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Facilitating knowledge sharing through ignorance management: the moderating role of knowledge processors

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Facilitating knowledge sharing through ignorance management:

The moderating role of knowledge processors

Abstract

Knowledge sharing is one of the most efficient management processes in supporting organizational effectiveness. Extant literature notes a number of behavioural factors with an impact on knowledge sharing. In this paper we introduce the behavioural factor of ignorance to empirically examine its direct effect on organizational knowledge sharing. Conducting a qualitative study within an organizational context we argue that knowledge sharing effectiveness could be greatly improved, by managing employees' ignorance i.e. knowing what needs to be known and also acknowledging the existence of unknowns. Moreover, based on the findings we identify the moderating role of Knowledge Processors in the linkage between ignorance and knowledge sharing in their capacity as both source and recipient of knowledge. Suggestions are further made regarding new roles in knowledge management whilst limitations and future research implications are also discussed.

Keywords: ignorance management, knowledge processors, knowledge sharing, aerospace and defense industry, multinational organizations.

INTRODUCTION

In the era of the knowledge economy, organizations which are innovative performers are in great need of effectively managing either the knowledge stock that is already stored in various organizational repositories, or the new amounts of knowledge that are externally derived (Jantunen, 2005). Thus, organizations which perform this capability, i.e., to manage the organizational knowledge by capturing, storing, sharing and utilizing it within their boundaries (Davenport and Prusak, 1998), habitually, maximize their performance by improving productivity and overall efficiency of operations (Nonaka and Takeuchi, 1995). Extant literature on knowledge management defines, among others, human capital as a vital factor in knowledge exchange activities that take place either internally (e.g. within teams, units and/or departments) or externally (e.g. between partners and third-party organizations). Additionally, employees' involvement in various face to face or virtual Communities of Practice (CoP), has become one of the most well-known strategies for managing their knowledge. Specifically, examples to support the above statement include but are not limited to Chevron, Ford, Xerox, Raytheon, IBM (Ellis, 2001), Dow Chemical, Shell, Schlumberger, Cap Gemini Ernst & Young and Best Buy (Vestal, 2002), as well as Caterpillar (Ardichvili *et al.*, 2003). In recent times, the expansion of social media (such as Facebook, LinkedIn and Twitter) as well as other information technology tools (such as blogs, wikis and collaboration platforms) allow users to join groups, to participate in virtual discussion, to post their own views and to chat exchanging information which, in some cases, may contribute to the organizational knowledge stock. Apart from the contextual forces and the organizational environment which both influence organizational knowledge sharing, the current literature also recognizes a set of behavioural factors which moderate (i.e., enabling or disabling) the sharing of knowledge within organizations (Yoo and Torrey, 2002). As such, trust (e.g. Nahapiet and Ghoshal, 1998), anticipated reciprocal relationships (e.g. Bock *et al.*, 2005;

Chiu *et al.*, 2006; Wasko and Faraj, 2005), identification (e.g. Kankanhalli *et al.*, 2005), image (e.g. Wasko and Faraj, 2005), organizational rewards (e.g. Bock *et al.*, 2005), knowledge self-efficacy (e.g. Bock *et al.*, 2005; Jarvenpaa and Staples, 2000), and loss of knowledge power (e.g. Davenport and Prusak, 1998) have all been identified as behavioural factors which affect the process of knowledge sharing within organizations.

In this study we initiate the behavioural variable of ignorance, namely not knowing what needs to be known, to examine the effect of employees' ignorance on knowledge sharing. In so doing, we classify employees' ignorance between: (i) ignorance of subject matter experts, i.e., experts who possess extensive and unique knowledge skills, (ii) ignorance of Knowledge Management Systems implemented by organizations, i.e., existing technology and/or specific tool-sets (e.g. databases) and (iii) ignorance of the corporate knowledge itself, i.e., the content of the existing knowledge in the organization (e.g. current practices, processes and rules). Additionally, we argue that employees' ignorance, which render employees unaware of prevailing corporate issues, could be transformed in effective corporate knowledge, if successfully managed.

In the context of organizations which operate in knowledge intensive environments, ignorance plays a significant role towards knowledge sharing, by preventing employees from exchanging knowledge and ideas with their work teams in which they daily interact and perform various routine tasks and activities. Specifically, employees' unwillingness or tendency not to share the personal knowledge they possess is likely to be affected by the recipient's lack of appropriate cognitive background. Additionally, based on their unknowns, employees may underestimate the value of new knowledge which they could acquire in the course of knowledge exchange processes, thus may justifiably feel that their participation in knowledge sharing activities is a futile process of learning. However, such difficulties are effectively managed when both recipients and sources of knowledge, recognise the limits and

extent of their knowledge while exchanging knowledge and ideas. In other words, they perceive the extent of their ignorance, by exploring unknowns; therefore, managing the knowledge they possess more effectively and learning together.

Our empirical research aims to broaden the discussion on knowledge sharing behaviours, by analysing the effect of ignorance on knowledge sharing within the context of a multinational organization. Additionally, besides the use of social networking tools and other information technology applications which facilitate the aforementioned relationship, the need for interpersonal communication is also required. To address this need we initiate the role of Knowledge Processors (KPs), in their capacity to function as both sources and recipients of new knowledge, who may moderate the linkage between ignorance and knowledge sharing while managing employees' ignorance by transforming the unknown to the known.

