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Examining How Knowledge Managers Facilitate the Process of Knowledge Creation in Organizations

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Abstract

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Abstract

The problem addressed in this study was how knowledge managers facilitated the process of knowledge creation. Researchers identified this area as important because it begins to fill the literature gap in the dynamics surrounding knowledge creation. Using 4 research questions developed from the theory of dynamic organizational knowledge creation, the study investigated how knowledge managers facilitated and supported knowledge creation, promoted knowledge formation, and accounted for knowledge gaps. The theory was selected to provide a framework and an analytical perspective on the process of knowledge creation. A qualitative research design was used to learn from a sample of 12 Chief Knowledge Managers their experiences orchestrating a knowledge management program. In-depth interviews were conducted with each participant, transcribed and imported to NVivo. Data were analyzed using the theory and findings were validated via member checking and triangulation. The results revealed that knowledge managers facilitated knowledge creation by building on social and cultural factors, providing leadership, and incentivizing knowledge sharing. Skills identified for facilitating knowledge creation were future envisioning, change management, interpersonal communication, and culture building. Future research would benefit from studies that focused on the outcomes of knowledge management efforts, the perceptions of organization members to determine if knowledge management efforts facilitated knowledge creation, and if knowledge managers follow a specific cognitive learning theory. The social change implications from the present study include strengthening the potential for knowledge creation in organizations, prompting shifts in established paradigms, and fostering trust and expectation from collaboration.

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Dedication

No undertaking in life is a lone venture. There are always those who have pushed, prodded, encouraged, and even berated you along the way, and then there are those who simply have inspired. This work and, in many ways my life, is dedicated to them, and as in all things to God.

Acknowledgement

I would like to acknowledge the researchers, writers, and thinkers who have preceded me in this endeavor. My interests and sources are varied, yet there always seems to be the shoulders of giants to stand upon regardless of the where my thoughts take me. I would also like to acknowledge my committee, and especially my chair Dr. Horton for his willingness to review multiple versions of this research and to push me continually forward and into new areas of thinking.

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CHAPTER 1: AN INTRODUCTION TO THE STUDY

Introduction

During the 1980s the management of corporate knowledge became a popular idea (Wiig, 1997; Koenig & Neveroski, 2008). Built from Machlup's information society and stocks of knowledge (1962, p. 122-123), and Arrow's learning and knowledge creation (1962, p. 168), and driven by Zand's (1969) processes knowledge management proponents capitalized on the proliferation of computing, consultants, and conferences to focus on intra-organizational practices and information. This focus takes a reductionist approach, excluding information and knowledge maintained outside the organization (Hall, 2011), favoring what Peter Drucker referred to as organizational "…benefit and competitive advantage" (Anderson et al., 2002, p. 1272).

Commonly viewed as the interplay of data and information, knowledge is described as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It "…originates and is applied in the minds of knowers…" (Davenport & Prusak, 1998, p. 5). Even when reduced to the individual, the framework and context are often provided by the organization (Hofstede, Neuijen, Ohayv, & Sanders, 1990).

From the gathering of multiple individuals into a singular organization, researchers find that the sharing of knowledge allows employees to be productive (Davenport & Prusak, 1998) and the sharing of knowledge provides their organization a competitive advantage (Anderson et al., 2002, p. 1272). Competitive advantage is experienced typically through improved support for decision-making (Firestone, 2008) by an organization's leaders. It is this focus that creates the hierarchical nature of most knowledge management efforts.

The keys to managing knowledge are the capturing, creating, codifying, sharing, accessing, and reusing of that knowledge. The capture and codification of knowledge require methods to represent the incorporated body of knowledge for later retrieval, typically by computer processing. These representations include an ontological view, an epistemological view, a commodity view, and a community view. Each view approaches knowledge from a different perspective. The first three representations assume knowledge is a static organizational resource and, therefore, can be defined as an organizational commodity (Jakubik, 2007). The last view assumes that knowledge is a dynamic concept created through social interactions (Jakubik, 2007). The community view is also a departure from the accepted hierarchical management thinking in that it views knowledge as processual (Garvey & Williamson, 2002), formed through the community and continually being evaluated and reshaped (Burke, 1991; Stryker & Burke, 2000) rather than static and ordered.

Each of these representations of knowledge utilizes a reductionist approach, driven by the initial step in the knowledge management cycle: the capture of information. Lakoff (1995) and Tsoukas (2005) point out that information presupposes a useful subject. Information exists because someone collected it. Once information is captured it is codified for retrieval and reuse. This approach of collecting only targeted information, while ignoring the rest, creates an impoverished notion of knowledge where nothing is represented in its entirety (Tsoukas & Mylonopoulos, 2004). The reductionist approach fixes the representations of knowledge to a specific purpose (Lee, 1984). This stable representation begins to fade as the representation interacts with the world and intrapersonal interactions (the cognitive functions used to frame patterns and to self-organize information) begin to expand, to collapse, and/or to modify the

representation (Brown & Duguid, 1991; Orr, 1990; Vickers, 1983) in response to cases not represented or poorly represented in the original representation (Johnson, 1993; Lakoff, 1987).

By constraining knowledge management to the specific purpose of the collector, it is likely that a shared lexicon, common understanding, and common culture will exist; however**,** the original representation of knowledge provided by the collector holds true only until exposed to the world. By constraining knowledge management to a single group, it is more likely that a common understanding among users exists, even as other information is purposefully ignored. The collection of information assumes a singular purpose; the act of codifying information for retrieval is predicated on necessity of the ability to decodify the same information.

While the collection of information may denote a singular purpose and a single collector, the advent of Web 2.0 and the emergence of Web 3.0 technologies has loosened the control of corporate-based IT groups by allowing users to access low-cost (often free) information outside of the organization. Social media and Web 2.0, as described by O'Reilly (2005) allow informational sites to become increasingly interactive, further challenging the bounding of knowledge management to a single organization. Rather than relying on an agreed upon codebook, Web 2.0 applications allow peers to contribute to the development of tools, content, and communities, to exchange information, express thoughts, and reconfigure existing explicit knowledge into more complex knowledge structures (Shang, Li, Wu, & Hou, 2011). Web 2.0 users are unencumbered by specific discipline hierarchies (Kane & Fichman, 2009). Web 2.0 allows users to go beyond the knowledge systems provided by their organization, allowing peers to decide what is important based on their experiences and in a manner judged by the individual not the organization's managers (Bradley & McDonald, 2011). Given that knowledge is an individualistic concept, and that additional knowledge sources are readily available from outside

the organization is it possible to manage knowledge, and if so, how is this accomplished by the knowledge managers?

Organization of the Chapter

This chapter begins with a description of the purpose of the study. Once the purpose has been described, the nature of the research is explored before stating the research questions for this study. The terms critical to this topic are defined, and the study's assumptions and limitations are outlined. Finally the significance of the study is explained.

Purpose of the Study

To date, research on knowledge management tends to be segmental. Peer-reviewed articles filed under the subject of knowledge management focus on singular items such as the validation processes for data, pragmatic approaches to knowledge, the impact of information technology, or by design focus on an implementation in a specific setting. While this segmental approach provides great insight into those areas under review, these studies do not speak holistically to the art of knowledge management. Ramasami (n.d.) describes the task of knowledge management as managing the following: knowledge of facts (know-what), knowledge regarding the natural world (know-why), knowledge of social-relations (know-who), and the knowledge of how to do things (know-how). Tsoukas (2005) adds the knowledge of the social environment (know-where), and knowledge of the temporal constraint (know-when). Frand and Hixon (1999) expand this to include the involvement and knowledge of the needs of the individual (Frand & Hixon, 1999). With the expanding scope of knowledge management, successful knowledge managers rely on their combined experiences, pulling different aspects from the academic, technical, and the business worlds together, and melding them into something that works in the given context.

The context of knowledge management changes as the social environment expands, and as temporal restrictions are reduced, knowledge managers are more and more likely to interpret context, methods, and processes on the fly, in order to enable the creation of new knowledge. The creation of new knowledge depends upon the "…vagaries of human relationships and differing intellectual capabilities; knowledge enabling manages must recognize these basic human factors rather than ignoring them, turning the challenges of human interaction into new strengths" (Von Krogh, Ichijo, & Nonaka, 2000, p. 30). No less human, and perhaps more critical to the facilitation of the development of relationships, and management of human interactions are the knowledge managers themselves. As actors in the process of developing relationships and maximizing human interactions, knowledge managers serve a critical but little examined role. Other research examines management (Williams, 2008; Drucker, 2009; Templar, 2011) but none seeks to plumb the depths and complexities of managing the creation of knowledge. The purpose of this research is to explore and understand how knowledge managers facilitate the process of knowledge creation.

Nature of the Study

This study is qualitative. Qualitative research allows the researcher to interact with the participants in a natural setting in order to "…develop a level of detail about the individual or place and to be highly involved in actual experiences of the participants" (Creswell, 2003, p. 181). This setting provided the context for the participant's self-created reality. The processes and methods utilized to generate knowledge can only be understood in context. This focus allowed for a view of the processes involved in creating knowledge within the field of knowledge management. An in-depth review of the existing research on knowledge management was used to construct an initial set of interview questions. This research utilized a

qualitative design to investigate knowledge managers' descriptions of their work. Qualitative research is interpretative research and, through the researcher, seeks to "understand the world from the perspective of those living in it" (Hatch, 2002, p. 7). This research focuses on the perspectives relating to the creation of knowledge. Utilizing this approach, a formal hypothesis is not required to start the research. Through interviews, observations, and the use of unobtrusive data (Hatch, 2002) the researcher can obtain rich and in-depth information about the subject of the study. As the data are analyzed, the qualitative researcher begins to "see patterns, identify themes, discover relationships, develop explanations, make interpretations, mount critiques, or generate theories" (Hatch, 2002, p. 140). Through the use of qualitative research, this study developed an intricate, holistic picture of the human aspects involved in facilitating the creation of knowledge.

Research Questions

To aid in the development of this holistic view, the following research questions were addressed:

RQ1 - How do knowledge managers facilitate the process of knowledge creation in organizations?

RQ2 - In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?

RQ3 -How do knowledge managers facilitate commitment for promoting the formation of new knowledge within an organization?

RQ4 -How do knowledge managers account for gaps in knowledge?

Conceptual Framework

The research framework in this study relies on the theories of knowledge creation theories and the knowledge management models put forth by Nonaka (1994), and the frameworks of Wiig (1993), Bukowitz and Williams (1999), McElroy (1999), and Choo (1998), and peripheral technologies centered on the people, process, and projects associated with knowledge management.

The underlying theory considered in this study is the dynamic organizational knowledge creation, where tacit and explicit knowledge are viewed as the core elements in any knowledge management framework (Nonaka & Takeuchi, 1995). Hard to capture, tacit knowledge represents perspectives, and mental models. Easier to capture, explicit knowledge lives outside of human elements and can be captured in the form of documents. Knowledge management is about leveraging these forms of knowledge for organizational benefit. Following Nonaka and Takeuchi (1995), knowledge at an individual level is built from experience and perspective and validated through socialization. Knowledge becomes explicit as people interpret their thoughts, and find ways to articulate them into meaningful ideas and concepts that are comprehendible and useable by others. Individuals then internalize this information as it is accessed and used.

Central to all efforts of collecting data, information and knowledge for reuse within an organization is the Knowledge Manager. The knowledge manager serves as the facilitator for the maximization of knowledge use within the organization for its benefit. The basic question of how the knowledge manager facilitates this flow, as described by Nonaka (1995), comes into play in every knowledge management effort. The knowledge manager, by virtue of position, holds the responsibility of developing processes, adding motivators to the process to maximize

participation, capturing knowledge, and codifying knowledge, disseminating knowledge, acquiring new knowledge and applying the knowledge within his organization. How the knowledge manager perceives these activities will lead to a better understanding of the creation of knowledge within organizations.

Definitions of Terms

Several terms lie at the heart of this research. Their definitions follow:

Data: not yet interpreted symbols (Speck & Spijkervet, 1997)

Domain: the class of entities or events that constitutes the subject matter of a science or other disciplines (American Psychological Association [APA], 2007)

Epistemology: the study of knowledge and justified belief (Steup, 2014)

Explicit Knowledge: captured and codified knowledge (Dalkir, 2005, p. 334)

Information: data with relevance and purpose (Davenport, 1997)

Information Culture: socially shared patterns of behavior, norms and values that define both the significance and the use of information (Choo, Bergeron, Detlor, & Heaton, 2008, p. 792)

Knowledge: the capacity for effective action (Senge et al., 1999)

Knowledge Management: a deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This value is achieved through the promotion of creating, sharing, and applying knowledge as well as through the feeding of valuable lessons learned and best practices into corporate memory in order to foster continued organizational learning. (Dalkir, 2005, p. 337).

Knowledge Management Cycle: the process information follows in order to become transformed into a valuable strategic asset (Dalkir, 2005, p. 26),

Ontology: an explicit, partial specification of a conceptualization that is expressible as a meta-level viewpoint on a set of possible domain theories for the purpose of modular design, redesign, and reuse (Skuce, 1995).

Tacit Knowledge: highly internalized knowledge (Dalkir, 2005, p. 342).

Assumptions and Limitations of the Study

Assumptions

As a study based upon interviews, it is assumed that all participants offered their full and honest support and cooperation. Further, it is assumed that participants understood the basic tenants of knowledge management and had experience implementing and/or supporting knowledge management efforts. Knowledge can be viewed from multiple perspectives; it is therefore assumed that the ability to define true knowledge rests with the individual members.

Limitations

The constraints of this study include those determined by the characteristics of the chosen design. While transferability of the research findings to another situation cannot be assumed, the broad swath taken in the interviews should provide something for researchers that follow. To ensure the transferability of this research I thickly described the social actions by beginning to interpret the actions by recording the circumstances, meanings, intentions, strategies, motivations, and so on that characterize a particular episode. (Schwandt, 2007) Still, the burden of proof of transferability is placed on those seeking to make an application elsewhere (Lincoln & Guba, 1985). While the focus of this research will be on the art and practice of knowledge management, specifically the creation of knowledge itself, every effort was made to protect proprietary data, or practices that were exposed during interviews. Each participant was given a

fictitious name and companies and places of employment were not identified. Purposeful sampling was utilized.

Significance of the Study

This research adds a perspective to the abundant, yet reductionist-focused knowledge management research. Interviews with working Chief Knowledge Officers, knowledge practitioners and others in the field of knowledge management guided this study towards building a comprehensive platform of shared perceptions, expected outcomes, and methods. This research provides knowledge managers a better overall understanding of the true environment and practice of knowledge management.

Currently, knowledge management focuses on adding value for an organization's customers through the acquiring, creating, sharing, and reusing of organizational knowledge (Martin, 2000). Today organizations must think beyond their current practices and the boundaries of their current organizations (Rastogi, 2000). The emergence of a worldwide social system, powered largely by the Internet and its supporting Web 2.0 and Web 3.0 technologies (Weinstein, 2010) signifies a major shift in the practice of communication, expanding the range of people and locations from which information is available (Kling, 2000). This growth has added diversity to an already varied base of information and information providers available to individuals and knowledge managers who must now incorporate many different kinds of knowledge, including interdisciplinary knowledge, and knowledge of questionable origin and validity. This broad base of knowledge ensures that a holistic solution can be reached by ensuring the incorporation of many differing perspectives. In these cases, the effective application of knowledge becomes instrumental.

This study examined how knowledge managers facilitate the process of knowledge creation. This research study begins to fill the gap of the limited literature in the dynamics surrounding knowledge creation in from the perspective of knowledge managers themselves. Rather than narrowing the context of use to a single organization, this research aims to broaden the knowledge management base.

