and implemented conditions and mechanisms to support these tasks. Training was a common aspect and seen as a key mechanism for providing knowledge and experience to employees; however, training was handled differently between the organizations. Informal opportunities for interactions and training were perceived to provide greater value for the employees. These sessions often occurred at the initiation of the employees and provided an opportunity to discuss specific situations and provided a more immediate reaction or discussion for quicker responses. Participants mentioned:

> Staff needs to know how to ask the right questions which begins in the training. It comes back to experiences. It takes time for an employee to learn the tasks and what needs to occur. A lot of training is done one-to-one and through hands-on experiences – Participant, Healthcare.

> The hands-on experiences becomes valuable in order to learn how to handle the situations and have the knowledge on how to proceed, react, and solve a situation – Participant, Healthcare.

Formal sessions or scheduled meetings were more often perceived as less appealing, given the method for knowledge dissemination and not as effective. In addition, formal sessions were viewed as not being timely and occurring only after a KIBP was completed. Informal sessions allowed employees to discuss KIBP and share their individual knowledge regarding the situation immediately. Thus, the nature of these interactions was viewed as a method to develop trusting relationships between individuals and viewed as an important aspect within KIBP.

Research validity

Within the context of the study, the validity of the grounded theory approach and analysis can be explored. Four validity tests can be discussed to determine the quality of a research study including construct, internal, external and reliability (Yin, 2003).

Construct validity

The phenomenon studied was related to understanding knowledge creation in the context of KIBP. Three organizations were selected representing three types of industries: health care, financial and education. The use of the three organizations provided an opportunity to triangulate the analysis with the intent to provide some generalizations. The organizations were selected due to their inherent differences in both service and size. Individuals selected were directly involved with identified KIBP within their organizations. Follow-up interviews were conducted with six of the participants to verify their responses. Due to limited availability and access, not all areas of the organizations were represented.

Internal validity

Although interviews were permitted to occur (and be recorded), it was noted by supervisors that interviews needed to be kept within a reasonable time frame to avoid disrupting the working environment of the offices. Through the interviews, participants often noted their use of manuals, policies and other documents related to their ability to handle KIBP; however, these documents were not permitted to be distributed to a person not associated with the organization. Despite this limitation, follow-up questions were used to determine the perceived value and use of these documents. It is also noted that interviews may tend to provide only the employee perspective of their environment and may present an artificial reality. However, as each interview was completed, a more accurate description of the environment was believed to be obtained. The follow-up interviews also provided an opportunity to clarify any perceived misconceptions which might have arisen.

Following each interview, transcriptions were created through the use of the ATLAS.ti software through which the line-by-line analysis could be conducted. Through repeated comparisons, the codes were grouped according to similarities or differences. Thus, the groups were a result of comparing findings against each other through an iterative process.

The analysis and interpretation within the study was supported by prior knowledge of KM and KIBP literature; however, hypothesis or conclusions were not developed prior to the study. This allowed for the development of a framework, which is elaborated in the Discussion section, based on the data collected through the interviews. Gaps in KI process competency can be caused by a separation between organizational entities and different KM processes. The consequences of these gaps suggest problems with communication channels and an over dependency on organizational structures where knowledge creation is not achieved. The framework provides a perspective on the areas required for

developing these areas by supporting areas directly related to increasing KI task engagement, perspective and reasoning to develop knowledge creation opportunities.

External validity

Participants across the organizations were asked a series of questions similar in structure; however, specific questions differed due to the responses provided by each participant. The use of three organizations provided an opportunity for the study to be more robust in comparison to studying a single organization. Based on a limited literature review prior to the study, it was believed that the use of three organizations would sufficiently provide the basis for studying the phenomenon. Given the use of the interview questions, the study could be replicated; however, the nature of the environment and individual perspectives could alter over time, thus providing a chance for a different interpretation.

Reliability

This study followed the guidelines set forth by the grounded theory approach outlined in the paper. The operational stages of the research included data collection through interviews, transcription of the interviews, analysis through initial and focused coding techniques and data interpretation. Through these stages, the core category was revealed along with the corresponding groupings of the framework presented.