Hence, the key objectives of our paper are to: (i) empirically identify the linkage between ignorance and knowledge sharing and (ii) conceptually propose the moderating role of KP in reaching the complete state of high level of knowledge and low level of ignorance.

The next section of the paper offers a literature overview of the behavioural factors that affect knowledge sharing to help identify the ignorance effect on knowledge sharing. In regards to the remaining structure of this paper, the third section outlines the methodology and provides the results of the empirical study, and the fourth section discusses the empirical results by providing the role of KPs while outlining implications for practitioners and discussing areas for future research. The concluding remarks of our study summarize the study's contribution.

THEORY AND RESEARCH PROPOSITIONS

Knowledge sharing within organizations

The sharing of knowledge is one of the most significant organizational process aiding organizations to maximise learning (Bock and Kim, 2002; Davenport and Prusak, 1998;

Nonaka and Toyama, 2003; Tsai, 2001) and predicts a variety of desirable organizational outcomes including increased productivity, decreased task completion time, increased organizational learning, innovativeness (e.g., Argote *et al.*, 2003; Cummings, 2004; Hansen, 2002) and sustained competitive advantage (Gold *et al.*, 2001). Brown and Duguid (2000) note that knowledge management is a matter of sharing knowledge with others and not just keeping it for own use and power. Nonaka and Takeuchi (1995) argue that the creation of knowledge can be seen as a process of knowledge sharing through articulating and internalising knowledge processes. In addition, Jarvenpaa and Staples (2000) state that the sharing of ideas among employees is a key process underlying collective knowledge within an organisation without which a company may not be able to leverage its most valuable asset. Thus, the competitive and dynamic business environment increasingly requires employees to share knowledge with others (Davenport and Prusak, 1998; Drucker, 1985; Chow *et al.*, 2008) either through formal or informal processes which take place within an organization (Cummings, 2004).

The sharing of knowledge within organizations has received considerable attention from both researchers and practitioners throughout the world, also leading to the identification of a number of behavioural factors that affect it in either a positive or negative way. Apart from the behavioural factors which are discussed in details later on this paper, the extant literature identifies significant variables with an impact on knowledge sharing. The most commonly cited factors include the nature of knowledge to be shared i.e., tacit versus explicit (Polanyi, 1966) or codified versus personal (Hansen *et al.*, 1999; Nonaka and Takeuchi, 1995; Zander and Kogut, 1995), the organizational context, structure or systems in which the sharing of knowledge takes place (Argote and Ingram, 2000; Dushnitsky and Lenox, 2005; Gupta and Govindarajan, 2000) as well as the type of relationships (either formal or informal)

formed between those who share knowledge, among others (Ancona and Caldwell, 1992; Gupta and Govindarajan, 2000; Levin and Cross, 2004).

Focusing on behavioural factors with an impact on knowledge sharing we used the EBSCO and Emerald databases with the key words ‘behavioural factors’ and ‘knowledge sharing’ to identify studies that demonstrate a direct relationship between the linkage of behavioural factors and knowledge sharing. Our work led us to thirty-six (36) studies which have been published between 1994 and 2012, and are summarized in Table 1.

{Place Table 1 about here}

In general terms, the aforementioned studies demonstrate a direct link (either positive or negative) between several behavioural factors (e.g. trust, commitment, reputation enhancement, expected rewards, etc.) and the variable of knowledge sharing which has been viewed from different perspectives. Namely, scholars approach knowledge sharing either as an individual behavior to share knowledge (i.e. send or receive), the individuals’ tendency or intention to share knowledge, the quality and quantity of the knowledge to be shared, or as employees’ attitudes towards knowledge sharing (which has been used either as dependent or independent variable) and the subjective norms that dominate knowledge sharing. No matter how the sharing of knowledge has been approached, scholars come to a consensus with regard to the benefits that individuals receive from their participation in knowledge sharing activities in their organizational daily life. As such, Gupta *et al.* (2012b, p. 10) mention, among other individual benefits, the obligation of others to reciprocate, the level of self-esteem and the increased personal identification.

More specifically, with reference to Table 1, most researchers pay particular attention to variables, which may pre-determine employees’ knowledge sharing behaviour (e.g. trust, subjective norms, organizational commitment, etc), especially when such activities have been established by organizations to foster employees to share knowledge and are not found to be

employees' initiatives. However, other scholars highlight individual motivators which may, equally, determine employees' behavior to share knowledge. Employees habitually share the knowledge they possess, mainly, when they are intrinsically motivated (self-motivated) or when they anticipate specific personal benefits in return, such as enhanced reputation, perceived usefulness of the acquired knowledge, self-development, association, reciprocal relationships (e.g., Bock *et al.*, 2005; Foss *et al.*, 2009; He *et al.*, 2009; Kankanhalli *et al.*, 2005; Kwok and Gao, 2004; Lin, 2007). Likewise, employees share knowledge when they are driven by behavioural control (e.g. Ryua *et al.*, 2003), enjoyment in helping others (e.g. Kim and Lee, 2011; Kumar and Rose, 2012) or in some cases when they choose to be socially engaged in knowledge exchange activities even if the structures or rules of the organizations in which they are employed do not support the appropriate culture (Obembe, 2010).