This research supports social change by providing insight into the creation of new knowledge in support of services designed to meet the social needs and policy implementations to improve the public well-being (Weinstein, 2010). The examination of the processes and practices of knowledge creation will allow individuals world-wide to converge upon a common understanding for the purpose of creating, storing, and distributing information is support of knowledge creation (Weinstein, 2010). The descriptions of the human factors drawn from the interviews will provide guides for sharing, developing, and applying new knowledge (Choucri, 2007). These changes provide the basis for improved collaboration and positive interpersonal interactions leading to shifts in established paradigms fostering greater collaborative thinking and working styles.

Summary

Driven by the proliferation of computing, consultants, and conferences to focus on intra-organizational practices and information, the management of organizational knowledge gained popularity in the 1980s. Viewed as the interplay of data and information, knowledge is described as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It "…originates and is applied in the minds of knowers…" (Davenport & Prusak, 1998, p. 5). Key to managing knowledge is the capturing, creating, codifying, sharing, accessing, and reusing of

that knowledge. The capture and codification of knowledge require methods to represent the incorporated body of knowledge for later retrieval, typically by computer processing. Each of these representations of knowledge utilizes a reductionist approach, driven by the initial step in the knowledge management cycle: the capture of information. Lakoff (1995) and Tsoukas (2005) point out that information presupposes a useful subject. Information exists because someone collected it. Once information is captured it is codified for retrieval and reuse. This approach of collecting only targeted information, while ignoring the rest, creates an impoverished notion of knowledge where nothing is represented in its entirety (Tsoukas & Mylonopoulos, 2004). The reductionist approach fixes the representations of knowledge to a specific purpose (Lee, 1984). Even as reduced knowledge remains an in individualistic concept, the knowledge manager is asked to pull these concepts together to facilitate the creation of new knowledge.

Chapter 2 is a review of the literature on data, information, and knowledge, how knowledge is defined, the differences between knowledge management and information management, the commoditization of knowledge, knowledge management, relevance, and the codification of data.

CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter provides a literature review to provide grounding for this research. This chapter delineates the distinction between data, information, and knowledge, provides a definition of knowledge, explains how knowledge management differs from information management, provides a historical overview of knowledge management, and provides a look ahead into Web 2.0 and Web 3.0 and their impacts on knowledge management. Due to the contextual nature of knowledge the research draws from many disciplines, drawing on the work of philosophers, economists, anthropologists, sociologists and psychologists, among others. Because the literature review explored representations of knowledge, it provided great insight into related works with the notable focus on the management of knowledge, rather than the process of creating knowledge.

Organization of the Chapter

This chapter begins with a description of the methods used to gather research and literature pertaining to the study of knowledge management. Once the strategies used to yield the literary background have been explained sufficiently, the differences between data, information, and knowledge are explored. After these building blocks are reviewed, information management is reviewed to note the differences between it and knowledge management. The history of knowledge management is then examined beginning with the popularization of the term in the 1980s, and continuing through to modern research and into the use of Web based technologies (Web 2.0 and Web 3.0). The four representations of knowledge are reviewed to explain how the reduction of knowledge items creates a manageable form of knowledge. Finally, the literature gap is explained, before ending with a summary of the chapter.

Literature Search

Walden University Electronic Library's searching interface ("Thoreau") enabled the location of sufficient research literature. Thoreau provides a broad search of the entire Walden library from a single interface, including e-books and dissertation collections. From this broad base, refined searches against specific online databases allowed the following of interesting themes and the finding of specific articles cited. The online library of Bellevue University provided additional resources, primarily from databases in the ProQuest collection (not provided by Walden), the ebrary Business and Economics Collection; the ebrary Psychology and Social Work Collection; eLibrary; and NetLibrary databases.

Searches of *Muse Journals*, *Oxford Journals*, *Springer Journals*, *Emerald Insight* and other journal collections made available through the Cultural Knowledge Consortium, the Open Source Center, and IntelLink provided additional resources. Skillsoft's Books 24x7, provided through BAE, Systems, RX Joint Venture and the Project Management Institute, as well as access to Safari Books online through the Cultural Knowledge Consortium provided a number of eBook resources. Membership in the Academy of Management gave me online access to its journal archives, utilized to find secondary sources referenced in previous articles.

Journals providing the bulk of the research material included the following: *Computer and Information Science*, *Knowledge Management Research and Practice*, *Knowledge Management and Business Model Innovation*, *Journal of Knowledge Management*, *The Knowledge Management Theory Papers*, *Knowledge Management Journal*, *Knowledge Management Research and Practice*, *Computers in Human Behavior*, *Academy of Management Review*, and the *Journal of Information Science*. Sources used to provide breadth include:

Current Anthropology, *Human Computer Interaction*, *Industrial and Corporate Change*, *Expert Systems with Applications,* and the Palo Alto Research Center.

The terms "knowledge management," "knowledge," and "learning organizations" all served as the search terms within these resources. Additional search phrases included: "knowledge management cycle," "knowledge management models" and "knowledge capture and codification", "codification"; "web 2.0," "enterprise 2.0," "communication," and "social networks" as well as other terms that were found relevant. A review of these returned peer-reviewed documents yielded numerous pertinent articles. Many of these sources led to the discovery of additional foundational themes, nomenclature, accepted frameworks, models and process cycles that proved germane. These were investigated as found.

The approach of searching multiple online libraries and sources, providing different virtual stacks, the use of online journals, student papers, books (both eBooks and hard copy), and the inclusion of conflicting material provided a solid foundation on which to base the naturalistic inquiry. While succeeding at the original goal of providing for the directed creation of a wealth of peer-reviewed literature, the references, used and unused, ultimately pushed this research into corners and niches not originally expected.

Data, Information, and Knowledge

Research into the realm of knowledge management (KM) must first explore the foundations of knowledge and its sub-components -- information and data. These building blocks are widely accepted and represented in the KM literature as the Knowledge Hierarchy (Davenport & Prusak, 2000; Alavi & Leidner, 1999; Nissen & Espino, 2000) depicted in Figure 1.

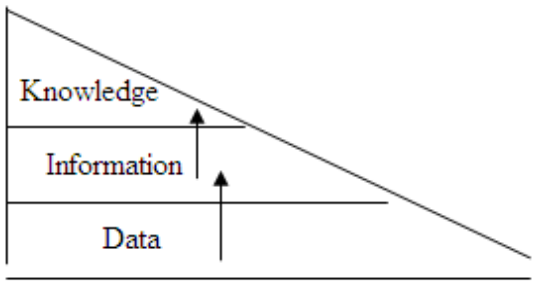


Figure 1. Knowledge Hierarchy
Note. Adapted from The Transformation In The Five Tier Knowledge Management Transformation 2007, by A. Hicks, S. Galup, R. Dattero. Copyright by Journal of Knowledge Management Practice.

Starting at the lowest level of the hierarchy, data equates to symbols. "Data comes through research, creation, gathering and discovery" (Ramasami, n.d., p. 50); it is the objective measurement of the attribute of an entity (Satterlee, 2006, p. 124). Davenport and Prusak (2000) define data as a set of discrete, objective facts that provide no judgment or interpretation and provide no sustainable basis on which to take action. Data has no meaning onto itself; it can be useful, and not useful (Bellinger, Castro, & Mills, n.d.). The existence of data provides no other significance than serving as the starting block that serves as the basis for everything else.

The next level of the hierarchy represents information. Simply, information is data put into context (Von Krogh, Ichijo, & Nonaka, 2000, p. 38). Context is created by arranging data into patterns that provide useful meanings (Davis & Botkin, 1994; Speck & Spijkervet, 1997; Vance, 1997; Davenport & Prusak, 2000). Even with meaning, information can still prove to be not useful (Bellinger et al., n.d.). Regardless of its usefulness, information is factual (Stenmark, 2001) and, therefore, is easily identified, organized, and distributed (Terra & Angeloni, 2003). It is the application of information that sparks changes in the individual's state of knowledge

(Choo, 1998) by increasing, or altering, an individual's level of knowledge opening new possibilities for action (Kidd, 1994).

This analysis means that knowledge is a non-independent construct. "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers…" (Davenport & Prusak, 2000, p. 5). Knowledge is shaped by the individual; it is combined with existing knowledge to form more complex structures (Fahey & Prusak, 1998).

Defining Knowledge

This individualistic combination of information and data may explain why a clear definition of knowledge is difficult to find. As early as Plato, great minds have struggled with the question "What is knowledge?" (Theaetetus). In Plato's account, Socrates considers and rejects defining knowledge as the various arts and sciences, perception, and as true judgment, before settling upon true judgment with an account. Later dialogues find that Socrates never truly settled on a final view of knowledge, but rather continued to develop new conclusions depending on the context (Mattey, 2005).

Aristotle followed Socrates by introducing syllogistic logic (Prior Analytics) where a conclusion is inferred from two or more premises. Following Aristotle's example of using the letters A, B, and C (Greek Alpha, Beta, Gamma) a syllogistic premise takes the form shown below:

Major premise: All A are B.

Minor premise: All C are B.

Conclusion: All A are C.

Later Aristotle argued that instruction given or received by way of argument effectively produces new knowledge from already existing knowledge (Posterior Analytics). Today, this concept represents the transmission of knowledge through argument or discussion.

With the ability to transmit knowledge settled, Descartes set out to show that science rested on a mindful foundation and not on the senses. Descartes began by calling into doubt beliefs based upon the senses through three very similar arguments: "The dream argument," "the deceiving God argument," and "the evil demon argument." The premise of each argument is that external objects are not perceived directly, but that they are perceived only through the contents of our minds. Descartes argued that since sense experience never puts us in contact with the objects themselves, but only with mental images, sense perception provides no certainty that there is anything in the external world that corresponds to the images we have in our mind. The obvious implication is that, since we do know that external objects exist, this knowledge cannot come to us through the senses, rather it is formed in the mind (Descartes, 1641/1993).

Whether the senses could be trusted or not, Hume believed, that knowledge is limited to sense-experience. Hume distinguished between impressions, which include all our sensations and passions, and ideas, which he referred to as "the faint images of these in thinking and reasoning" (Hume, 2003, p. 1). To Hume, simple impressions and ideas provide neither distinction nor separation, while more complex impressions and ideas can be analyzed into their component parts. The simple idea of the color "*Red*" does not distinguish one variation from the other, nor can it be separated into other parts. The complex idea of an apple can be broken apart into several smaller elements. Hume argued that complex ideas must have their veracity called into question.

Perhaps most famously, Hume criticized the relationship between cause and effect as a source of knowledge, another long-standing Western philosophical belief. Rather than believing that in order to know something its cause must be known, Hume argued that a priori knowledge of this is impossible, and that the knowledge is based on experience and inference. We mistakenly infer a cause to the effect, because our experiences have habituated us into that thinking (Hume, 2003).

Starting with Hume's skepticism, Kant set out to determine how synthetic judgments are a priori possible (Kant, 1781/2004). Simply, our knowledge is constrained to the empirical world because the mind itself plays an active role in constituting the features of experience and limiting the mind's access only to the empirical realm of space and time. Kant argued that, when challenged, assertions appeal to an individual's experience or perception of the reality. In this light, you can know a chair is hard, without having a priori knowledge of chairs (or having experienced all possible chairs) (Guyer, 2010).

Gettier argued that knowledge could in fact happen by accident, largely resulting from false beliefs; or rather, beliefs arrived at without adequate justification (1963) thereby directly challenging the definition of knowledge is true judgment with an account or justified true belief. Gettier provided only two examples, both showing a justified true belief, which failed to count as knowledge. This problem (branded the Gettier Problem) arises because it seems possible to "know" even when presented with uncertain evidence. Gettier's problem was later reinforced by researchers such as Feldman (2001) and Rosenberg (2002). It is perhaps best summarized by Ludwig Wittgenstein's (n.d./1969) statement that it is possible to say "He believes it, but it isn't so", but not "He knows it, but it isn't so". The elimination of the distinction between belief and

knowing removes the need for absolute certainty in essence returning us to Theaetetus' original definition -- "Knowledge is perception."

Knowledge, can be said to be a perception (Theaetetus) that has been inferred (Prior Analytics), from past experiences (Hume, 2003) , even limited experience (Kant, 1781/2004) which is combined in our mind (Descartes, 1641/1993), even if based on uncertain evidence (Gettier, 1963), and is only given meaning through its use (Wittgenstein, 1958). While this definition touches upon the various philosophical arguments, it does not necessarily assist in clarifying much. Professor John R. Searle turned to the etymology of the word to provide a more proper starting point: "The word "know" derives from the Latin *noscere*; also meaning "to know"…The suffix "--ledge" may have originally meant "process of action" (as cited in Senge, P., Kleiner, A., Roberts, C., Ross, R., Roth, G., & Smith, B.., 1999). Knowledge is what we know; it involves comprehension, understanding, and learning, all of which are mental processes (Wilson, 2002). This idea supports C. West Churchman's (1971) assertion that knowledge resides with the user and not with the general collection of information. The processing provides the capacity for effective action (Senge et al., 1999). Bodeaux (2010) describes this as:

> …the difference between a recipe and a chef, a map of London and a London cabbie, a book and its author. Information is in technology domain, and I include books (themselves a technology) in that description. Digitizing, subjecting to semantic analysis, etc., are things we do to information. It is folly to ever call it knowledge, because that is the domain of the brain. And knowledge is an emergent property of a decision maker – experiential, emotional framing of our mental patterns applied to circumstance and events. It propels us through decision and action, and is utterly individual, intimate and impossible to decompose because of the nature of cognitive processing [sic].

Von Krogh, Ichijo, and Nonaka, I. (2000) simply state that knowledge is a truthful justification of an individual's beliefs based on observations of the world; these observations are in turn dependent upon the individual's unique viewpoint, personal sensibilities, and experiences. Hence, "knowledge is a construction of something that is true in any abstract or universal way" (p.6). Wilson (2002) adds: "…everything outside the mind that can be manipulated in any way can be defined as 'data'; if it consists of simple facts, or as information, if the data are embedded in a context of relevance to the recipient" (p. 4). This paper will define knowledge as: the truthful justification of an individual's beliefs based on observations of the world. In turn, these observations are dependent upon the individual's unique viewpoint, personal sensibilities, and experiences that are all relevant to the given context and provide a means for action.

Selected definitions of data, information, and knowledge are shown in Table 1.

Table 1 Selected definitions of data, information and knowledge

Author(s)	Data	Information	Knowledge
Wiig, 1993	-	Facts organized to describe a situation or condition	Truths, beliefs, perspectives, judgments, know-how and methodologies
Nonaka & Takeuchi, 1995	-	A flow of meaningful messages	Commitments and beliefs created from these messages
Spek & Spijkervet, 1997	Not yet interpreted symbols	Data with meaning	The ability to assign meaning
Davenport, 1997	Simple Observation	Data with relevance and importance	Valuable information from the human mind
Davenport & Prusak, 1998	A set of discrete facts	A message meant to change the receives perception	Experience, values, insights, and contextual information
Quigley & Debons, 1999	Text that does not answer questions to a particular problem	Text that answers the question who, when, what, or where	Text that answers the questions why or how
Choo, Detlor, & Turnbull, 2000	Facts and messages	Data vested with meaning	Justified, true, beliefs

Note. Adapted from The Relationship between Information and Knowledge, by D. Stenmark, Proceedings of IRIS, Ulvik, Norway.

Information Management

Since knowledge cannot be separated from the information presented to an individual (See Wilson, 2002; Dalkir, 2005), systems designed with the intent to manage knowledge may not differ drastically from those designed to manage information. This has led some to argue that knowledge management is simply information management rebranded; however, there are many differences.