Discussion

Although previous studies have examined knowledge creation and KIBP as separate topics, this research focused on the collective aspect of both areas and one of the first to reveal how social competencies influence knowledge creation in the context of KIBP. Using interview data as a primary source regarding the organizational environments, the study revealed the impact of developing the process competencies of employees connected with KIBP, thus enhancing the potential for knowledge creation. The results suggest a framework (Figure 2) for understanding the KI process-competency gaps which can exist. To overcome these gaps, organizations can expand their opportunity for knowledge creation in the context of KIBP through the development of KI process competencies comprising of three main areas including *task engagement*, *task perspective* and *task reasoning*, through which employees gain skills, knowledge and experience. As this progression occurs, employees are able to understand and use the knowledge required for KIBP, ultimately leading toward opportunities to develop new knowledge valued by the organization.

Common responses revealed recurrent themes surrounding the need for more hands-on experiences, technologies and socialization opportunities. Employees conveyed the need for both new and current members to use more personalized training experiences to develop the knowledge required for KIBP. Participants often indicated that it takes at least six months of on-the-job training to build and learn the knowledge required. We also noted that the perceived complexity of the KIBP itself dictated the need for further training opportunities. The opportunities for training was recognized as key, with the goal of providing more knowledge and a deeper understanding of KIBP; however, participants mentioned the time required for training was often not available due to other commitments.

As suggested by previous studies (Alavi and Leidner, 2001; Freeze and Robles-Flores, 2005; Kalpic and Bernus, 2006), many factors can be seen as influencing KM and knowledge creation activities. Social competencies in relation to organizational objectives have been the subject of previous research studies across disciplines which argued the need to improve these skill areas. However, the focus within these studies has been limited to general KM and overall management strategies (Cicmil and Hodgson, 2006; Marcus and Anderson, 2006; Swan and Scarbrough, 2001). Further, studies noted knowledge creation being intrinsically connected to individuals within the organization (Alavi and Leidner, 2001; Gold *et al.*, 2001; Janz and Prasarnphanich, 2003). Building on these findings, this study

revealed the need to also facilitate the development of the KI process competencies of employees directly as a means to increase knowledge creation opportunities in the context of KIBP.

By focusing on the development of these competencies, individuals will be able to build on their knowledge and develop common objectives based on integrative efforts (Sitterle and Kessler, 2012). Through task engagement, individuals are able to develop new perspectives by generating new knowledge based on the associations between previous knowledge obtained (Knoll and Horton, 2011). Further, individuals are able to build on their task reasoning to learn how to ask relevant questions, work through complex situations and infer knowledge from multiple sources (Nissen, 2005).

Implications and future research

In this research, it was evident that KI process competencies are key to effective enactment of KIBP. Gaps between these KI process competencies and the requirements need to be mitigated to foster knowledge creation in KIBP. The analysis from this study reveals implications for both individuals and organizations. The potential exists for the development of the competencies to be supported through:

- social interactions (both formal and informal);
- continuation of ongoing training opportunities as a method for understanding how KIBP tasks are connected and what knowledge is required; and
- development of problem solving activities related to KIBP.

As the competencies are developed, employees will be able to contribute to knowledge creation activities within KIBP through:

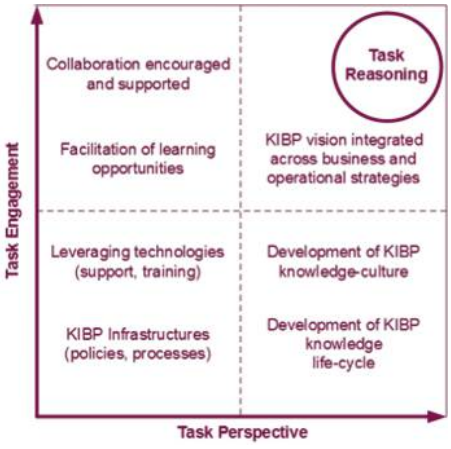
- opportunities to reflect on the knowledge used by the organization and understanding why and how such knowledge is being used;
- providing opportunities to examine trends and relationships associated with KIBP tasks and to discuss why KIBP tasks occur within their organizations; and
- discussion and argumentation related to the knowledge being developed, and why or how this knowledge is being generated.