Considering, particularly, the impact of the expected rewards on individuals' knowledge sharing behaviours, the existing literature does not recognise a definitive relationship between these two variables since the findings are inconsistent and opposing. For instance, Burgess (2005) argues that expected rewards positively influence the knowledge sharing behaviour of employees. Liao (2008) also sees a direct and positive relationship between the power of rewards and the knowledge sharing behaviour of employees in Research and Development (R&D) departments of Information and Computer Companies in Taiwan. Similarly, He *et al.* (2009) support that rewards along with training and management facilitation could positively affect knowledge sharing, exploring various antecedents of employees' behaviour who use Knowledge Management Systems (KMS) to share knowledge. Moreover, Kumar and Rose (2012) confirm the positive relationship between organizational rewards and knowledge sharing by studying the knowledge sharing behaviour of Administrative and Diplomatic Service Officers in Malaysia.

Contrary to this, the empirical studies of Bock and Kim (2002) and Bock *et al.* (2005), note that expected rewards do not affect knowledge sharing behaviours; whilst Lin (2007) argues that expected organizational rewards neither affect employee attitudes towards knowledge sharing nor their knowledge sharing intentions. In addition, Gupta *et al.* (2012b) verify that there is no relationship between these two variables (i.e. expected rewards and knowledge sharing) when they analyzed the impact of employees' perception towards the perceived knowledge sharing benefits and costs on their knowledge sharing behaviour in their study of 228 employees of two major Information Technology organizations in India.

Based on the review of the current knowledge management literature, it appears that the behavioural factor of ignorance is not sufficiently explored. There are several signs to suggest that recognising the role and significance of ignorance could further improve such knowledge management efforts within technology intensive organisations (Israilidis *et al.*, 2012). Also, several attempts have been made to explore the value of managing organisational ignorance in order to enhance knowledge creation, sharing and transmission processes (Wolchover, 2012). Hence, to take the extant literature one step further, we introduce the behavioural factor of ignorance and argue that the effectiveness of knowledge sharing could be greatly improved, if successfully knowing what is needed to be known and also acknowledging the existence of unknowns.

Linking ignorance to knowledge sharing

In a recent study conducted by Dunning and Kruger (Wolchover, 2012), it was noted that humans find it intrinsically difficult to get a sense of what they don't know and the authors argue that incompetence deprives people of the ability to recognise their own incompetence – also known as the Dunning-Kruger effect (Kruger and Dunning, 1999). Furthermore, Zack (1999) highlights that managing organisational ignorance can yield impressive benefits, if successfully incorporated within a company's KM strategy.

Additionally, Pynchon (1984, p.15-16) argues that ignorance could be seen as a potential component for future success and achievement: *“Ignorance is not just a blank space on a person's mental map. It has contours and coherence, and for all I know rules of operation as well. So as a corollary to [the advice of] writing about what we know, maybe we should add getting familiar with our ignorance, and the possibilities therein for writing a good story”*. It can therefore be deduced that ignorance could play a vital role in reducing the risks of making the wrong decision when using ‘imperfect information’.

The above observations are also supported by the theory of Ignorance Management as presented by Israilidis *et al.* (2012). In this theory, four paradigms were identified and visually illustrated in a four quadrant diagram based on different assumptions about the nature (e.g. high and low volume) of knowledge and ignorance. Employees who demonstrate higher levels of ignorance may be characterised as ill-informed, whilst employees who demonstrate low levels of ignorance may be characterised as more competent and productive.

It is therefore apparent that employees classified within the category of low level knowledge and high level ignorance are characterised by poor knowledge sharing and collaboration skills, due to the fact that they are more likely to give out wrong information and hence place the company in a high-risk position, both financially and knowledge-wise. Additionally, highly ignorant employees may be prevented from participating in knowledge sharing activities since they are lacking prior knowledge and experience which in itself reduces (or in some cases may eliminate) their ability to absorb new knowledge. According to the seminal work of Cohen and Levinthal (1990, p. 128) on absorptive capacity, *“one’s ability to recognize the value of new information, assimilate it and apply it to commercial ends is largely a function of the level of prior related knowledge”*. Moreover, ignorance can also be seen as an obstacle to knowledge sharing in terms of employees’ unawareness of the information they possess. Unaware employees cannot estimate the real value of information

which can often be transformed into significant organizational knowledge increasing efficiency and productivity, if shared effectively. It is also worth noting that lack of knowledge regarding the existence or utilization of new technologies and tool-sets, such as current Knowledge Management Systems available to employees, could also restrict knowledge flows in various organizational team discussions.

Thus, in this paper, influenced by the theory of Ignorance Management, we argue that managing ignorance, i.e., exploring the transformation from the unknown to the known, may facilitate the sharing of knowledge within organizations since employees will have reached the complete state of 'I know that I know', that is high level of knowledge and low level of ignorance. Also, based on the above argumentation we postulate that managing employees' unknowns will also augment the sharing of knowledge within organizations.