Targowski (1998) defines information management as the systematic study and practice of telematic (computers, telecommunications, and television) technology applications (systems, services, and infrastructure) in organizations and for individuals (p. 82). This definition focuses squarely on the management of systems and the information contained in them (Venkatraman, 1994). The systems are the focus and the drivers of information management. This concept is best shown by the five domains put forth in the *Information Management Body of Knowledge* (see Figure 2), which are intended to provide for the assessment of the competencies needed to manage the delivery of benefits from investments in information technology (Bytheway, 2011). These five domains are described using terms including system and technology (Bytheway, 2004). None addresses the human elements, which are most relevant from the knowledge management perspective (Terra & Angeloni, 2003).

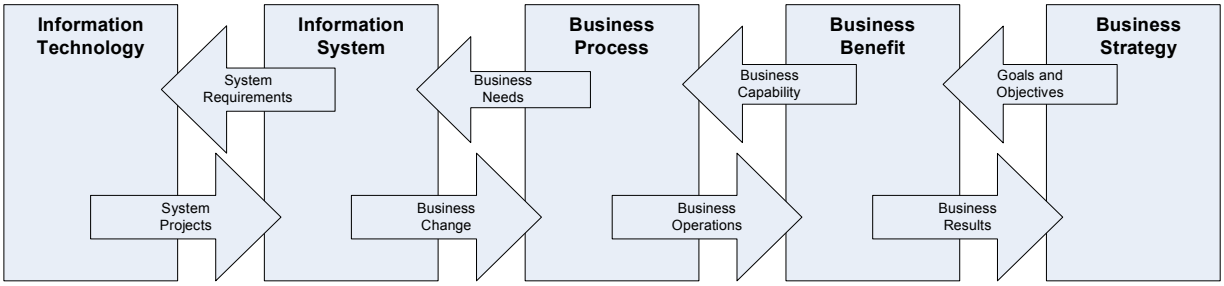


Figure 2. IMBOK Framework.
Note. Adapted from "Assessing Information Competencies in Organizations" 2011, by A. Bytheway. Copyright by Academic Publishing International LTD.

While true that systems and technology have inspired the vision of leveraged knowledge, knowledge remains a human act (McDermott, 1999). Knowledge ultimately involves someone who knows, and this interaction goes beyond the art of managing the information and towards the use of the information. This use distinguishes information management from knowledge management. With knowledge viewed as the combination of information, thinking (transforming), experiences in the context of the present moment the argument that knowledge cannot be managed (Sveiby, 2001) seems valid; still it seems unwise to define a new nomenclature. Rather it is better to accept that "knowledge management is a poor term, but we are stuck with it" (Sveiby, 2001).

Knowledge Management

Perhaps the inadequacy of description comes from the unsure origins of the practice itself. Most would argue that the discipline of knowledge management emerged along with the propagation of the three Cs: computing, consultants, and conferences (Lambe, 2010). The ready availability of computing power, combined with the propagation of the term through consulting

firms and conferences, provided a strong push for the acceptance of knowledge management as a commercial tool for organizational success. This golden age of knowledge management spanned only five years from 1993 – 1998, however it largely ignored the preceding decades of management literature utilizing the phrase knowledge management and the implicit management of knowledge.

Pre-Knowledge Management

Berner (2001) adds that all significant human activity leads to the acquisition of knowledge. This new knowledge can then be captured and communicated to others, sometimes spanning generations (p.3). The first hunters surely taught their teammates and up-and-coming hunters the best and most successful practices, thereby ensuring the long-term viability of the group (Wiig, 1997). These narrative storehouses have existed for a long time, with individuals finding ways to share knowledge-building on their previous experiences and eliminating mistakes – or at least avoiding making the same mistakes twice (Dalkir, 2005). As Berner explains:

> In the village, from time immemorial, the elder, the traditional healer and the midwife have been living repositories of distilled experience in the life of the community…Interactive knowledge-sharing mechanisms have always been used – from palavers under the baobab, village square debates, and town meetings, to conclaves, professional consultations, meetings, workshops, and conferences – all functioning to enable individuals to share what they know with others in the relevant area of knowledge (2001, p. 3).

Anthropologist Frederick Barth (2002) breaks knowledge into three facets, stating that it must contain a corpus of substantive assertions and ideas regarding the world, it must be

instantiated and communicated in some manner (words, symbols, gestures, actions, etc.) and it must be communicated within a series of instituted social relations. Wiig (1997) utilizes economic drivers to trace the growing importance of knowledge management through Barth's social relations. After the hunters mentioned previously, the focus of managing knowledge turned to agriculture and the husbandry of domesticated animals, raising crops, and the creating of food supplies as the Agrarian Economy took hold. From here, the focus again shifted as people turned towards providing products by exploiting natural resources (Natural Resource Economy). This economy brought forth the rise of guilds, and the sharing knowledge about process and customers by expert tradesmen. The Industrial Revolution again changed the focus from resources to efficiency, by giving the advantage to those who could provide quality goods at the lowest prices. The first half of the 20th century, termed the Product Revolution (Wiig, 1997) found manufacturers giving greater variability in their products and saw the emergence of service in support of the products, shifting the knowledge management focus to product leadership and the sophistication of products. During the second half of the 20th century, this change was augmented by the information revolution, which brought closer control of manufacturing, marketing, and logistics with Information Technology (IT). This shift also prompted the collection of extensive amounts of data and the exchanges of data from suppliers to customers, and vice-versa. The last decade has signaled another shift --this time towards the management of knowledge and other intellectual assets.

The Commoditization of Knowledge

Along this timeline, two economists Machlup (1962) and Arrow (1962) and a sociologist Rogers, (1962) laid the groundwork for a set of theories that would dominate for 50 years. Machlup' s *The Production and Distribution of Knowledge in the United States* popularized the

idea of an information society based on his recognition of the growing importance of knowledge and the requirement to deploy it properly for economic advantage. Machlup portrayed a developing economy with a required division of labor between "brain work" (knowledge production) and physical performance (production) was found in all sectors of both the social and economic organization (Machlup, 1962, p. 6). Machlup further recognized that knowledge is reusable and cannot be priced. Finally, he put forth the notion of what he referred to as stocks of knowledge and flows of knowledge. To Machlup, stocks of knowledge consisted of two distinct types: on the record (captured and encoded in a manner for others to decode in order to add this knowledge to theirs), and knowledge in the mind (the memories of individuals, groups, or members of a society). From these stocks of knowledge, flows were established from person to records, from records to persons, and finally from person to person with no record. This flow of knowledge from source to recipient does not reduce the stock but it does increase the knowledge on the receiving end. "This implies that every flow of knowledge may bring about an increase in the combined stock of knowledge" (Machlup, 1979).

Around this time, another economist Arrow published a book and two articles that should have provided the theoretical foundation for organizational knowledge management. Arrow's "The Economic Effects of Learning by Doing" (1962) described his economic theory of endogenous growth where innovation and knowledge, specifically new knowledge, spur economic growth. Arrow also held knowledge as something that could be produced (Langolis & Savage, 2000). A critical component to this theory -- "the presence of learning means that an act of investment benefits future investments, but this benefit is not paid for by the market" -- (Arrow, 1962, p. 168) outlined the importance of organizational knowledge creation.

Arrow added to his original thoughts seven years later (Arrow, 1969) in drawing on the thoughts of Rogers (1962) by speaking to the classic knowledge management problem: the transmission of knowledge. In "The Limits of Organization," Arrow discusses the use of channels and the costs of maintaining the channel weighed against the benefits provided by the channel. The benefits of information are in its non-diminishing nature; information is transmitted via channels without diminishing the information at the source. This feature allows the repeated use of information, without harming or depleting the source. Information costs relate primarily to the accumulation, storage, and retrieval of the information for processing. Rather than speaking of the cost of infrastructure to support the passing of information, Arrow applies cost to the time and effort of distinguishing channels from each other, noting that it is not directionally uniform. That is the time and effort to pass information from A to B may be far less than the time and effort required to pass information in the opposite direction. This is partially due to differing levels of ability and understanding at either end of a given channel. Understandably, the "codes" used to transmit information via a channel must be deciphered; this process requires that these codes be mutually understandable. The codes represent the specialized information utilized within an organization.

Knowledge Management

The works of Machlup, Arrow, and Rogers precede the term knowledge management. Not until the 1980s did the term knowledge management becomes popularized (Wiig, 1997; Koenig & Neveroski, 2008) and by this point, the focus was beginning to shift away from applications at the societal level (See Caldwell, 1967; Henry, 1974; and Carroll & Henry, 1975) in favor of the organization and the thoughts of Drucker (1968) and Zand (1981). This focus permeates the research into knowledge management and establishes the primary focus for

today's knowledge management efforts. To illustrate this point, one only needs to examine a knowledge management textbook. Dalkir's (2005) text provides four business drivers of knowledge management: (1) globalization of business, (2) leaner organizations, (3) corporate amnesia, and (4) technological advances (p. 18).

To support an organization, knowledge management must support decision making (Firestone, 2008). Successful knowledge management provides access to the information needed to make a decision; it does not provide the answer. Everyday members of an organization use what they learn from the knowledge that is available to them to take advantage of opportunities and to solve the problems they face. Knowledge management facilitates this process by bringing ''order to 'the chaos of infoglut' with powerful organizational, search and retrieval technologies that enable employees to find and focus on business'' ("Darwin Magazine," 2001).

These decision-making processes are supported by four sub-processes, otherwise known as the Knowledge Management Cycle. The Knowledge Management Cycle emphasizes the use of knowledge assets in a cyclic and iterative manner. While several researchers have defined variations of the knowledge cycle (Oldenkamp, 2001, 2002; Brailer, 1999; McElroy, 1999; Nickols, 1996; and Wiig 1993) in the simplest terms, Knowledge Management Cycle involves the capturing, creating, codifying, sharing, accessing, and reusing of knowledge.

Capturing knowledge is an imperative business function (O'Hara & Shadbot, 2001; Davenport & Prusak, 1998). Some of this data resides in highly structured formats maintained in information technology systems. This explicit data accounts for about 5% of the information holdings of an organization (Dalkir, 2005). The remainder exists as tacit data, maintained in the expertise and experiences of the individual. This data must be extracted from the individuals and made explicit in order for it to be captured and stored in a manner that is retrievable. Still, our

environment is too big to be known in its entirety; rather, it is a foundation that allows for the addition of pieces. We get to know our world by constraining what we know (Weinberger, 2011). Knowledge is not fixed; it is diverse, changing, and reflective of the cultural values of the moment. No single classification can capture all of it (Weinberger, 2007), so we choose a singular purpose and begin to capture and to codify the relevant pieces of knowledge.

Relevance

Before delving into the process of codification, it is important to understand the importance of relevancy to knowledge management. For knowledge to be important to it must be connected to a matter of concern for the organization, or the individual. "In relevance-theoretic terms, any external stimulus or internal representation which provides an input to cognitive processes may be relevant to an individual at some time" (Wilson & Sperber, 2002, p. 251). Central to Wilson and Sperber's theory is the idea that relevance is conceived as subjective depending on the knowledge held by an individual when encountering new knowledge.

If a plumber needs to fix a leaky faucet, for example, some objects and tools are relevant (e.g., a wrench) and others are not (e.g., a waffle iron). And, moreover, the latter seems to be irrelevant in a manner which does not depend upon the plumber's knowledge, or the utterances used to describe the problem. Relevance is viewed as goal-dependent. A piece of knowledge is relevant if and only if it can be used to achieve a desired goal (Lindsay & Gorayska, 2002).

As described by Wilson and Sperber relevance is not an all-or-none question, rather it is a matter of degrees. As the size of knowledge repositories grow, there is an ever expanding number of possible items which might have at least some relevance, but it is impossible to focus on them all. What makes an item worth the cost of opening, reading and combining with

existing knowledge is not that it is relevant, but that it seems more relevant than any alternative. (2002, p. 252) What makes an item relevant or more relevant than a competing item is not just the cognitive effect achieved. In a different context, the same input may be more or less relevant.

If an individual can apply meaning and context to the item they will create new knowledge more quickly. "Years of experience give us a great number of complex mental templates for storing new information; the key is to recognize those familiar templates and use them to our advantage" (Small & Vorgan, 2008, p. 42) The availability of these templates provide guides that determine the ease or difficulty perceived in creating new inferences. "In relevance-theoretic terms, other things being equal, the greater the processing effort required, the less relevant the input will be" (Wilson & Sperber, 2002, p. 252).

Organizations create knowledge as part of a continuous process which also determines if this knowledge is truly worthwhile for the organization. In an organization knowledge is typically chosen based upon cost, profit margin, and how much its capture can contribute to the organization's growth, profit, and well-being. There may be additional considerations that make the knowledge relevant for the organization. These considerations include the extent that the knowledge is consistent with the organization's vision. It is the role of the organization's management to develop, refine, and maintain the standards that determine the relevancy of knowledge for the organization (Nonaka, 1994). Once it is determined relevant, it is codified.

Codification

Codification involves the extraction of explicit knowledge from individuals who have developed it through a dynamic process (processes) that turns un-reflected practices into reflective ones by establishing and clarifying the rules. This process then guides the codification

practice. The codification process may utilize a variety of methods, however, these approaches typically include, but are not limited to: structured and unstructured interviews, stories (Denning, 2001), on-site observations, protocol analysis, repertory grids, concepts mapping, and black boarding (Awad & Ghaziri, 2004). This "amplification and articulation" of knowledge for internalization (Malhotra, 2000) allows the transfer of expertise from an individual into a knowledge repository, complete with an established context. All of this sharing allows for the furthering of knowledge (Tsoukas & Vladimirou, 2001).

Codification reduces knowledge to explicit, discrete informational messages that can be reconstructed later (Cowan, David, & Foray, 2000). These informational messages are manageable, portable, reusable, and transferable (Ruggies, 1997, Davenport & Prusak, 2000). The capture and codification of knowledge requires methods that properly represent the incorporated body of knowledge. Knowledge representation tackles how information is structured and stored so that it may later be retrieved (Weller, 2010).

Knowledge Representation

The representation of knowledge has a long history drawing largely from philosophy and library sciences (See Stock & Stock, 2008/2012 and Weller (2010). Today it typically involves determining the best methods to represent domain for computer processing, whether as simple knowledge retrieval or complex artificial intelligence applications. Regardless of the goal, the more a system makes use of semantic relations, the more complex it becomes. In correlation, the more complex the semantic structure then the smaller the captured knowledge domain becomes because of reasons of feasibility (Weller, 2010).

Four Views of Knowledge

The complexity of the concept of knowledge causes it to be approached in many different ways. Jakubik (2007) found four primary views of knowledge in a literature review of selected (1990-2004) knowledge management publications. These views include the Ontological View, the Epistemological View, the Commodity View, and the Community View. The Ontological View of Knowledge looks at the phenomena of knowledge. The Epistemological View of Knowledge is a scientific and philosophical look at the nature of knowledge. The Commodity View of Knowledge takes an entitative approach, viewing knowledge as a static organizational resource. The Community View of Knowledge counters the commodity view by assuming knowledge is variable and is a social construct. Each of these views is based on the collection and organization of information to form a representation of knowledge.

The Ontological View of Knowledge

Stemming from a philosophical grounding, ontologies denote "…what is what, in example, what exists, the kind and structure of objects, properties, and other aspects of reality of the universe" (Gokhale, Deokattey, & Bhanumurthy, 2011). Ontology models the entities and interactions in a specific domain of knowledge allowing for the definition of classes, relations, and functions (Cheung, 2006). When complete, ontology represents a catalog of the things that exist in a specified domain, from the perspective of someone using a specific language (the language of the domain). The ontology defines the common vocabulary (See Noy, Mcguiness – Ontology Development 101).