Such activities further allow employees and organizations to evaluate their KI processes in a deeper, more meaningful, manner to develop and understand their connections to these processes better.

For practitioners, several suggestions can be derived in terms of developing these competencies with the objective of building toward higher level KI task reasoning. The development of these competencies can then lead toward more effective KM practices in KIBP processes. Figure 3 illustrates that as levels of task engagement and perspective increase, a path toward achieving a higher level of task reasoning exists.

Through an exploration of these areas, developing KI task engagement and KI task perspective enhances the opportunity for organizations to guide their employees toward handling KIBPs more effectively. These practitioner-focused opportunities are elaborated next. First, create or revise KIBP infrastructures by establishing policies, processes for capturing and organizing knowledge, training and technology support. By providing a more defined set of procedures for KM, employees will be able to develop a better understanding of what knowledge is required for the KIBP. In addition, establishing a clear KIBP infrastructure allows for a more systematic and defined structure to be developed. Second, leverage the current technology through assessment, selection and supporting KIBP-related learning and KM. Although various KM and KIBP technologies are available to support the organizational expectations, improving the IT effectiveness and efficiency through evaluative techniques can exist (Bhatt and Grover, 2005). Therefore, providing

Figure 3 Framework for developing competencies



opportunities for the organization to leverage their IT assets in a more value-adding and nurturing manner in relation to their KM and KIBP strategies. Third, develop a KIBP knowledge life cycle illustrating knowledge through the stages of organizing, categorizing, classifying, disseminating and destruction. Through the development of a KIBP knowledge life cycle, organizations and its employees will be able to gain a better perspective on the stages of KM as well as the necessary resources and constraints to support the organizational strategies (Choi and Lee, 2002). Fourth, develop a KIBP knowledge culture by examining innovation requirements for knowledge creation, breaking down barriers between organizational areas, geographic locations and motivate employees to share knowledge. The organization's overall knowledge culture which emphasizes KM practices can positively influence collaboration and KIBP effectiveness. As seen within KIBP characteristics, KIBPs require a strong human element for decision-making and judgment, therefore requiring effective collaboration across KM strategies (Gold *et al.*, 2001). Fifth, convert knowledge into learning by maximizing learning at individual levels, facilitating the capturing of tacit knowledge from areas and convert to explicit forms for other organizational areas and individuals. Providing the methods for facilitating knowledge capture and conversion across organizational boundaries can allow for an opportunity for building stronger inter-relationships. This in turn can allow for the enablement of maximizing the overall KM capabilities of the entire organization through trust and collaboration (Panteli and Sockalingam, 2005). Sixth, encourage collaboration within the workplace and social environments and support coordination and communication. Organizations often face challenges with KM strategies; therefore, it becomes essential for management areas recognize the need to support KM across all organizational levels including individual and group activities. Over time, as one area effectively implements KM actions, the evolution of these actions can filter across the organization (Sun, 2008). Seventh, develop a clarified KIBP vision integrated with business and operational strategies. Bridging potential gaps between these areas can allow for the organizational strategies to be implemented efficiently through established KIBP objectives. Leveraging the human expertise and available technologies is an important aspect as argued; however, linking KIBP objectives with operational strategies can be perceived to be one of the important keys for organizational success (Marjanovic and Freeze, 2011). As such, a better understanding of this relationship creates a more holistic perspective required to shape both KM and KIBP strategic value.