Research Proposition: *Employees' ignorance may negatively affect their knowledge sharing behaviour.*

CONTEXT AND METHODOLOGY OF THE STUDY

The organization

The focus of this research is given in particular to multinational organisations where knowledge sharing is essential to both short-term opportunistic value capture and longer term business sustainability. Hence, this study has been applied to technology intensive environments and was conducted within a specific organisational context at DefenseCo¹, which employs more than 60,000 employees across the globe and operates within the Aerospace, Defense and Information Security industry with worldwide interests. The company's employees are highly skilled within their respective field and the organisation has attempted to create an environment specifically suited to knowledge exchange, transfer and

¹ DefenseCo is a pseudonym that has been adopted to protect company anonymity.

sharing. As Jafari *et al.* (2007) note, one of the most important industries which should be managed completely from the knowledge point of view is the aerospace industry as the design and construction of aerospace systems has raised specific KM concerns, such as dealing with complexity, traceability, maturity of knowledge, interaction between experts, awareness of the status of information, and trust in knowledge. Therefore, in the light of these observations, facilitating knowledge sharing is increasingly critical due to the increased pressure to boost efficiency and explore organisational knowledge for new aerospace and defense systems effectively.

The study design

The philosophy of this study is based on an interpretative approach; thus, qualitative methods were implemented using as units of the analysis various departments in DefenseCo to gain a better understanding of the relationship between employees' ignorance and knowledge sharing. Ten different departments (i.e., business units) were explored, including land, maritime, air and space, among others. A number of factors affected the selection process, such as organisational issues and cost limitations imposed by the organisation. However, the selection was sufficiently representative since analysing different organisational departments resulted in looking into multiple knowledge exchange mechanisms which gave both breadth and depth to the research findings.

The personnel within DefenseCo were highly involved in knowledge sharing activities and other knowledge intensive processes, such as dealing with complex information and managing multiple projects simultaneously. As such, all participants were actively engaged in several different knowledge sharing activities including sharing good practice, connecting people to people, supporting growth, stimulating innovation, auditing current systems and enhancing services. This allowed us to better understand whether employees' unknowns have

an impact on the sharing of knowledge that takes place in their daily routine, tasks and activities and then to identify whether ignorance plays a critical role in knowledge sharing.

The data presented in this paper were collected as part of a larger research project, which used both quantitative and qualitative methods. For the purposes of this study, a series of nine semi-structured interviews were conducted, supporting van der Heijden's (2007, p.181) view, who notes that "it seldom proves necessary to interview more than fifteen or so people [...] but after say ten interviews a lot has already surfaced and interviews become repetitive". On average, the semi-structured interviews lasted approximately 45 to 50 minutes; however, there was no predetermined length for the interviews and participants were free to continue talking for as long as they wished, providing both breadth and depth results about the organisation's structure and knowledge sharing processes. In order to overcome logistical difficulties, all interviews were conducted by telephone and were recorded using a digital voice recorder as the interview was being conducted.

The interviewees were mainly senior managers and had an extensive experience in the organisation. They were also involved in KM-related activities and were eager to promote knowledge sharing within their area of responsibility.

Data Analysis

The interview data were transcribed in note form for further analysis, once the interview had been finished. Each interviewee was assigned with a unique reference code, which was used to identify the relevant documents; hence, by maintaining the anonymity of the interviewees, open and frank answers were encouraged.

Furthermore, the analysis was conducted using the Atlas.ti computer assisted qualitative data analysis software due to the wide selection of built-in features and functionalities which fully supported the qualitative research process, including text

interpretation and content analysis. Coding was performed manually and patterns were identified and classified automatically via the use of the software programme.

The data analysis uncovered patterns, themes, and categories important to both academia and business. However, because qualitative research is fundamentally interpretive, the researchers made every effort to achieve a balance between description and interpretation, supporting Patton's view who argued that an interesting and readable article "provides sufficient description to allow the reader to understand the basis for an interpretation, and sufficient interpretation to allow the reader to understand the description" (Patton 2002, p.503-504).

The following section presents the findings of the research, the implications of which will be discussed in a later section of this paper.

Findings

The interviews suggested that there is a relationship between employees' ignorance and knowledge sharing and that managing unknowns may yield effective knowledge sharing within organizations. More specifically, the majority of the interviewees (seven participants) identified a strong connection between ignorance and knowledge sharing, illustrating further, the benefits of interpersonal communications as opposed to the use of applications and other computer-related software programmes in managing knowledge effectively. It was also found that within the organisation, several employees were not familiar with the term 'knowledge sharing' as they had never come across anything similar before. In relation to organisational KM methods and practices that would enhance sharing opportunities, the interviewees noted the importance of involving the management at a variety of levels to resolve deficiencies or compliance issues. Finally, despite the fact that in recent years a lot of effort has been placed on enabling accurate and personalised results by improving ontologies, artificial intelligence

and heuristics, it was found that the majority of tools were lacking effective search mechanisms and the ability to filter down results based on the user's preferences.

To present clearly key elements of the findings discussed above, representative quotes from the interviewees have been grouped into four categories, namely: (i) ignorance of subject matter experts with specialist knowledge within the organization; (ii) ignorance of Knowledge Management Systems implemented by the organization; (iii) ignorance of the corporate knowledge itself, and finally (iv) the need for interpersonal communications as opposed to the use of applications and other computer-related software programmes in managing knowledge effectively. The output of this classification is portrayed in Table 2.