Noy and McGuiness explain that ontologies use classes to describe concepts in the domain. A class then divides into smaller, more specific subclasses, which may contain descriptive properties. Noy and McGuinness (n.d.) provide an example of a simple ontology

with a class called *Wines* representing all wines. Each wine is an instance of this class. The wine class is divided into subclasses that provide greater specificity than provided by the class. Subclasses can represent *Red*, *White*, and *Rose*; it is also possible to add *Sparkling*, and *Nonsparkling* wines, and to add descriptions to the instances of the class. This labeling provides a method to denote the body of the specific wine (instance of the class), and the sugar level. Figure 3 represents an example of the classes, instances, and relations in the wine domain.

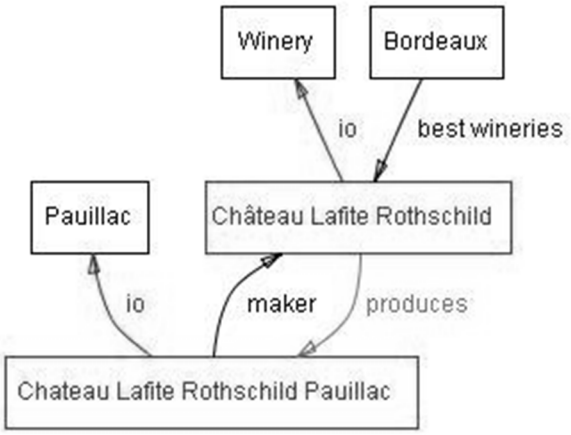


Figure 3. Wine Domain Ontology
Note. Adapted from *Ontology Development 101: A guide to Creating your First Ontology* n.d., by N. Noy & D. McGuiness. Copyright by author.

Note that this ontology is built starting from the Class *Wine*. A person interested in *Wine Makers*, *Vineyards,* or *Grapes* would view this ontology differently, and either extends it with additional classes, subclasses and descriptions, or exclude parts or the entire ontology. Uschold and Grüninger (cited in Weller, 2010) state that while ontology may take many forms, it will always include a vocabulary of terms and some specification of their meaning -- both definition

and how the concepts inter-relate. This practice imposes both a structure on the domain and constrains the possible interpretations of terms.

The Epistemological View of Knowledge

The Epistemological View of Knowledge examines the nature of knowledge itself. Montague (1962) and later Searle (1996) explain epistemology as the extent to which things and qualities are reliant on their existence as relatable objects to an individual. Through collective intentionality, objects and their functions are agreed upon as representations. Searle (1996) uses the formula "X counts as Y in the context of C". Returning to the example used previously, Chateau Laffite Rothschild Pauillac counts as Bordeaux in the context of Wine; however, this relationship holds true only as long as the definition of Bordeaux is agreed upon and constant. If the representation of Bordeaux changes, or is abandoned outright, Chateau Laffite Rothschild Pauillac ceases functioning as a Bordeaux. In this way, knowledge represents belief and agreement, and is the function of a particular perspective; knowledge is about action (it is always knowledge "to some end"); and knowledge is context specific and relational (Nonaka & Takeuchi, 1995).

The concept of organizational epistemologies is broken into three types: (1) cognitivist, (2) connectionist, and (3) autopoietic (Venzin, Von Krogh, & Roos, 1998) as shown in figure 5.

Cognitivist Epistemology

Varela (1992) explains that the cognitivist perspective creates models of reality and that learning occurs as these models are manipulated. A cognitive epistemology views knowledge as a self-organizing system in which humans are transparent to the information received from outside the system (Dalkir, 2005). The goal is to create the most accurate representation of the world through the application of universal and standardized rules (Jelavic, 2011). This

technological approach views knowledge as explicit, meaning it is methodical, formal, and systematic, allowing it to be distributed as hard data, codified procedures, and scientific formulas (Bukowitz & Williams, 1999). As Holden (2002) points out, cognitive epistemologies exclude societal and cultural factors.

Connectionist Epistemology

Less technical than cognitivists, connectionists hold that there are no universal or standardized rules governing knowledge (Marr, Gupta, & Roos, 2003), rather they hold that the rules are team-based and variable, based on both location and situation (Marr, 2004). Connectionists, as the name implies, believe that knowledge resides not only in the individual mind but also in the connections maintained between individuals. In this view, organizations and groups are seen as means to aid in the transfer of knowledge (Jelavic, 2011). To a connectionist, knowledge is tacit. Knowledge is an abstraction and inseparable from the knower. This view creates and reinforces the need for the maintenance of connections between the stored knowledge and the creators of the knowledge (*i.e.,* subject matter experts, authors, and experienced users) (Dalkir, 2005).

Autopoiesis Epistomology

Kay and Cecez-Kecmanvic (2003/2003) declare that organizations cannot have the same knowledge as people; in fact organizations may not be able to claim any knowledge unto them. Rather the autopoiesis theory views organizational knowledge as an emergent entity garnered from the sum of the organization's people. Knowledge is socially constructed, context-sensitive, and historically dependent. The individual embodies knowledge and bases it upon individual rules and interpretations (Jelavic, 2011). Knowledge of the knower is displayed through effective action (Dalkir, 2005), which may or may not be viewed by other knowers.

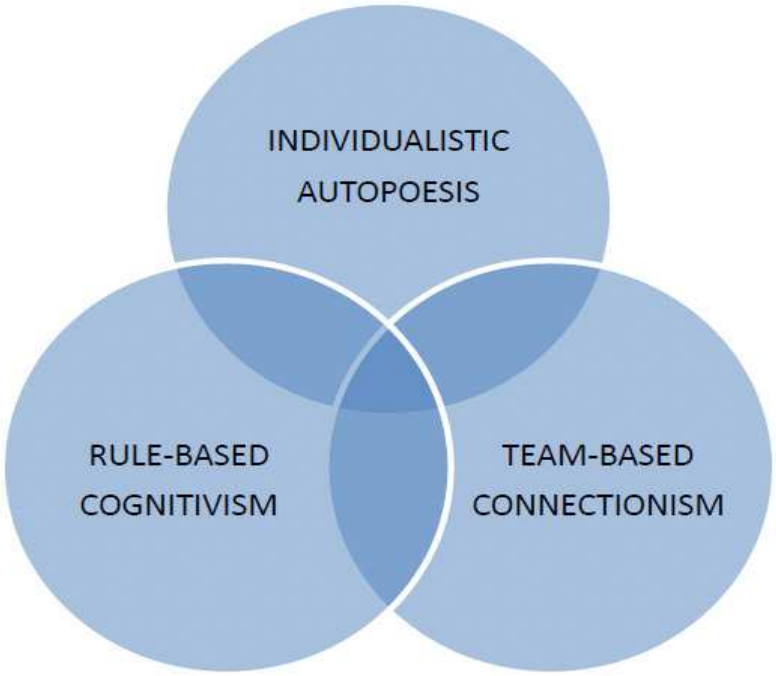


Figure 4. Classes of Epistemology
Note. Adapted from "Socio-Technical Knowledge Management and Epistemological Paradigms: Theoretical Connections at the individual and Organisational Level," 2011, by M. Jelavic. Copyright by Interdisciplinary Journal of Information, Knowledge, and Management

The Commodity View of Knowledge

Like epistemology, the Commodity View of Knowledge assumes that knowledge is a static organizational resource and therefore can be defined as an organizational commodity (Jakubik, 2007). This view provides the foundation for using knowledge to foster long-term business advantages (Davenport & Prusak, 2000). Mische (2001) sees knowledge as the product of data and information developed to be meaningful to both individuals and organizations.

The Community View of Knowledge

The newest view of knowledge, the Community View, sees knowledge as a dynamic concept created through social interactions (Jakubik, 2007). Individuals acquire new knowledge through their interactions with their environment; both the physical environment and the social

environment shape the new knowledge (Fuller, 2005). Knowledge is formed through the community as well as in the individual interacting with others and continually evaluating and reshaping knowledge (Burke, 1991; Stryker & Burke, 2000). This view is a departure from the typical hierarchical thinking towards a processual view that breaks from the accepted management thinking (Garvey & Williamson, 2002).

Complex Knowledge Reduced

The well-developed views of knowledge all take a reductionist approach. Ontologies are built from a set starting point and expand outwards to collect the information (subclasses and descriptions) pertinent to the builder. The Epistemological View requires that representations of knowledge are agreed upon, that knowledge is driven by perspective, and that knowledge is context specific (Nonaka & Takeuchi, 1995). The Commodity View is centered on the concept of developing business advantages (Davenport & Prusak, 2000), and is, therefore, reduced to the interests of an organization.

This reductionist approach to the organization of information stems from the initial step in the Knowledge Management Cycle: the capture of knowledge. Lakoff (1995) points out that information, the building block of knowledge, presupposes a useful subject. Information therefore is not and cannot be neutral; it exists because someone collected it. "There is no particular information without a particular actor requesting or producing it" (Tsoukas, 2005, p. 31). More simply, the information generated depends on who is looking for it and why (Tsoukas, 2005, p. 35). Once captured, it is codified for the purpose of retrieval and reuse for use by those same individuals. Codification creates what Tsoukas and Mylonopoulos (2004) refer to as an impoverished notion of knowledge where nothing is represented in its entirety --

only slices of the entity are known at any point. The entity itself takes on a shadowy presence, represented not in its entirety, but more simply by the chosen representation (Tsoukas, 2005).

The organizing of information implies a process of generalization. While these generalizations allow representations of knowledge to be fixed for certain purposes, it does not have complete and total control over the representation (Lee, 1984). For these representations to be of use they must provide effective closure of meaning (Beer, 1981); however, intrapersonal interactions and external engagements conspire to make this closure tenuous at best (Brown & Duguid, 1991; Orr, 1990; Vickers, 1983).

The stability of the representation is conditional upon the stability of the shared cognitive models (Johnson, 1993), that is, variations from the shared representation must be learned one by one (Lakoff, 1987). As individuals interact with the world, responding to cases not represented or poorly represented requires that the individuals make imaginative extensions (Johnson, 1993; Lakoff, 1987). These individuals also have the intrinsic ability to draw new distinctions and apply metonymy (Lakoff, 1987; Rorty, 1989, 1991). These interactions blur the representations, changing them on an individual basis, thereby, weakening the stability of them.

Even with many researchers recognizing codification as a foundational component of knowledge management, little research exists that speaks to the complex process of codification and the issues this process raises (Saviotti, 1998). By constraining knowledge management to a single group, a shared lexicon, common understandings, and common cultures between and among users are more likely to exist; however, these common understandings blur because of external and internal forces. The original representation of knowledge provided by the collector holds true only until exposed to the world.

Exposure to a wider audience breaks down the predefined and accepted representations of knowledge. The act of collecting information assumes a singular purpose. The act of codifying information for retrieval is predicated on necessity of the ability to decodify the same information - it assumes access to the "codebook." As pointed out by Hall (2006) the development of a common understanding or a codebook has clear implications for knowledge transfers beyond those sharing access to the codebook. This assertion explains why the approach has been to utilize content managers and experts to write, to collect, to organize and to categorize content in knowledge management efforts (Levy, 2009). Knowledge itself is fungible, and the knowledge contained by an expert is spectacularly narrow (Surowiecki, 2004). As the constraints on sharing, accessing and using knowledge expand, the representations lose focus.

Expanding Knowledge

As mentioned previously the Community View of Knowledge sees knowledge as a dynamic concept created through social interactions (Jakubik, 2007). In this view, knowledge forms through the community, as well as, in the individual interacting with others and continually evaluating and reshaping personally-held knowledge (Burke, 1991; Stryker & Burke, 2000). This view is a departure from the typical hierarchical thinking towards a processual view that breaks from the accepted management thinking (Garvey & Williamson, 2002), essentially freeing knowledge from its organizational constraint and throwing the creation of knowledge to the masses. This release of the mechanisms of knowledge creation allows new evolutionary forms to emerge both from the battle for personal advantage and from the competition between social coalitions (Bloom, 1997). The added diversity of represented knowledge allows individuals to break out and create new representations of knowledge (Surowiecki, 2004).

Knowledge creation must be supported by social as well as by individual processes (Von Krogh et al., 2000). These social aspects of knowledge creation are aided by a host of applications that allow peers to contribute to the development of tools, content, and communities across the Internet. These applications, known collectively as Web 2.0, build a platform that allows users to exchange information, express thoughts, and reconfigure existing explicit knowledge into more complex knowledge structures (Shang, Li, Wu, & Hou, 2011). The creation of knowledge is no longer dictated by time or place (Small & Vorgan, 2008).

Web 2.0

According to Tasner (2010):

> Web 2.0 began when Web users started to drastically change the way they were using the Web on a day-to-day basis. The main trends that shaped Web 2.0 include content sharing, creativity, segmentation, social components, and added functionality. Some of the added functionality is peer-to-peer sharing of files, easier communicating and networking on various social marketing sites, video sharing, and blogging. Web directories evolved to social tagging, personal Web sites shifted to blogs, and online versions of encyclopedias morphed into Wikipedia. In the Web 2.0 world, collaborating on social networks and sharing information helped shape the trend relatively quickly.

Web 2.0 is less about technology and more about enabling of new business, economic, social models defined, and supported by the appropriate technologies (Sankar & Bouchard, 2009 – see Enterprise Web 2.0). IBM lists several technologies and supporting architectures found in Web 2.0 (see figure 5). While an in-depth discussion of each technology is beyond the scope of this research, these technologies support the development of interactive web applications, the

transportation of information between servers and browsers, and the dynamic combination of asynchronous services.

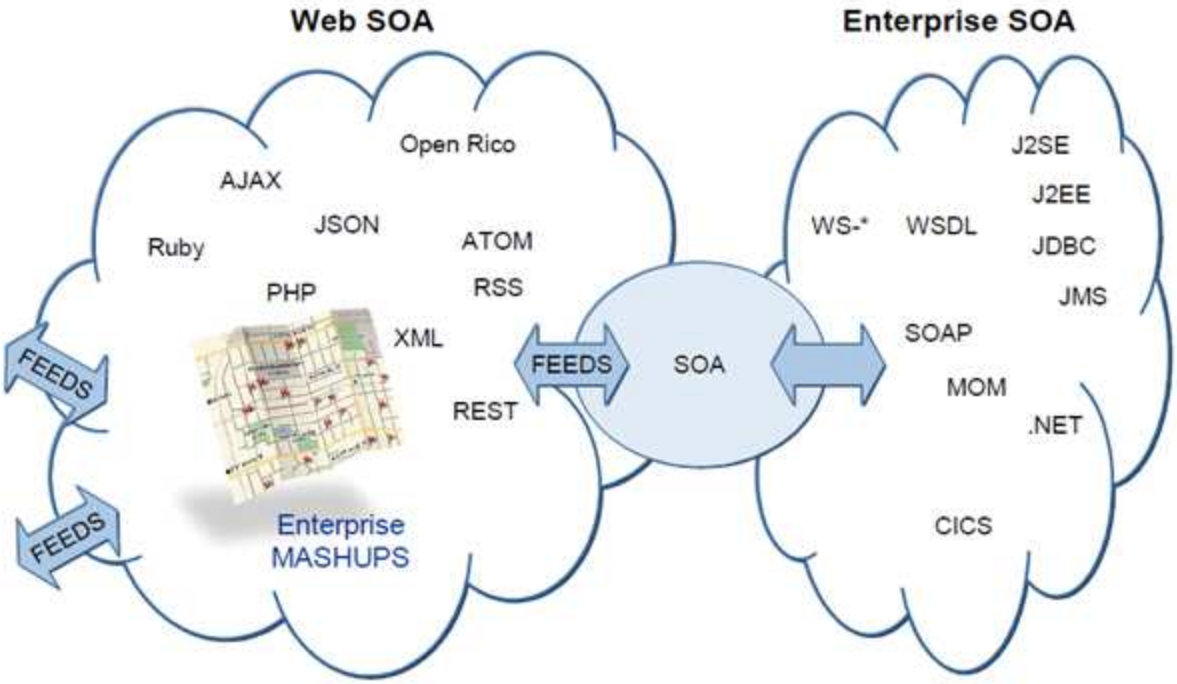


Figure 5. Web 2.0 Technologies.
Note. Adapted from *WebSphere Commerce Best Practices in Web 2.0*, 2009, by R. Credle, et al. Copyright by International Business Machines Corporation

These technologies support nine primary characteristics (Sankar & Bouchard, 2009):

- User-generated content - two-way contributions to content.
- Rich Internet Applications (RIA) - responsive, dynamic and multimedia rich web user interfaces.
- Social networking - social networking and the larger social media domain combine other Web 2.0 tenets, including user-generated content, interactive and dynamic web application platforms, communities, tagging and bookmarking, mobility, and inferenceability.