Three areas can be summarized to guide practitioners in the developmental process of the competencies which can be viewed as abilities required to perform defined processes. First, as competencies can be acquired and developed, it is expected that organizations

will provide accurate and complete role definitions and position descriptions to understand what competencies are required. Second, organizations can further provide step-by-step guides and outline the activities required in handling and monitoring of processes. Even though characteristics of KIBP suggest that these processes are often undefined intrinsically, it would be beneficial to have an outline along with a mapping of the activities and individuals involved in the process defined. Third, it is possible to connect competencies to measurable outcomes. Formal, structured training as well as educational opportunities are deemed necessary not only to gauge competency levels of employees but also to provide a base upon which to develop further training programs over time as required by the concerned KI processes. Competency development presents an organizational challenge due to potential lack of active participation in development training and implementations. Therefore, it could be beneficial for the organization to further measure the frequency of these training opportunities, the types of materials presented, attendance and impact on collaborative efforts between individuals (Nielsen, 2013). For organizations and practitioners, developing employee competencies starts with the identification of what competencies should be acquired and continues with the assessment of how they are being applied toward the business processes. The ongoing development and implementation of training opportunities becomes essential for employees to obtain additional knowledge and experiences required for KIBP.

The study helped identify several research areas for further exploration. First, additional studies focusing on these stages of the KI process competencies would be beneficial to further align these aspects with organizational strategies. Examination of these competencies, either individually or in combination, would further indicate their interconnections. Understanding the co-relation between these competencies is a topic worth exploring further. Second, through the study, organizational controls were revealed which would allow for further research into how organizations can better handle their KIBP based on policies and procedure. As such, building an understanding on how and why organizations design and implement their KI policies and procedures would provide some insight into best practices associated with the management and utilization of KIBP as a whole. Third, exploring additional organizational types beyond financial, health care and education may also reveal specific differences on how KIBP and knowledge creation occur in the organizations. This examination could allow for corroborating the results from this study and thus increasing its generalizability. Fourth, international and cultural diversity in organizations would present an interesting dimension from which to examine knowledge creation in the context of KIBP. Given that the cases in this study were situated in a single country, generalization from an international and cultural diversity perspective is a limiting factor. In that regard, it is worth noting that extant research has found that international diversity can be viewed as an influence on KM impacting employee handling of KIBP tasks and processes (Nielsen and Nielsen, 2013). Also, studies have pointed to the benefits and opportunities presented by colleagues from different countries in terms of furthering knowledge sharing and collaboration as a result of interactions between individuals of different cultural backgrounds (Barjak and Robinson, 2008). Finally, additional research could also include measuring the level of the KI processes competencies in organizations from a maturity standpoint. This study of KI process competencies provides a foundation; however, further studies into the specifics of each area would be beneficial and provide additional guidance for practitioners.

Conclusion

The increasing awareness of KIBP within organizations has led to an examination of how knowledge creation occurs within this context. This study presented a grounded theory approach to research knowledge creation in the context of KIBP based across three organizations. The resulting framework (Figure 2) explains how knowledge creation in this context is negatively impacted by the lack of KI process competencies. A key contribution of this study is the identification of successful strategies to overcome the potential lack of

KI competencies as segmented into KI task engagement, KI task perspective and KI task reasoning. The solutions to these gaps in KI process competencies are primarily concerned with the development of a common vision for communication channels, the facilitation, support and commitment toward training opportunities, and the development of a KI culture across the organization. The interconnectivity between these areas do suggest continual development opportunities. As employees gain knowledge and experiences, growth in the areas can exist. However, organizations and employees both need to intentionally encourage and commit to their development.

While the strength of this study provides an opportunity to explore the KI process competencies of individuals, limitations do exist. The scope of the study was limited to only three types of organizations and to the data collection period. Although the study attempted to provide generalizations across other industries, it is acknowledged that further studies would be worthwhile to develop and strengthen the framework and its foundation. The patterns in employee behavior and responses obtained could have been different if given an extended period for data collection. Hence, it should be noted the results should be construed within this constraint. Although prior studies have provided an extensive perspective on information systems and KM disciplines, there is a relative limited amount of literature connecting these aspects to competency requirements to understand previous theoretical foundations. This research provides a new perspective of knowledge creation within the context of KIBP and lends itself directly to existing literature. The nature of the analysis and interpretations has allowed the development of a foundational framework through an adaptation of the Glaser's (1978) "Six C's" model. This study argued knowledge creation occurs within the context of KIBP through the development of KI process competencies of individuals. Managers and more broadly organizations need to support and enable the development of these competencies to improve their KIBP and knowledge creation techniques.

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