{Place Table 2 about here}

DISCUSSION

The main finding in our study is the impact of ignorance on knowledge sharing activities that take place within our case organization of DefenseCo. The results revealed an interesting linkage between the aforementioned entities, viz., ignorance and knowledge sharing, which has not been previously discussed in the KM literature. Specifically, the negative effect of ignorance on employees' knowledge sharing behavior demonstrates the importance of acknowledging the existence of unknowns when sharing knowledge and recognizes the potential value of managing ignorance in the workplace. Also, employees who are found to be ignorant about corporate knowledge, subject matter experts or existing KMS in their organization, may inevitably transmit wrong information, if knowledge sharing occurs.

It is therefore inferred that employees' ignorance may result in significant performance consequences to organizations. For instance, in terms of managing external knowledge, employees who are unaware of new technologies, modifications of already existing products or services, and cost-efficient ways of managing operations within the

business may not be able to implement innovation, i.e., make the appropriate decisions to adopt innovation (Klein and Sorra, 1996). Similarly, in terms of managing internal corporate knowledge, ignorant employees are likely to increase organizational costs by spending additional time and resources while searching for knowledge in various external knowledge repositories. Employees ignorance could also lead to poor decision-making and communication, which may inevitably affect the performance of operations while limiting the ability to repel external threats or manage future crisis situations.

Building on these observations and given the linkage between ignorance and knowledge sharing, the necessity to re-examine KM strategies and improve the efficiency and effectiveness of existing knowledge sharing processes has become common place. Managers should find ways of managing ignorance, similar to how they would manage knowledge, while fostering knowledge sharing which will undoubtedly help them overcome problems that might arise within their industry.

It is therefore argued that beside the use of social networking tools and other information technology applications (such as wikis, collaborative workspace platforms and dynamic share drives), the role of Knowledge Processors (KP) could positively moderate the aforementioned relationship by helping employees to reach the complete state of highest knowledge and lowest ignorance. Siachou and Ioannidis (2008) have already discussed several benefits of KPs in the context of facilitating knowledge sharing within action teams by extracting net-based knowledge from various Internet repositories. However, given the focus of this paper, KPs are examined as moderators in managing ignorance effectively through improving knowledge searching and acquisition processes across organizational business units. KPs are also viewed as moderators in reliably transmitting new knowledge and problem-solving skills within work teams in order to successfully deliver products or services within limited time constraints. Further analysis on the characteristics of the role of KPs as

well as various implications for KM practitioners are extensively presented in the following section of this paper-

Implications for practitioners: The moderating role of Knowledge Processors

The results of our study indicate that beside the various knowledge management systems (KMS), mainly supported by new technologies and advanced tool-sets, the transformation from the state of employees' unknowns to the knowns requires interpersonal communication among those who possess and those who seek knowledge. Reviewing the relevant literature, several factors (e.g. personnel movement and replicating routines) which facilitate the interpersonal communication in the context of knowledge sharing were found to be isolated (Alavi and Leidner, 2001; Gupta and Govindarajan, 2000). To address this issue, we argue that team leaders should consider the role of KPs functioning as both sources and recipients of knowledge (Siachou and Ioannidis, 2006) in order to facilitate employees with their transition from the unknown to the known. This, in itself, will enable team leaders to actively participate in knowledge sharing activities providing effective knowledge sharing mechanisms as well as minimizing search and sharing knowledge costs affecting the organization. For instance, knowledge intensive organizations often render knowledge obsolete and are in great need of constantly acquiring new amounts (both sources and updates) of knowledge. If this is the case, KPs could absorb new knowledge from outside the organization as knowledge recipients, whilst effectively sharing the newly acquired knowledge within the various organizational units accurately and on time as knowledge sources. In parallel however, KPs could identify the level of employees' ignorance while transforming them into more knowledgeable employees. To achieve this, KPs should accurately inform employees about the content and value of existing corporate knowledge as well as how to utilize it wisely for the benefits of the organization. Furthermore, KPs could sculpt the appropriate culture between and within parts of the organization which foster

employees' initiatives to share the knowledge they possess. Activities to achieve this may include, but are not limited to, annual executives' conferences, formal and informal departmental meetings, ad-hoc situational committees, training sessions and speak-up groups (Alavi and Leidner, 2001; Reagans and McEvily, 2003).

It must be noted that Knowledge Management literature has already identified specific roles in leadership positions within multinational organizations, including Chief Knowledge Officers (e.g., Earl and Scott, 1999) and Knowledge Champions (e.g., Jones *et al.*, 2003) among others. However, the role of KPs differs from existing paradigms in its responsibility to manage employees' ignorance in identifying their unknowns, thus rendering them knowledgeable employees. Simultaneously, KPs get actively involved in knowledge sharing activities by distributing the appropriate knowledge to various organizational units accurately and on time while facilitating employees' knowledge sharing behavior. This not only exceeds the management of corporate knowledge and acquisition of new knowledge that is externally derived, but also provides additional support to business action teams, the members of which should effectively deal with unpredictable situations within various time constraints (Edmondson, 2003). Hence, in their capacity as leaders of these teams, KPs could help identify the different types of ignorance of each team member while providing the necessary support to effectively perform their tasks. In doing so, it is proposed that KPs should first locate and absorb knowledge that is externally derived before appropriately sharing it within the action teams, based on its value and usefulness for the organization.