- Cloud computing - the cloud computing model makes computing and storage infrastructures available to use as a utility rather than only within a single infrastructure.
- Web-centric development and architectural models - applications are added or updated at a much faster pace than normal desktop or business applications. Applications must also be massively scalable to handle the petabyte-scale computations required by the massive amounts of unstructured data.
- Data - Massive amounts of data are generated because of the participatory nature of Web 2.0. While always integral to the Web, Web 2.0 allows individual users to create, to add to, or to comment on wikis and blogs, to add photos to Flickr, and to post videos to *YouTube*. These massive amounts of data have become an impediment to individuals finding relevant information. This unproductivity has led to efforts to aggregate and to syndicate information feeds, as well as to the development of the Semantic Web to foster better searching and data retrieval (The Semantic Web enables information in machine-understandable language, in order to capture metadata and relationships, allowing programs to crawl through information repositories, to make inferences, and to find relevant answers)
- Mashups – combined, annotated, and aggregated content from different sources creating new knowledge.
- Scale-free and Long Tail - scale-free indicates that no upper or lower limit to the number of users that visit a site exists. Long tail counters scale-free in recognizing smaller markets, preferring rare or lesser-known products.

- Mobility - cell phones and their networks have become both ubiquitous and increasingly powerful. This growth has driven Web 2.0 to embrace the mobile web, with Web 2.0 sites also having a mobile footprint.

Web 2.0 provides the capabilities for a bottom-up, personal, dynamic, and social learning process (Shang et al., 2011). The capabilities of Web 2.0 effectively flip the accepted hierarchical, top-down, management-driven approach employed by knowledge managers for the last decade (Levy, 2009). Web 2.0 allows knowledge to flow from person to person and allows peers to decide what is important. The level of importance is judged by the individuals themselves and neither by the organization (Bradley & McDonald, 2011) nor by the experts organizations employ.

Most Web 2.0 tools have attributes similar to knowledge management tools (Levy, 2009) and are emerging as viable solutions in dealing with general or discipline-specific communities (Kane & Fichman, 2009). The creation of platforms spanning connected devices (Bebensee, Helms, & Spruit, n.d.) effectively eliminates the boundaries of the organization. Web 2.0 focuses on the individuals, while typical knowledge management focuses on the organization.

Web 3.0

Still evolving out of the new technologies and uses prevalent in Web 2.0, Web 3.0 promises a more intelligent World Wide Web (Markoff, 2006). Also called the Semantic Web, it represents a web that is able to analyze and to search for content by utilizing machine learning, data mining, artificial intelligence technologies, and the recommendations of agents (Harris, 2008) to aggregate information without the intervention of individuals. Web 3.0 makes structured and unstructured data available in standardized formats via the Internet, including not

only complete data sets but individual data elements along with their intended semantics to allow for machine processing (Antoniou, Groth, Van Harmelen, & Hoekstra, 2012).

As explained by Antoniou et al. (2012), to capture the semantics of the data, new representations of knowledge must be created to allow for inferences to be included in the data. This process, of course, is no easy undertaking; a standard syntax to represent the data must be agreed upon, metadata vocabularies must be agreed upon, and large amounts of data must be made available following these conventions.

The basic language of Web 3.0 is the Resource Description Framework (RDF), which simply makes statements regarding the information by providing semantic representation to the data. RDF schemas provide methods for organizing objects into hierarchies of classes, class properties, subclasses, and subclass property relationships, forming a simplified or primitive ontology (discussed previously)(Antoniou et al., 2012). An RDF representation takes the form shown below:

Company A offers orthopedic surgery.

The name of A is "Sports Medicine and Orthopedic Center."

Samuel Brown is a doctor.

Samuel Brown works for A.

The power of RDF, over a standard ontology, is its wide acceptance, and its machine-readable format. Combine this feature with the ubiquitous nature of the worldwide web, and a simple RDF statement, combined in a mash-up with other RDF statements can provide a wealth of information that greatly exceeds what could be captured by a single organization. In this manner, a web page containing 60 RDF triples (subject, predicate, object combination), can link to 300 more RDF Triples, from which some 40 ontologies can be inferred to provide information

regarding information from across the Web (see Antoniou et al., 2012). Web 3.0 brings more resources online, where many different systems can utilize them in many different ways as needed (Siegel, 2009).

The application of these Web 3.0 tools into the realm of knowledge management can be referred to as Knowledge Management (KM) 3.0. KM 3.0 further disrupts the typical reductionist approach to knowledge by calling on all available information collected anywhere, rather than limiting the knowledge to that which is collected internally within the organization.

Current Literature Gap

Knowledge management continues to be a hot topic in business. Its purpose is to capture and use stored knowledge to provide an organization with a competitive ad advantage (Satterlee, 2006). This potential advantage is typically experienced through improved support for decision-making (Firestone, 2008) by an organization's leaders. Yet knowledge is ultimately individualistic, and it consists of a fluid mix of experiences, values, contextual information, and expert insights. Knowledge originates and is applied in the minds of knowers…" (Davenport & Prusak, 2000, p. 5). The individual shapes knowledge, by combining existing knowledge to form more complex structures (Fahey & Prusak, 1998). The individualistic nature of knowledge is now supported by the new and emerging technologies and capabilities included in Web 2.0 and Web 3.0. Web 2.0 and 3.0 add considerable variations to the models and methods possibly employed by knowledge managers (see Wiig, 1993; Brailer, 1999; McElroy, 1999; Oldenkamp, 2001, 2002) as they work towards managing their specific brand of knowledge.

Peer-reviewed articles filed under the subject of knowledge management focus on singular items such as the validation processes for data, pragmatic approaches to knowledge, the impact of Information Technology, or, by design, focus on an implementation in a specific

setting. While this reductionist approach provides great insight into those areas under review, they do not speak holistically to the art of knowledge management. Ramasami (n.d.) describes the task of knowledge management as managing knowledge of facts (know-what), knowledge regarding the natural world (know-why), knowledge of social-relations (know-who), and knowledge of how to do things (know-how). Tsoukas (2005) adds the knowledge of the social environment (know-where), and knowledge of the temporal constraint (know-when). Frand and Hixon (1999) expand this to include the involvement and knowledge of needs of the individual. With the expanding scope of knowledge management, successful knowledge managers rely on their combined experiences, pulling different aspects from the academic, technical, and the business worlds together, and meld them into something that works in the given context.

This research adds a holistic perspective to the abundant, yet reductionist-focused knowledge management research. Interviews with working Chief Knowledge Officers, knowledge practitioners and others in the field of knowledge management will guide this study towards building a comprehensive platform of shared perceptions, expected outcomes, and methods. This research will provide knowledge managers a better overall understanding of the true environment and practice of knowledge management.

Summary

From Machlup's (1962) knowledge society knowledge management efforts have been reduced to a managing the knowledge of a single organization. Arrow (1974) points to the cost channels and flows of information while Cowan and Foray (1997) point out the need for a common lexicon, or codebook. From this reductionist approach, knowledge management practitioners have developed frameworks and practices to help organizations achieve competitive advantage. With the advent of Web 2.0 applications, the cost of Arrow's channels and flows is

greatly reduced, allowing individuals to reach easily beyond the boundaries of their organizations to share information and generate new knowledge. With Web 2.0 and the emerging Web 3.0, the old frameworks need to be revisited and updated to include investigation into new and emerging methodologies applied by current practitioners across the spectrum of knowledge management.

I examined the foundations of knowledge, and the reductionist approach toward its representation. More specifically, by investigating the role knowledge managers play in facilitating the creation of new knowledge, this study addressed a gap in the literature by exploring the experiences of knowledge managers in creating new knowledge. Chapter 3 describes the study's design and includes the research setting, sample, instrumentation, data collection and analysis procedures, and steps taken for the ethical protection of participants.

CHAPTER 3: RESEARCH METHOD

Introduction

This chapter details the requirements for the implementation of this study. Because the goal of this study was to explore aspects of the management of knowledge and knowledge inherently involves mental processes (Wilson, 2002), removing the individual's perspective from the study is impossible. To understand knowledge management and the various adaptations to the methods and approaches used to facilitate knowledge creation, this research study used an interview format to investigate the approaches and processes utilized by knowledge managers from both the organizational and cultural perspective. Therefore, a qualitative approach was proposed. The chapter outlines the design of the study, discusses the participant selection, and explains how the study will be conducted to answer the research questions.

Research Questions

To aid in the development of this holistic view, the following research questions will be addressed:

RQ1 - How do knowledge managers facilitate the process of knowledge creation in organizations?

RQ2 - In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?

RQ3 -How do knowledge managers facilitate commitment for promoting the formation of new knowledge within an organization?

RQ4 -How do knowledge managers account for gaps in knowledge?

Rationale for Choosing a Qualitative Method

Robert Stake points out that "...the more we study human affairs (as contrasted with physical mechanisms), the more we expect things will work differently in different situations" (2010, p. 18). As the practice of knowledge management is examined, the purpose of the study remains the capture of interpreted meanings of the work from the various viewpoints of the interviewees, to gather their combined experiences along with the applicable situation and contexts. Since the approaches taken to manage knowledge are as individualistic as the knowledge they assume to manage, it is likely that each knowledge manager will experience different circumstances, settings, and attitudes and experiences.

Qualitative research provides insight into the attitudes, behaviors, values, concerns, motivations, aspirations, culture, and lifestyles of participants. The qualitative methods of data generation offer both flexibility and sensitivity to the social contexts in which data are produced (Berg, 2007). Qualitative research captures the attributes of human behavior by not relying on mathematics, statistics, and other quantitative measures, making it possible to gain an understanding of how participants interact with each other and how they interpret those interactions. Merriam (1998) posits that the world is subjective, and is born of human perception. Alasuutari (2010) argues qualitative research provides an interest in subjectivity and experience that allows for the understanding of different minor variations in cultural values and meanings. It is these small individual perceptions that create multiple realities (Merriam, 1998) that must be explored through a process that provides meaningful descriptions and interpretations of events. These descriptions and interpretations can be provided by utilizing the conceptual framework of naturalistic inquiry. This approach will provide in-depth answers to the stated research question, while minimizing biases arising from prior theories (Yin, 2003). Naturalistic

inquiry captures feelings and emotions, which would be difficult to measure quantitatively (Creswell, 2003). Given the researcher's role, the interpreted nature of knowledge, the requirement for interactions with people, the qualitative approach is preferred (Yin, 2003).

The biographical, phenomenological, and grounded theory studies were eliminated due to their singular focus. Biographical studies recount an individual's story, while phenomenological studies focus on a single event. Grounded theory studies seek the development of a single theoretical construct perfectly fitting a single dataset (Glaser & Strauss, 1967). Ethnographic studies focus on cultural issues, ethnicities, and group behaviors, which may represent a piece of this research, but is too narrow for a holistic goal of the study. Finally, case studies examine a singular social phenomenon (Singleton & Straits, 2005), and like ethnographies, are found to be too narrow in focus.

This research focused on the perceptions of knowledge workers in their natural environment-- their organizations. The researcher was instrumental in the collection and analysis of the data obtained from each participant. Inductive reasoning will allow the researcher to develop commonalities in the meanings provided by the interviewees to form a holistic view of knowledge management in action. To achieve this goal, an in-depth, yet wide-ranging, straight qualitative study utilized interviews with knowledge workers from multiple organizations in multiple countries to build a broad perspective on the creation of knowledge.

Role of the Researcher

Researchers invariably bring to their research their own preexisting knowledge, identities, and biases (Maxwell, 2005). As a researcher with much experience working in and around knowledge management efforts, I acknowledge feeling that most knowledge managers rely too heavily on technology and ignore the priori responsibility of facilitating the creation of new

knowledge. With the focus centering on the technical aspects, the individual uniqueness of knowledge creation is lost. In qualitative research the researcher becomes an instrument (Creswell, 2007). In this study, I am a doctoral student majoring in Organizational Psychology employed as a Program Manager with oversight responsibilities for a knowledge management initiative at a military command. Further, I have held positions in fields including project management, knowledge and information management, business process reengineering, and various information technology fields. Some of these positions add to my breadth allowing for a greater understanding of technical and process-related aspects; others lend themselves to analytical thinking and adapting to unplanned events. This combination provides a unique foundation to adapt and to explore new areas exposed by the research and to minimize the subjectivity inherent in personal biases by focusing on the pertinent information. These positions, combined with previous educational endeavors promote strong ethical standards, and encourage objectivity in the collection and analysis of data.

To ensure my preconceptions, beliefs, values, and opinions were held at bay, my experiences were bracketed from this study's design. By setting aside existential assumptions any bias that may influence the research or interview questions data collection and analysis, or other aspects of the research were identified and isolated. This allowed me to minimize the inherent subjectivity of qualitative research.

The Process of the Research Study

This research study began with the identification of knowledge workers, from multiple organizations and in multiple countries, who would be willing to participate in interviews regarding their efforts to manage knowledge.

Participants

For inclusion in this study, the participant needed to have been working as a Chief Knowledge Officer or in a position of functional equivalency that being tasked to orchestrate a knowledge management program. As this study focused on developing a holistic view of knowledge management, the actual titles may not represent the position of Chief Knowledge Officer, however all participants were functionally equivalent to Chief Knowledge Officers.

Volunteers were solicited by posting an announcement on the social networking site *LinkedIn,* using the template included in Appendix A. Those who responded who were not serving as knowledge workers were excluded. To obtain additional volunteers an announcement was posted (see Appendix B) to appropriate, knowledge management related groups on *LinkedIn.*

Sample

For this research, a criterion based purposeful-sample technique was used to target only those individuals with knowledge management experience (Patton, 2002). Purposeful samples are those participants who provide the researcher the ability to learn a great deal regarding the issues important to the study (Patton, 2002). In qualitative research, minimizing bias, not generalizability, becomes the primary focus (Morgan, 1997); therefore, the purposeful sample was selected carefully (Guest, Bunce, & Johnson, 2006). Guest, Bunce, and Johnson (2006) posit that a sample size of 6 interviews creates data saturation, and a sample size of 12 interviews creates thematic saturation, the point where new themes emerge infrequently. Using Guest et al., (2006) as a guide, this research is based on 12 interviews.

Data Collection

Data were collected via face-to-face interviews, via teleconference, or Skype when face-to-face interviews were not possible. Participants were interviewed utilizing semi structured questions. In order to maintain accuracy of the data, interviews were audio recorded and transcribed by me.

In-Depth Interviews

In-depth interviews were conducted to elicit information about the complexities of generating new knowledge. Active listening was used to guide the interview.

Instrument

To facilitate the collection of data I used existing literature on knowledge management and knowledge creation to create the interview questions (see Table 2 below). To ensure validity of the interview question, the questions were vetted-by a panel with expertise and experience in knowledge management and/or qualitative methods. Seven individuals were invited to participate on the expert panel. They were sent a cover letter (Appendix C) and a template to complete (Appendix D). Expert panel members were asked to return the completed template with their feedback about the research questions and accompanying interview questions within three weeks.