Furthermore, KPs include a set of skills and abilities which are relevant to the context of this work, including their ability not only to effectively absorb new knowledge but equally to retain it, i.e., to institutionalize the utilization of the incoming knowledge (Szulanski, 1996). Finally, KPs should be seen as self-motivated roles with the intention to share important amounts of knowledge with other organizational parties, devote time and personal

resources in order to support the sharing of knowledge as well as promote on-going learning by exploring the transition from the unknown to known.

Limitations and Future Research

This research experienced some limitations in regards to the feedback of the proposed solutions, mainly due to internal organizational rules and regulations. In terms of the findings, our study supports a direct link between ignorance and knowledge sharing when other factors are not taken into account. Therefore, it is not clear whether these results support a bidirectional relationship between the aforementioned entities. Additionally, since our study is based on qualitative analysis, we propose that the use of quantitative analysis could also be explored to support data generalizability as well as to confirm presence of a bidirectional relationship. Equally, additional studies need to be conducted to examine the linkage between ignorance and knowledge sharing by also considering the moderating (or mediating) effect of other variables than the KPs which we propose. Also, the role of KPs should be further tested empirically in future work. Finally, the study was conducted for an Aerospace and Defense organisation; hence it may not reflect other corporate environments where agile and less hierarchical structures are established.

In terms of the literature review, our study is based on a number of articles accessed through specific databases while using pre-selected key words, as noted in the body of this paper. Consequently, this may have increased the likelihood of not taking into consideration journal articles and published research work in other electronic databases or print sources.

CONCLUDING REMARKS

This paper identifies a direct link between ignorance and knowledge sharing and argues that managing ignorance could facilitate employees' knowledge sharing behavior. Very little of this discussion is captured by the current KM literature and no relationship has been identified

between ignorance and knowledge sharing. Hence, in an attempt to address the existing gap, this paper argues that the effectiveness of knowledge sharing could be greatly improved, if successfully knowing what is needed to be known and also by acknowledging the existence of unknowns. Moreover, this paper conceptually proposes the moderating role of KP to enable the smooth transition from the unknown to the known in reaching the complete state of high level of knowledge and low level of ignorance.

The study reflects large multinational organisations and much remains to be done in analysing small and agile corporate environments. Also, the exact nature of the aforementioned relationship merits further study, to make Knowledge Processors usable in more general contexts.

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Table 1: Key Studies that demonstrate the impact of behavioral factors on knowledge sharing

	Author(s) in alphabetic order & Publication Year	Type of Study	Behavioral Factors	Approach to Knowledge Sharing (KS)	Impact on Knowledge Sharing²
(1)	Abzari and Abbasi (2011)	Empirical Quantitative Study	Attitude towards KS Subjective Norms Perceived Behavioral Control	KS Intention	+ + +
(2)	Aliei <i>et al</i> (2011)	Empirical Quantitative Study	Helping Behavior Sportsmanship Organizational Loyalty Organizational Compliance Individual Initiative Civic Virtue Self-Development	KS Behavior	+ + + + + + +
(3)	Appel-Meulenbroek (2010)	Case Study Quantitative Study	Connectivity Co-presence	KS Behavior	+ Not Significant
(4)	Bock and Kim (2002)	Empirical Quantitative Study	Expected Rewards Expected Associations Expected Contribution Attitudes towards KS KS Intention Level of IT usage	Attitudes towards KS Attitudes towards KS Attitudes towards KS KS Intention KS Behavior KS Behavior	Not Significant + + + + Not Significant
(5)	Bock <i>et al</i>	Empirical	Attitudes toward KS	KS Intension	+

² + indicates a positive impact of the proposed behavioral factors on knowledge sharing.
- indicates a negative impact of the proposed behavioral factors on knowledge sharing.

	(2005)	Quantitative Study	<p>Anticipated Extrinsic Rewards Anticipated Reciprocal Relationships Self-Worth through KS Behavior Self-Worth through KS Behavior</p> <p>Subjective Norm to KS Subjective Norm to KS Organizational Climate</p> <p>Organizational Climate</p>	<p>Attitudes toward KS Attitudes toward KS Attitudes toward KS Subjective Norms to KS KS Intention</p> <p>Attitudes toward KS Subjective Norms to KS KS Intention</p>	<p>- Not Significant + + + + + +</p>
(6)	Chiu <i>et al.</i> (2006)	Empirical Quantitative Study	<p>Community Related Expectations</p> <p>Personal Outcome Expectations Social Interaction</p> <p>Trust</p> <p>Norm of Reciprocity</p> <p>Identification Shared Knowledge</p> <p>Shared Vision</p>	KS Quantity and Quality	<p>Not Significant on quantity and quality + (Quantity and Quality) + Quantity, Not Significant Quality Not Significant Quantity, + Quality + Quantity, Not Significant quality +Quantity, Not Significant quality -quantity, +quality -Quantity, +Quality</p>
(7)	Chow and Chan, (2008)	Empirical Quantitative Study	<p>Extensive Social Networking Extensive Social Networking</p> <p>Social Trust Social Trust</p> <p>Shared Goals</p>	<p>Attitudes towards KS Subjective Norm towards KS</p> <p>Attitudes towards KS Subjective Norm towards KS</p> <p>Attitudes towards KS</p>	<p>+ - Not Significant Not Significant +</p>