Three expert panel members returned the template providing feedback on every interview question. The recommendations by the expert panel resulted in changes to the interview questions.

Table 2. Interview questions

Research Question	Interview Question
How do knowledge managers facilitate the process of knowledge creation in organizations?	1. As Knowledge manager in your organization, what kind of tasks do you do on a daily basis? 2. Please describe your process for ensuring knowledge seekers understand where information exists in order to facilitate knowledge creation. 3. Please describe your process for ensuring knowledge seekers understand in what forms information exists to facilitate knowledge creation. 4. Please describe your process for transforming individual knowledge into organizational knowledge. 5. What is your role in ensuring access to organizationally relevant information?
In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?	1. How do you support the discovery of new knowledge? a. Probe: Can you provide an example? 2. How do you balance the handling of divergent information with the need to support current cultural norms? 3. What criteria do you use to manage the individual's knowledge needs and the knowledge needs of the organization? a. Probe: Can you tell me about the tools you use? b. Probe: Can you describe your methods/processes?
How do knowledge managers facilitate commitment to the formation of new knowledge within an organization?	1. Please describe how you foster a shared vision for knowledge management within your organization. 2. Explain how you foster commitment to knowledge sharing. 3. How do you incentivize individuals to share knowledge?

	4. In what ways do you demonstrate knowledge sharing?
How do knowledge managers account for gaps in knowledge?	1. In your role as a knowledge manager, how do you handle instances where a fundamental shift in the organization's knowledge needs causes a significant knowledge gap between what is currently known, and what is needed? 2. How do you facilitate social interactions to create a context in which knowledge creation can fill knowledge gaps? 3. Please describe how you form alliances with external organizations that maintain complimentary knowledge to fill knowledge gaps.

Data Preparation and Analysis

All interviews were digitally recorded and transcribed by me using Audacity software to record and playback the interview. Audacity's built in capabilities allowed interviews to be slowed down and/or amplified in volume to facilitate the transcription of some areas that were not clear at regular speed, or volume. Additionally, Audacity's noise reduction feature assisted in the transcription of one or two interviews. Transcripts were created in Microsoft Word, and saved as Rich Text Documents.

For analysis, the transcripts were imported into a single NVivo project running on my personal computer. Each transcript was named with the pseudonym of the participant and a standard description of the research. All research questions and interview questions were styled as headers, to ensure the context of the provided answers was clear. Before analysis this project file was duplicated to ensure preservation of the original transcripts.

The rich text in each transcript was color coded as a method to distinguish the speaker. To ensure the proper coding of only participant provided information the transcripts were color

coded. Text from the participants was colored black, while my comments in the transcripts were colored in blue. NVivo nodes were created to represent each research question in order to facilitate analysis of the individual research questions. Each transcript was examined and initial visual codes were assigned based upon contextual analysis and interpretation. These codes were common to multiple research questions and repeated across the interviews, and can be found in Table 4. These initial visual codes served as the starting point for the creation on NVivo nodes. These nodes represented the common ideas and themes generated from the analysis of the transcripts. After the initial analysis, each of the initial codes was further decomposed and additional free nodes were created to provide greater granularity to the larger more general nodes described above. While entire passages were initially color coded, and then created as nodes in NVivo, individual sentences, and phrases were considered as the analysis proceeded. This allowed findings and conclusions to be drawn at multiple levels.

Trustworthiness in Qualitative Research: Reliability and Validity

Technique for Establishing Credibility

Member checking was used to ensure the accuracy of descriptions, explanations, and interpretations of the research. A 1 to 2-page summary of each interview was presented to each participant. Member checks were conducted with each participant after the research was completed. Member checking allowed the participants to either affirm that their experiences are properly reflected and to correct interpretations if they do not reflect these experiences. If the participants affirm the accuracy and completeness the research will have credibility.

Triangulation of data was used (Yin, 2009; Hesse-Biber & Leavy, 2011). Data from the individual interviews were compared to determine areas of divergence and agreement.

Protection of Participants

Permission to conduct the research as proposed was obtained from the Walden University Institutional Review Board (IRB), ensuring that all ethical practices regarding respect for persons and beneficence were closely followed.

Prior to the study commencing participants were informed of the purpose of the research. Each interviewee was provided with a consent form to read and sign, detailing what the participants were being asked, who will be asking and for what purpose, any risks and/or vulnerabilities associated with participation, their right to participate or not, their right to review and to withdraw from the process at any time (Seidman, 2006). To maintain participant confidentiality and to protect the identity of any organization involved in this dissertation and subsequent and future published related reports, the names of organizations' and participants were replaced with fictitious names. Each participant was presented with a consent form, which contained the confidentiality agreement (See Appendix E).

As the bulk of the data collected by this research resides in digital format, it is vital to enforce data security standards to prevent unauthorized access. Evans and Combs (2008) state that the digitalization of participant data places greater pressure on the researcher to ensure anonymity and confidentiality because of the inherent vulnerability of IT data. To mitigate these vulnerabilities, all digital files (documents, MP3s, and other electronic files) were encrypted and password protected. To provide additional protection, all research data were removed from the internal hard drive and any network drive or storage devices upon completion of the research. The data was transferred over to external media and stored in a locked cabinet for five years. After five years, the data will be disposed of by physical destruction of storage media.

Additionally, any hard copy (paper documents and notes) pertaining to the research will be shredded after five years.

Summary

The chapter began with a restatement of the research questions before providing the rationale for choosing a qualitative methodology. The role of the researcher was examined, and the process of the study was explained. The sample, and data collection process was explained, and the interview questions are outlined. Specifics of data coding and how the codes and categories will be generated from the transcriptions were presented. These components are an integral part of the research methodology. The protections of human participants, including the consent form and confidentiality agreement, were presented. In chapter 4, I will summarize the study's results, and in chapter 5, I will present conclusions and recommendations.

CHAPTER 4: DATA ANALYSIS AND RESULTS

Introduction

The purpose of this qualitative study was to explore and understand how knowledge managers facilitate the process of knowledge creation. Specifically, the study investigated how knowledge managers facilitate the process of knowledge creation in organizations, support individuals or provide a context for such individuals to create knowledge, facilitate commitment for promoting the formation of new knowledge within an organization, and account for discontinuity in knowledge creation.

The study addressed the following research questions:

RQ1 - How do knowledge managers facilitate the process of knowledge creation in organizations?

RQ2 - In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?

RQ3 -How do knowledge managers facilitate commitment for promoting the formation of new knowledge within an organization?

RQ4 -How do knowledge managers account for gaps in knowledge?

This chapter presents the results of the interviews. Key observations made during the interviews and the analyses of interview transcripts are discussed. Recurrent and emergent themes from the interviews are then explored. This chapter closes with a focus on the results of the interviews. The four research questions originally outlined in Chapter 1 serve to frame this discussion.

Data Collection

This study's data collection process commenced with approval from Walden University's IRB. An announcement was posted on the social networking site *LinkedIn*, using the template included in Appendix A; an additional announcement (see Appendix B) was posted to appropriate, knowledge management-related, groups on *LinkedIn*. All study participants came through the social networking site *LinkedIn,* as per IRB-approved recruitment protocol. Participants who expressed an interest were given a consent form (Appendix E). All signed consent forms were collected prior to the interviews taking place. The recruitment process ended when twelve knowledge managers agreed and committed to participate in the study. Prior to the commencement of individual interviews, each participant was reminded of the confidentiality of the interviews, and were also informed that they could stop the interview process at any time if they were experiencing any discomfort from the questions.

Interviews were conducted with 12 chief knowledge officers (or functional equivalents) from 12 different office locations throughout North and South America. Participants came from Toronto, Canada; New York City, New York; Richmond, Virginia; Carrollton, Virginia; Washington D.C.; Charlottesville, Virginia; Seattle, Washington; Chattanooga, Tennessee; Albuquerque, New Mexico; Great Falls, Virginia; Atlanta, Georgia; and Santiago, Chile. Of those interviewed, 11 participants were male and 1 was female. As the interviews were transcribed, names, places, and other identifying information were changed to ensure privacy for the participants. The pseudonyms assigned to the participants and their locations are listed in Table 3.

Table 3. Participant matrix

Pseudonym	Location
Benny	Chattanooga, Tennessee
Bill	New York City, New York
Dan	Richmond, Virginia
Drew	Carrollton, Virginia
Frank	Toronto, Canada
George	Washington, D.C.
Jeff	Great Falls, Virginia
Joe	Charlottesville, Virginia
Lori	Seattle, Washington
Mac	Atlanta, Georgia
Mike	Santiago, Chile
Rick	Albuquerque, New Mexico

All 12 participants were asked the same 15 semi-structured interview questions (See Table 2). Respondents were told, and often reminded, that there was no right or wrong answers to their responses. Interviews ranged from 40 minutes to over 90 minutes in length and were conducted via telephone and *Skype*. Interviews were digitally recorded and notes were taken as each discussion progressed.

How Interview Questions Related to Research Questions

The questions that were used in the interview related to the four research questions. Fifteen interview questions were used to prompt a response from the selected study participants. RQ1 asked how knowledge managers facilitate the process of knowledge creation in organizations. The first five interview questions related to this research question. Research question two asked about the ways knowledge managers support knowledge creation by all individuals in their specific organizational context. The research question had three corresponding interview questions. Research question three asked how knowledge managers facilitate commitment for promoting the formation of new knowledge within an organization and

had four related interview questions. Finally, research question four asked how knowledge managers account for gaps in knowledge. This research question had three related interview questions.

Data Analysis

All interviews were digitally recorded and transcribed by me using Audacity software to record and playback the interview. Audacity's built in capabilities allowed interviews to be slowed down and/or amplified in volume to facilitate the transcription of some areas that were not clear at regular speed, or volume. Additionally, Audacity's noise reduction feature assisted in the transcription of one or two interviews. Transcripts were created in Microsoft Word, and saved as Rich Text Documents. *NVivo 10* was utilized to process the large amount of collected data.

For analysis, the transcripts were imported into a single NVivo project named KMOrgs running on my personal computer. This file was password protected. Before analysis this project file was duplicated to ensure preservation of the original transcripts. Each transcript was named with the pseudonym of the participant and a standard description of the research. All research questions were coded as Heading 1 and interview questions were styled as Heading 2, to ensure the context of the provided answers was clear. NVivo nodes were created representing each research question and the corresponding interview questions in order to facilitate analysis of the individual research questions as illustrated in Figure 6.

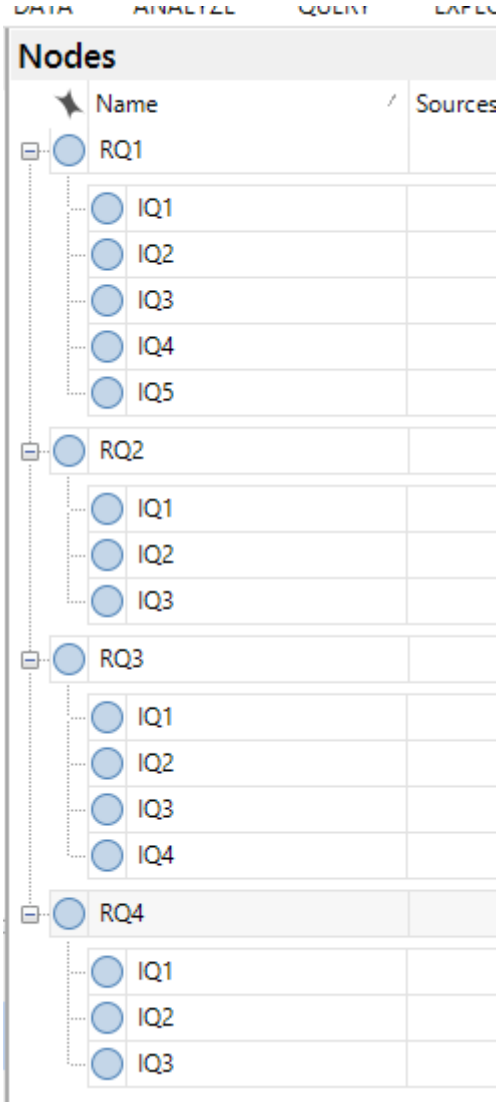
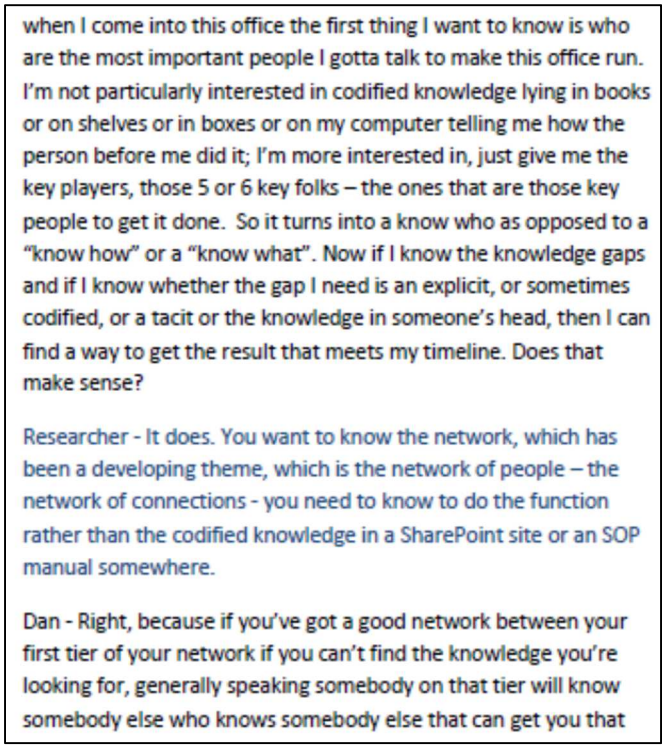


Figure 6. Research Question Nodes

To ensure the proper coding of only participant provided information the font of the transcript was colored black for text generated from participants, while researcher comments were colored in blue font, as shown if Figure 7.


when I come into this office the first thing I want to know is who are the most important people I gotta talk to make this office run. I'm not particularly interested in codified knowledge lying in books or on shelves or in boxes or on my computer telling me how the person before me did it; I'm more interested in, just give me the key players, those 5 or 6 key folks – the ones that are those key people to get it done. So it turns into a know who as opposed to a "know how" or a "know what". Now if I know the knowledge gaps and if I know whether the gap I need is an explicit, or sometimes codified, or a tacit or the knowledge in someone's head, then I can find a way to get the result that meets my timeline. Does that make sense?

Researcher - It does. You want to know the network, which has been a developing theme, which is the network of people – the network of connections - you need to know to do the function rather than the codified knowledge in a SharePoint site or an SOP manual somewhere.

Dan - Right, because if you've got a good network between your first tier of your network if you can't find the knowledge you're looking for, generally speaking somebody on that tier will know somebody else who knows somebody else that can get you that

Figure 7. Text Color Coding

Coding

Each transcript was examined and every statement relevant to the research questions was given equal value. Initial visual codes were assigned based upon contextual analysis and interpretation. This process involved reading the transcripts several times. These initial visual codes served as the starting point for the creation on NVivo nodes. These nodes represented the common ideas and themes generated from the analysis of the transcripts. Approaching the data in this manner allowed me to start analyzing the data with codes generated from the ground up. All themes were found in the transcripts.

During this stage, I considered how interview data related to the found themes. As the process continued, finer categories evolved. Using the NVivo software, the categories were electronically stored as nodes. To enhance reliability of the project coding, I created a test

project using NVivo and coded some of the interview raw data a second time and compared and found high levels of consistency.

The coding process was iterative and involved revisiting the coding multiple times. This process often led to new categories, which were organized through a tree structure of nodes and stored in NVivo. If two categories were deemed similar, they were combined into one category. The initial color coding yielded two primary nodes. These nodes were named Social and Environment. The social node represented text that related directly to interpersonal interactions of any type. The environment node consisted of text that broadly related to the environment where the creation of knowledge was to occur. The environment node was renamed to culture later in the analysis to better represent the data. The original analysis left Research Question 3 without an initial node. All transcripts were reviewed again, with a specific focus on research question 3, the analysis of this question created an additional two nodes: Leadership and Incentive. Leadership contained the descriptions of specific actions taken by knowledge managers to generate new knowledge. Incentive contained descriptions of the various methods used by knowledge managers to foster buy for the creation of new knowledge.

After the initial analysis, each of the initial codes was further decomposed and additional free nodes were created to provide greater granularity to the larger more general nodes described above. While entire passages were initially color coded, and then created as nodes in NVivo, individual sentences, and phrases were considered as the analysis proceeded. The interconnection between the research questions and the initial themes is shown in Figure 8.

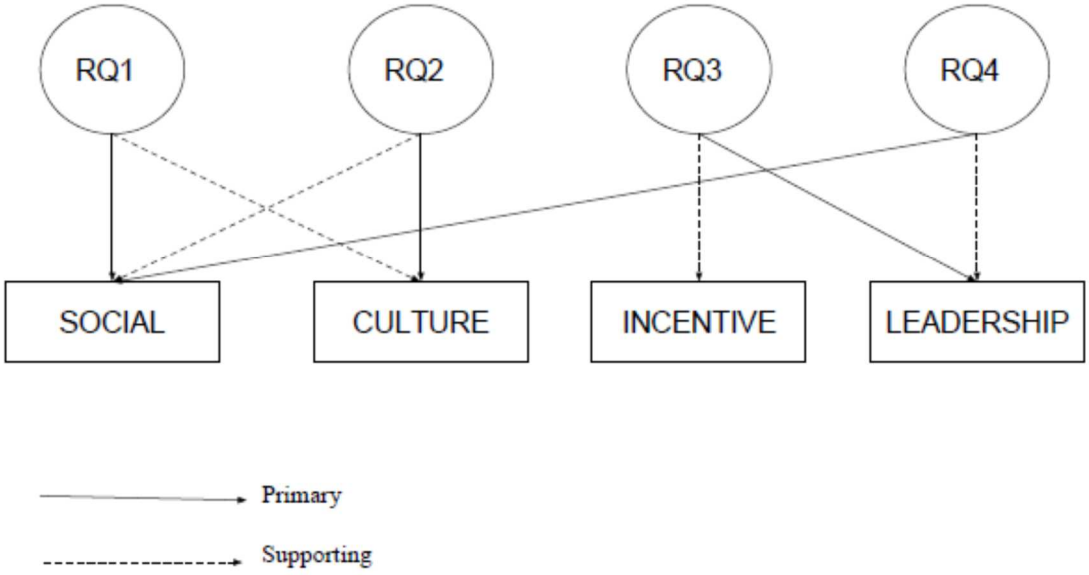


Figure 8. Primary and Secondary Themes

As the transcripts were reviewed, additional nodes were created under each of the original nodes as shown in Table 4.

Table 4. Emerged themes

Social	Culture	Leadership	Incentive
Society	Control Context	Alignment	Reward
Community	Methods	Collective Identity	Value
		Meaning of Events	
		Empower People	

Evidence of Trustworthiness

Techniques for establishing credibility

Member checking was used to ensure the accuracy of descriptions, explanations, and interpretations of the research. A one to two-page summary of each interview was presented to each participant. Member checks were conducted with each participant after the research was

completed. Member checking allowed the participants to either affirm that their experiences are properly reflected and to correct interpretations if they do not reflect these experiences. If the participants affirm the accuracy and completeness the research will have credibility.

Triangulation of data was used (Yin, 2009; Hesse-Biber & Leavy, 2011). Data from the individual interviews were compared to determine areas of divergence and agreement. This variety of participants allowed for triangulation between participants. Individual viewpoints and experiences recounted by the participants were verified against others to provide a rich picture of the behaviors of knowledge managers in creating new knowledge. Additionally, the inclusion of participants from several organizations of varying types reduced the effect of particular localized factors on the research. The inclusion of knowledge managers from multiple organizations provided a variety of perspectives in order to develop a more stable view of how knowledge managers facilitate the creation of new knowledge.

All participants were volunteers solicited on the social networking site *LinkedIn*. All participants gave permission to contact them by phone, or by *Skype* to conduct the interview. Prior to the scheduling of the interview, all participants were provided a consent form (See Appendix E) that was signed and returned. Additionally, the goal of the research, the confidentiality of the responses, and the ability of the participant to withdraw at any time was reiterated at the beginning of each interview.

There was minimal need for additional post interview member checking due to abundant clarifying and repeating back key points with the respondents during the interviews. All respondents agreed to being contacted if there was a need to clarify their responses during transcription and data analysis. All participants gave permission to contact them by phone, *Skype*, or e-mail if additional clarification was needed.

For another to gauge the credibility of the researcher's interpretations, the contexts under which these interpretations are made must be thickly described. As described by Lincoln and Guba (1985) thick descriptions provide sufficient detail to allow others to evaluate the extent to which the conclusions drawn are transferable. These thick descriptions of social actions record the meanings, intentions, strategies, and motivations characterized by a particular episode. It is this interpretive characteristic of description rather than detail per se that makes it thick.

Results

This section presents the themes that emerged from analysis of the coded data from the interviews. Every individual participating in the interviews mentioned the social aspects of knowledge creation. One interviewee, Dan, commented that it is "…more important to know who, than it is to know what." As detailed by the respondents, these social interactions are supported by the culture of the organization, specifically the level of reciprocal trust of individuals and how prone they are to interact. The significance of the proper culture and trust between individuals was mentioned as a factor in all research questions. All interviews also pointed to the need to focus data collection on relevant information, with respondents noting the need to "…not cloud the channel…and to 'ensure context' by limiting the signal to noise ratio" (Benny). Respondents noted the importance of incentivizing individuals in order to get them to participate in the knowledge-sharing activities. Finally, respondents noted that leadership skills were essential to the creation of new knowledge. Each of these categories is explained in further detail below.

Social Facilitators of Knowledge Creation

During the first stage of coding, it became clear that the social aspects of knowledge creation were a critical aspect of the knowledge creation process. This theme is best represented by the response "…trust the network" (Benny). All respondents commented on their leveraging

the social aspect of knowledge creation by providing individuals with the capability to make connections and determine their own knowledge requirements. Knowledge Manager Dan explained the social aspects succinctly by stating that "…it may be a tacit exchange, where it is more important to know who…what most newcomers want is not a 'Dick-and-Jane' of what that person knows. What they really want to know is who did that person know and find most productive when they were doing their work." This theme was carried across all interviews with comments regarding the creation of new knowledge now resting with "…how the connections are made between the individual and the knowledge they are looking for…" (Frank). The need for knowledge managers to "be aware of knowledge resources…" (Joe) throughout the organization and to advocate for their use by prompting, prodding, introducing, facilitating, and engaging (Larry) the social interactions across all levels of the organization. All of these actions create what Frank referred to as a "…network of brains…" The action of putting individuals in contact with each other echoes the interactive knowledge-sharing mechanisms described by Berner (2001) and Wiig (1997).

Looking deeper into the social aspects of knowledge creation, two distinct types of social interactions emerged. The first type was social interactions defined by emotional attachments. The second type was those social interactions defined by mutual bonds. These types of social interactions were originally coded as relationships and community respectfully. These codes were later changed to communities and society to provide a more standard definition of the types of social relationships they contained. An example of the codes and key terms contained under the social aspects of knowledge creation are shown in Table 5.

Table 5. Social facilitators of knowledge creation

Social Facilitators of Knowledge Creation		
Social	Society	Community of Interest Community of Practice
	Communities	Personal Relationships Mission Relationships Maintain Relationships Facilitate Relationships/Connectivity Social Networks Connections across verticals (vertical functions, vertical industries) Know who not what All about the people Build Relationships Relationships Matter Keep Connections Outside the Organization

Society

In order to facilitate social interactions, all of the knowledge managers interviewed utilized both phrases "communities of interest" and "communities of practice." As Dan explained, every knowledge manager has read about, heard about, or knows about communities of interest and communities of practice. Members of communities of interest share an interest or a passion. They gather in the community to share their ideas on this specific topic. Communities of practice differ from communities of interest by the extent of the focus. Members of a community of practice share a concern or a passion for something they do and they utilize these communities to learn how to do it better.

Benny, Bill, Dan, Drew, George, Jeff, and Joe mentioned both communities of interest and communities of practice explicitly. Frank described building teams to address specific issues or specific knowledge needs, which meets the definition of a community of interest. Frank also described "knowledge clusters," where groups of individuals who do similar work are brought

together in order to share information and create knowledge. Based on this definition, knowledge clusters are viewed as synonymous with community of practice.

All participants mentioning communities of practice described them as a method for linking people who share a technical discipline. These groups allow the individuals, who are often geographically dispersed, to collaborate directly with each other. Dan, Drew, and George utilized communities of practice extensively to connect individuals world-wide with peers who serve as sounding boards and collaborate to create knowledge. All of these participants mentioned that they utilize communities of practice to develop a shared set of practices by allowing for the transfer of information across the entire expanse of the community. This reach allows junior members of the community to find mentors willing to share information.

Operating exactly like a community of practice but serving a narrower scope is communities of interest. Dan, Drew, and George describe communities of interest as an offshoot of their communities of practice. In their utilization, communities of interest are short-term undertakings revolving around a specific issue. As Drew explained, "…the larger community of practice oftentimes encounters novel problems that have not been addressed, this will serve to pique the interest of others who either might have a similar issue or who may have an idea on a solution. It is at this point that community of interest will form to delve into the specific problem in order to find a solution. Once the solution is found, the corpus is introduced into the larger community of practice."

Interestingly, Joe described an inverse use of communities of interest and communities of practice. While community of practice was still utilized to serve well established organizational knowledge needs, a community of interest was established to investigate new areas of potential.

In this case, the community of interest would investigate the new need and determine if it should become an organizational community of practice.

Regardless of the order of formation, all respondents indicated that both communities of practice and communities of interest facilitate the formation of new knowledge by:

1. Linking individuals with common interests, regardless of location, to facilitate access to new knowledge sources,
2. Enabling the transfer of expertise throughout the organization,
3. Developing mentoring relationships,
4. Aiding in the retention of organizational knowledge by spreading it through the organization,
5. Decreasing the learning curve of individuals, and
6. Cross pollinating ideas and increasing the opportunities for innovation.

Communities

As mentioned, communities are defined by emotional attachments; these types of social interactions are characterized by a vested interest in the maintenance of the connection. With this in mind, all participants commented on the importance of building, encouraging, facilitating and trusting in the relationships built among and between individuals. This includes those individuals who are outside of the organization.

Dan discussed a time where he and an associate were discussing a company. The discussion turned to who was the CEO. By making a few phone calls to others within their community, they found the answer within forty minutes. Mac was perhaps the biggest proponent of supporting community relationships; his view was "…you might not know, but chances are you know someone who knows or someone who knows someone who knows…"

George, Bill, Joe and Rick all spoke of the need to develop relationships within the organization. As Bill explained, the ability to reach out to someone you trust, and who trusts you, in another part of the organization can save you time and effort. Joe went further, explaining how his job was to make the introductions across the vertical divisions of the organization. These actions follow the premises of stocks of reusable knowledge (Machlup, 1962) flowing between individuals (Arrow, 1969; Machlup, 1979) to increase the organizations store of knowledge (Arrow, 1962).

When asked about their specific actions, each participant spoke about establishing an organizational culture to support the social aspects of knowledge creations.

Cultural Facilitators of Knowledge Creation

As the transcripts were reviewed during the initial coding, cultural themes emerged. All respondents commented on the need to ensure the needs of the organization are met by providing a culture tha0t helps to focus, share and provides for the methods to support knowledge creation. These cultural aspects were coded as Control Context, Trust, and Methods respectively. An example of the codes and key terms contained under the social aspects of knowledge creation are shown in Table 6.

Table 6. Cultural Facilitators of Knowledge Creation

Culture	Control Context	Common Environment Balance Signal and Noise Tied to the Shared Purpose FOCUS (You can't capture it all) Manage the channel Common Operating Environment Don't cloud the info Add/remove parts of the (social) network on the fly Ensure context - signal vice noise Organizational Taxonomy (Common Codebook) Tagging/folksonomy Don't jump to explicit capture needlessly Resonate with the crowd – signal vice noise
	Trust	Allow them to share Relationships of trust No Fear of Reprisal Trust through the network (both ways) TRUST relationships spanning years Respect Everyone can do it (as long as they improve the knowledge store) Can't be afraid to ask questions
	Methods	Teach/install methodology on how to create knowledge Develop methods to capture knowledge all the time Develop methods to identify experts (Badging) Discipline everyone to manage knowledge Develop accountability for knowledge Interject new ideas into the network to stimulate dialogue Capture what is learned (Feed the Beast) The Process Becomes Self-perpetuating Develop Cultural Norms (Cultural Norms Win Hands Down) Build the narrative (New knowledge as part of the lore of the organization) Provide technology supported accessibility (Search/Navigation) Mentor new hires on systems, procedures

Control knowledge context

First, all respondents mentioned the need to control the context of the knowledge being created. While every participant stressed that the creation of new knowledge was important,

each indicated that not all new knowledge was thought to be important to the success of the organization. All participants stressed that they were tasked to ensure that the knowledge being created mattered in the larger organizational context.

As explained by Benny, the culture must provide a clear and managed context that ensures that the knowledge captured is not lost in the noise of needless or irrelevant information. Benny described this by using the Shannon-Hartley theorem as an illustration. The Shannon-Hartley theorem is an information theory that explains the maximum rate at which information can be transmitted via a channel in the presence of noise (Shannon, 1949). The theorem establishes a capacity for a communication link and establishes the maximum amount of information that can be transmitted in the presence of interference. As Benny stated:

> In the world of knowledge management, the relevant information provides the signal, and the extraneous information provides the noise. As the level of noise or non-relevant information increases, the efficiency of the information exchanges decrease. By ensuring all knowledge seekers operate in a contextually based common environment, and by limiting extraneous information flows, knowledge managers promote efficiency in the knowledge creation process by ensuring that the proper knowledge is provided at the correct time and in the proper context.

All respondents discussed the need to ensure knowledge is validated and articulated in some form to guarantee that it helps the organization compete or to find efficiencies in how it achieves its mission. Because of the individualistic aspects of knowledge creation, knowledge managers interviewed commented that the knowledge created should be linked to or integrated with the organization's mission. This alignment to the mission secures that knowledge managers "focus on what is important to the organization" (Lori).

This narrowing of the context of knowledge by bringing order to the chaos of infoglut ("Darwin Magazine," 2001). This focus confirms the work of O'Hara and Shadbot (2001), as well as Davenport and Prusak (1998, 2000) who both make knowledge capture a business function. Weinberger (2007, 2011) also reduces the scope of knowledge down to a specific purpose. In an organizational context, this narrowing also would increase the change the information shared had relevance (Wilson & Sperber, 2002).

Establish trust

Once knowledge managers established what knowledge was important in their organization, they set about building an environment in which individuals were willing to participate. According to all participants, the key to this environment was the establishment of organizational trust. As stated by Rick, trust is key to promoting that all individuals feel they have equal footing and have a say in the knowledge-creation process. Frank and Joe described trust as the most critical cultural factor for the creation of new knowledge. Each respondent described environments in which all levels of the organization are free to act and discuss topics of interest. These trusting environments encourage all participants to generate new knowledge, as long as they improve on the knowledge stores of the organization and advance the shared purpose.