			Shared Goals	Subjective Norm towards KS	+
			Attitudes towards KS	Intension to KS	+
(8)	Constant <i>et al</i> (1994)	Experiments	Self Interest Reciprocity Work Experience Work Teams Self Expression Self Consistency Self Interest Reciprocity Work Experience Work Theory	Knowledge Sharing (information) Product/Expertise	- (as product) -(as product) No Direct Relationship (as product) No Direct Relationship (as product) + (as expertise) + (as expertise) - (as expertise) - (as expertise) No Direct Relationship (as product) No Direct Relationship (as product)
(9)	Foss <i>et al</i> (2009)	Empirical Quantitative Study	Employees Intrinsically Motivated Employees Motivated by Introjection Employees Externally Motivation Job Autonomous Employees Task Identified Employees Receiving Feedback	Receive and Send Knowledge	+ Not significant to receive and negatively to send) - + + +
(10)	Gupta <i>et al</i> ^a (2012)	Empirical Quantitative Study	Organizational Commitment Psychological Contract Fulfillment	Knowledge Sharing	Nor significant +

			Psychological Contract Breach		-
(11)	Gupta <i>et al</i> ^b (2012)	Empirical Quantitative Study	Expected Rewards Expected Association Expected Contribution Perceived Cost	Knowledge Sharing	Not supported + + -
(12)	He <i>et al</i> (2009)	Case Study Qualitative Study	Perceived Usefulness of KMS Trusting Relationships Cooperative Norms Strong Ties Rewards, Training and Management Facilitation	Knowledge Sharing	+ + + +
(13)	Hsu and Lin (2008)	On-Line Field Study	Perceived Usefulness Perceived Ease of Use Perceived Enjoyment Employee Attitudes Altruism Expected Reciprocal Benefit Reputation Trust Expected Relationships Social Norm Community Identification	Attitude towards KS Attitude towards KS Attitude towards KS Intention to KS Attitude towards KS Attitude towards KS Attitude towards KS Attitude towards KS Intention to KS Intention to KS	Not Direct + + + + Not Direct + Not Direct Not Direct Not Direct +
(14)	Iqbal <i>et al</i> (2010)	Conceptual Paper	HR Practices (i.e. Hiring Practices, Collaboration, Team Assignments, Reward Systems) Trust	Knowledge Sharing	+ +
(15)	Jones <i>et al</i> (2006)	Empirical Qualitative Study	Basis of Truth and Rationality Motivation Orientation to Change	Knowledge Sharing (through ERP implementation)	+ +

			Orientation to Work Orientation to Collaboration Control, Coordination and Responsibility Orientation and Focus		Not Significant + + + +
(16)	Joy and Haynes (2011)	Case Study Analysis	Team Based Working Environments Mentoring	Knowledge Sharing	+ +
(17)	Kim and Lee (2011)	Empirical Quantitative Study	Facilitating Conditions Social factors Affect Enjoyment in Helping Others Knowledge Self-Efficacy Anticipated Usefulness Anticipated Reciprocal Relationships	Knowledge Sharing	+ + Not supported + + + +
(18)	Kumar and Rose (2012)	Empirical Quantitative Study	Enjoyment in Helping Others Reciprocity Self efficacy Trust Pro-Sharing Norms Self-Image Organizational Reward	Knowledge Sharing	+ Not significant + + + Not significant Not significant
(19)	Kwok and Gao (2004)	Case Study Analysis	Rewards Personal Needs Altruism Reputation Linking Affiliation	Knowledge Sharing	+ + + + + +

(20)	Liao (2006)	Empirical Quantitative Study	Organization's Commitment to Learning Organization's Open-Mindedness Organization's Shared Vision Communication Trust	Knowledge Sharing	Not significant + + + Not significant
(21)	Liao (2008)	Empirical Quantitative Study	Reward Power Coercive Power Legitimate Power Reference Power Expert Power Trust	Knowledge Sharing	+ Not significant Not significant Not significant + +
(22)	Lin and Lee (2004)	Empirical Quantitative Study	Senior Managers' KS Intention Senior Managers' Attitudes towards KS Senior Managers' Subjective Norms Senior Managers' Perceptions of Behavioural Control	Knowledge Sharing (Corporate)	+ + + +
(23)	Lin (2007)	Empirical Quantitative Study	Employee Attitudes toward KS Expected Organizational Rewards Expected Organizational Rewards Reciprocal Benefits Reciprocal Benefits Knowledge Self-Efficacy. .Knowledge Self-Efficacy Enjoyment in Helping Others Enjoyment in Helping Others	KS Intentions Attitudes towards KS KS Intentions Attitudes towards KS KS Intentions Attitudes toward KS KS Intentions Attitudes toward KS KS Intentions .	+ Not significant Not significant + + + + + + +
(24)	Lin and Joe (2012)	Empirical Quantitative Study	Flow Experience Interemployee Helping	Knowledge Sharing	+ +
(25)	Marks et al	Laboratory Experiment	Managerial Prompts	Knowledge Sharing	+

	(2008)		Group Identification Social Value Orientation		Not significant +
(26)	Michailova and Minbaeva (2012)	Case Study Empirical Quantitative Analysis	Organizational Values: Espousement Enactment Internalization of The Core Value of Dialogue	Knowledge Sharing	+ + +
(27)	Obembe (2012)	Case Study Empirical Qualitative Analysis	Personal Perceptions Considerations of Past Experience Prospective Engagements in Practice	Knowledge Sharing	+ + +
(28)	Panteli and Sockalingam (2005)	Conceptual Paper	Trust Conflict		+ -
(29)	Ryua et al (2003)	Empirical Quantitative Study	Attitude toward KS Subjective Norms Behavioral Control	KS Intention	+ + +
(30)	Shin <i>et al</i> (2007)	Empirical Quantitative Study	Attitude toward Quanxi Collectivism Confucian Dynamism	Attitudes toward KS (Information)	+ + +
(31)	Teh and Sun (2012)	Empirical Quantitative Study	Job Involvement Job Satisfaction Organizational Commitment Organizational Citizenship Behavior	KS Behavior	+ + - +
(32)	Wang (2004)	Empirical Quantitative Study	Ethical Concerns Self-Interest Concerns	KS Intention	+ Not significant
(33)	Wang <i>et al</i> (2009)	Conceptual Paper	Personal Benefit from Contributions Lowering the Cost for KS	Knowledge Sharing	+ +
(34)	Wasko and Faraj (2000)	Empirical Quantitative Study	Enhanced Reputation Enjoy Helping	KS Contribution	+ Not Significant

			Centrality Self-Rated Expertise Field Tenurship Commitment Reciprocity		+ Not Significant Not Significant - -
(35)	Yanga and Farn (2009)	Empirical Quantitative Study	Affect-Based Trust Shared Value Internal Control Internal Control	Tacit KS Intention Tacit KS Intention Tacit KS Intention Tacit KS Behavior	+ - + Not significant
(36)	Zhang and Ng (2012)	Empirical Quantitative Study	Intention to KS Perceived Behavioral Control Attitude towards KS Subjective Norms Perceived Behavioral Control Over Knowledge	KS Behavior Knowledge Sharing Knowledge Sharing KS Intention KS Intention	+ Not significant + Not significant +

Table 2: Ignorance classification – Detailed Findings

No	Quote from employees	Classification*
(1)	<i>“I suppose I’m more of a people person [...] I’m not really someone that interfaces with the screen. I do and in fact I’m looking at one now but it is a tool for me to pass information, not necessarily to learn from”</i>	<4>
(2)	<i>“In an organisation like ours, we tend to think that it’s got lots of information and data stored on computers and we need to access that. I think, actually, what you need to do is maximise the use of knowledge, and the knowledge bit is actually stored in the people. So you need to know who to go to and have access to them”</i>	<1>
(3)	<i>“I think you have to go back to the human being to make it really work. Problem being is there are savings, you drop of all the people involved to try to make the system work and say you’re actually going to be physically doing it rather than working on that digital cloud, you’re actually going to be speaking with other people passing this information down, so human being; the human element”</i>	<1>
(4)	<i>“Try not to get rid of the human element, keep the human element in and it will work”</i>	<4>
(5)	<i>“Well it seems to me that it’s one of those subjects that’s almost going on in a dark room in the background, so at least raise the profile of it - what is it that we’re trying to achieve, how are we going about achieving it, what will be the benefits, how can I contribute, how can I take from it. At the moment it’s just KM, I’m not quite sure that people understand what that is. Is it just retention of documents? How do we start to retain people’s experiences as well which may have a bearing on the piece of work that we’re about to undertake? Do we have a robust knowledge/register of qualified people? It’s all about people - it’s knowing who to go and talk to”</i>	<1>
(6)	<i>“It needs to be more integrated with daily management. So maybe we could set some kind of objective around making sure that knowledge is not only captions stored but it’s shared between the team”</i>	<2>
(7)	<i>“More up and down feedback just in general communications would help”</i>	<2>
(8)	<i>“When we have team meetings, there should be a part at the end of that where suggestions can be made and then they should be communicated back at the next one”</i>	<4>
(9)	<i>“I struggle a bit with this, because Knowledge Sharing across the company, I don’t think it’s done very well. We all go on to the main website and we can read the handbooks and the guidebooks and the templates and everything, but there isn’t any database of perhaps Learning from Experience, things that tell people what’s gone right, what’s gone wrong. There isn’t</i>	<3>

	<i>anywhere that pulls our knowledge together”</i>	
(10)	<i>“I’m not aware of any knowledge sharing tools [...] The only tools that I really use are my own eyeballs looking down the list of assets”</i>	<3>
(11)	<i>“Because we are very busy at times, the opportunity for face-to-face networking within the business is not as active as it was. I personally think that its better when people have the opportunity to work and to share ideas through working through a common tread”</i>	<4>
(12)	<i>“I think lot of us struggled with that question around Knowledge Sharing and what those tools were, because we’re not aware of any specific Knowledge Sharing tools”</i>	<3>
(13)	<i>“You would do a search, for example Knowledge Capture, and within our database it came up with 7640 results. And then I thought well, what’s the point in Knowledge Capture process”</i>	<2>
(14)	<i>“If I want to find out what’s going on in other business areas for sharing best practice, the searching methodology doesn’t work on our main corporate site. If you saw that number of results there was no way you would have the time to scroll through the results”</i>	<2>

* (1): ignorance of: subject matter experts;

(2): ignorance of KMS;

(3): ignorance of the corporate knowledge itself;

(4): need for interpersonal communications