Each participant discussed the need to establish trust among individuals where each believes that the shared knowledge will not be misused and that all will benefit from reciprocal knowledge-sharing (George). Additionally, individuals should be encouraged to give proper credit/recognition for the knowledge and knowledge sharers should ensure the accuracy and credibility of knowledge they provide (Frank).

Benny returned to the description of Shannon's law, in pointing out that trust effectively lowered the perceived cost of the channel – making it safer and less intrinsically costly to share knowledge with the connection. This sentiment was echoed by all participants, but none as succinctly as Dan who stated that it was critical to have "...trust through the [social] network." While all participants explained the importance of trust, each acknowledged that trust is specific to the individual and established via interactions.

Establish common methods

Central to assuring that the knowledge generated is of importance to the organization are the methods utilized to capture relevant information. Respondents described the use of organizational taxonomies to define organization-wide knowledge categories. These taxonomies are created and controlled at the organizational level but allow for new topics to be inserted through a formal vetting process. Knowledge managers utilize designated experts to vet information and serve as facilitators of the ongoing dialogues. These experts are also occasionally tasked to stimulate dialogue by interjecting questions into the network to generate new ideas. To assure knowledge seekers are turning to the proper knowledge providers, most respondents utilize systems to identify company-approved experts and encourage participation. These systems allow knowledge seekers to search for a subject, and obtain near instant listings of resources who are experts in that area. They provided a form of social networking aimed directly at solving the problem of finding the expertise needed. These common methods facilitate the closure of meaning (Beer, 1981).

Incentivize knowledge creation

To influence the efforts of individuals towards promoting the formation of new knowledge, most participants provide incentives (Benny, Bill, Dan, George, Joe, and Rick).

Unpacking these incentives, we find they can be broken down into two distinct types -- rewards and value. These incentives provide the catalyst for action or greater effort as a reward offered for sharing and creating new knowledge. An example of the codes and key terms contained under the social aspects of knowledge creation are shown in Table 7.

Table 7. Incentive Facilitators of Knowledge Creation

Incentive	Reward	Provide rewards - compensation/recognition
		Gamification to support knowledge creation
		Provide rewards and punishment
		Award small victories
		Provide reward and recognition
		Inventiveness (prizes/idea tournaments)
		Game play
	Value	Engage the mutual interests
		Weave KM into the fabric of the organization
		Has to Visible and promoted
		Has to show value in the outcome
		People will seek and share if they find value
		How much time (cost) what is the value of the answer(product)
		Show features and benefits
		Help the leaders see value in KM
		People will return to the connection if there is value in the connection

Rewards for the creation of new knowledge

Through the use of rewards, knowledge managers reinforce the employee's participation in the knowledge-creation process. These rewards typically involve recognition for contributions, badges denoting experts in a particular field of knowledge, or compensation.

Frank explained that providing a form of recognition for the contribution of knowledge serves as an organizational thank you and denotes the individual's contribution to the organization's knowledge creation efforts. Joe used a form of "expert badging" to denote organizationally-approved experts to provide individual status. This system marked individual's on-line profiles letting others know their expertise.

Other participants spoke of using elements of on-line games (gamification) to promote the sharing of information and the creation of new knowledge. These elements consist of the components, design, and feedback mechanisms typically found in on-line games -- such as points, badges, and leaderboards. Participants noted that to facilitate the sharing of knowledge, rewards were used. The knowledge managers reward experts' sharing of knowledge by awarding them points, badges, or levels. Levels were assigned to users based on accumulated points, allowing individuals to advance through the levels as a method for demonstrating expertise or for performing specific tasks. Making these rewards visible to others within the organization encourages participation by all and identifies the go-to people within the organization.

Value in the creation of new knowledge

Participants described a second incentive that facilitates commitment, that being the perceived value of the effort. This was not be viewed by the participants as value in a monetary sense; rather, it was seen as a measure of economic value. Economic value is a measure of the benefit provided by the effort or service. For users to commit to the effort of creating new organizational knowledge they must see a return on their investment – it should provide a benefit to them. All participants noted that the knowledge management effort built by the organization should provide individuals the information they need to perform their functions more effectively.

Leadership

As the transcripts were reviewed, several of the items now included in the leadership theme were scattered under other areas. As the themes were reviewed, it was deemed important to gather these together under the overarching theme of leadership. While the other themes do

overlap with leadership, the leadership theme is by far the most internally focused, action-orientated theme.

Every participant, with the exception of Mike, spoke of facilitating commitment by providing leadership to the organization. Like other organizational leaders, the participants see themselves serving as positive role models for their subordinates, striving to inspire and to be visionary. Key to the success of establishing commitment to the creation of new knowledge is the establishment of a collective identity that strives to create new knowledge. Participants stressed that it is critical to infuse knowledge creation into every level of the organization. "Critical to this effort is buy-in by leadership and then for those proponents to establish, to communicate, and to exemplify that vision throughout the organization" (Mac). This identity then permeates the organization and becomes a cultural reality rather than an ideal. This culture is protected by the leaders and by establishing policies that support the ideals of the organization. These leaders also facilitate interpretations of the events surrounding the organization to ensure that the organization's needs are known and understood. Once leaders define the organization's culture and the process to support it, the individuals making up the organization feel empowered to participate and commit to the type of organization that builds new knowledge. Every respondent mentioned the need to reconcile the alignment of knowledge creation efforts with the needs of the organization, and then to weave this alignment into the stories of the organization.

It should be noted that the larger theme leadership does not contain clear boundaries between the following items -- rather each works to support the other areas and to build and reinforce the others.

Table 8. Leadership Facilitator of Knowledge Creation

	Alignment	Enshrine KM function in policy
Leader ship	Collective Learning	KM become part of the culture Vision/Strategic Plan for KM Buy in at all levels KM principles must be agreed upon
	Collective Identity	What outcomes do you want, where is the information, understand culture dynamics, effort feasibility Communicate the vision Buy-in from Top Leaders Tell a story through goals vision strategy Have a champion Leaders must exemplify the strategy
	Meaning of events	Don't allow the grapevine to define KM - manage the effort All tacit knowledge must become explicit Knowledge becomes information (cycle) Make information visible in the right context
	Empower the people	Face-to-face (smaller groups are better) Talk to the people Connections to related aspects of knowledge Have to know who and where the experts are Organizations are built on relationships NETWORK (social network) Keep connection with external Develop the growth of the network - every exchange of knowledge builds the knowledge network

Alignment of knowledge creation efforts with the needs of the organization

Each participant indicated that it is critical for individuals in their respective organization to know what is expected of them. They must know and understand the vision of the knowledge manager to promote commitment to the effort of knowledge creation, as well as understand how the knowledge management efforts fit into the larger organizational context. Rick explained that it is the organization's goals and objectives that drive the organizational processes and determine what knowledge is needed. "Knowledge management, when aligned with the organization's

goals, creates a synergy across the organization that impacts or can impact every individual." (George) Knowledge managers implement specific strategies to enhance structures, processes, and activities that promote system and organizational climates conducive to collective learning.

Establish a collective identity

Knowledge managers all spoke of establishing a collective identity. Participants define this collective identity as the individual's cognitive and emotional connection with the process of knowledge management and knowledge creation. Bill stated that it was easier to recognize once it was in place. As he described it, you have developed a common identity once the word we was used more than you or I. He viewed collective identity as the result of a negotiated dynamic process, where an individual's actions are constructed from and understood in the context of shared organizational interactions. These interactions actualize a common set of rules and systems that enable individual autonomy in the environment while still exhibiting transparency with regards to the benefits and risks of participation. This collective identity helps to unite the organization by providing a shared history.

Meaning of events

Knowledge managers help individuals interpret events and their relevance. They also assist in identifying emerging threats and opportunities. Knowledge managers must help people find meaning in the complex events that happen in their organizations. Given that the accelerated pace of the social and organizational change can prove to be a disorientating factor, knowledge managers must be able to help individuals understand the organizational fit and implications of their own work and the importance of knowledge creation to the organization as a whole. It is important to not "… let the grapevine define your KM initiatives". The goals and benefits of your KM initiatives must "…tell a story through your goals, vision and strategy"

(Lori) so that everyone understands the history of the organization, the organization's knowledge management efforts, and how they interact within both.

Empower people

Finally, participants emphasized the importance of the individuals within the knowledge-creation process. As described by Benny, once everything else is in place, people need to know their part – and be free to act. Participants stated that they must help authorize individuals to create new knowledge and to participate in its creation. This involves first evaluating and then developing the potential of an individual or a team and then providing them with tasks that challenge them. Ideally, this authority empowers organization members for self-management.

To this end, George outlined several methods he encourages and has utilized. These are:

1. Communicate openly and freely, about everything, at all levels;
2. Allow individuals to fail without punishment;
3. Maintain accountability, and ensure social justice; and
4. Allow autonomy, as appropriate.

While not directly addressed in the literature review, the functions of leadership place knowledge managers in a supporting role for the commoditization of knowledge. Machlup (1962), Arrow (1962, 1969) and Rogers (1962) all describe developing knowledge stores and flows. By ensuring the creation of knowledge aligns with the needs of the organization, ensuring a common identity and providing interpreted meanings for the events in the organization knowledge managers provide context in order to facilitate the recognition of familiar knowledge artifacts (Wilson and Sperber, 2002) that will aid in the process of knowledge creation.

Discrepant Cases

The review and accounting for discrepant cases in this study helps to weigh both confirming and disconfirming data, thus enabling the expansion, restriction, or modification of the original explanation. The review of discrepant cases can help generate alternative explanations.

In this study, a singular discrepant case was observed. After reviewing the data, it was determined that the discrepancy originated from a limiting view of the fundamental concept associated with this research: knowledge management. In order to participate in this research, participants were required to be working as a Chief Knowledge Officer or in a position of functional equivalency. While most respondents took a broad view of knowledge management, collecting and distributing data relevant for the organization in its entirety, one respondent's functional area was limited to specific types of data surrounding a very specific and finite purpose within his organization. While meeting the stated requirements for participation, the limited scope of the knowledge management efforts, and perhaps the limited scope and application of the knowledge being managed, made the answers provided vary slightly from those of the remaining participants. Rather than focusing the knowledge creation efforts at an organizational scale, this participant was focused on singular projects. Where all other participants spoke of creating organization wide knowledge, this participant was limited to only speaking of his singular project.

While reviewing this interview, his replies only varied in breadth from the remaining interviews. The answers provided, though limited in scope within his organization, were not inconsistent with the other participants. These answers were included in the analysis.

Summary

Knowledge managers facilitate the process of knowledge creation in their organizations by building upon social and environmental factors, by providing leadership functions, and by incentivizing the sharing of knowledge to encourage maximum participation. The social aspects of knowledge creation were themes in answers to three of the four research questions. This was matched by the environmental aspects of knowledge creation. A knowledge manager's leadership skills are put to use to fill gaps and most importantly to foster commitment to the idea of knowledge creation. Commitment was supported through the use of incentives either by showing the value of sharing knowledge or through the use of gamification. The results from the analysis provide a framework for facilitating the process of knowledge creation within organizations. Based on the answers provided to the interview questions, the interpretation and implications of these findings, recommendations, and limitations of the study will be discussed in Chapter 5.

CHAPTER 5: DISSCUSSION, CONCLUSION AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to present the findings, implications, and recommendations for subsequent knowledge management implementations and knowledge creation actions, and to suggest studies for future research. The literature gap addressed by this research involves the dynamics surrounding knowledge creation from the perspective of knowledge managers themselves. Knowledge management provides organizations with a competitive advantage (Satterlee, 2006) through improved decision-making (Firestone, 2008). Still, knowledge remains an individualistic mixture of experiences, values, contextual information, and insights. The bulk of research into knowledge management focuses on singular items such as data validation processes, the impact of information technology, or an implementation in a specific setting. This reductionist approach does not provide a holistic view into the art of knowledge management.

This research explored how knowledge managers facilitate the process of knowledge creation. Through an in-depth review of the existing research on knowledge management, four research questions were developed and pursued. These research questions show that knowledge managers facilitate the process of knowledge creation in their organizations by building upon social and environmental factors, by providing leadership functions, and by incentivizing the sharing of knowledge to encourage maximum participation.

Confirming and Disconfirming Knowledge Creation from the Literature

Based on the literature review of this study, the research findings confirm the propositions in the literature review asserting the individualistic nature of knowledge. While it would be a leap to confirm Hume's work, it is possible to infer that the knowledge managers interviewed in this research work diligently to expand the capacity of individuals to draw upon

the experience and inferences of others within their social networks, the social aspects outlined in this research supports the work of Churchman (1971), Senge (1990), Bordeaux (2010), Berner (2001) and Wiig (1993). As described by Machlup (1979) these social interactions take place between individuals. The knowledge mangers in this research worked to establish the means to put knowledge seekers together with knowledge holders through societies and communities; this supports the assertion of Machlup. Arrow (1969) discussed the use of channels in the transmission of information, this research confirms the importance of Arrow's channels as Benny used Shannon's Law to describe the need to ensure these channels are maintained and provide the clearest possible message. By controlling the context of the knowledge captured and by establishing the meaning of events the knowledge mangers constrain the types of knowledge. This finding confirms the work of Weinberger (2007) and Nonaka (1994) who found that knowledge must be reduced in order to remain consistent with the needs of the organization. There is strong support for the Community View of Knowledge (Burke, 1991; Stryker & Burke 200; Garvey & Williamson 2002; Fuller, 2005; Jakubik, 2007) where individuals acquire new knowledge through social interactions.

Research Question One

The first research question asked, "How do knowledge managers facilitate the process of knowledge creation in organizations?" Results indicated that knowledge managers facilitated the process of knowledge creation in their organizations by leveraging the social aspect of knowledge creation through a variety of efforts.

This finding implies knowledge managers leverage and build social structures to facilitate the process of knowledge creation. Knowledge managers utilize the common interests of the individual knowledge seeker to build associations of individuals with similar interests.

Knowledge managers must also be aware of and learn to utilize the personal relationships an individual maintains to allow them to broaden the potential for knowledge creation.

Knowledge itself is fungible, and the knowledge contained by an expert is spectacularly narrow (Surowiecki, 2004); however, as the constraints on sharing, accessing, and using knowledge expand, likewise the capacity to create new knowledge expands. Knowledge is formed through an individual's interactions with others and the continual evaluation and reshaping of personally-held knowledge (Burke, 1991; Stryker & Burke, 2000). Knowledge management is defined as the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation (Dalkir, 2005, p. 337). This definition breaks down as the knowledge managers both foster and allow individuals in their organizations to utilize communities and societies. The coordination becomes less deliberate, and less systematic, and more individualized; individuals are allowed to exercise their own social networks to find the information they need without consideration of the organization's boundaries. This shifts the focus of the practice of knowledge management from creating knowledge, to creating relationships, and allowing individuals to exercise these relationships to create knowledge.

Looking deeper into the social aspects of knowledge creation, two distinct types of social interactions emerge. Communities provide emotional attachment between individuals. Communities are bound by feelings of togetherness and mutual bonds. Most individuals are more likely to be invested in and concerned with maintaining the sanctity of community relationships and view these ties as self-fulfilling. The second type was interactions between individuals with common aims and goals. These common elements define a society of

individuals. Societies are groups or networks of individuals who are objectively connected to each other by semi-durable social relations defined as important to their identity or practice.

Given this finding, knowledge managers should facilitate interactions between individuals. These interactions now easily and readily expand beyond the boundaries of their organization. These social structures serve as multipliers in the process of knowledge creation and are predicated upon a carefully managed organizational culture. Within this culture knowledge managers work to control the context of the knowledge being created to ensure relevance in the larger organizational context and establish trust. Essential to establishing the optimum cultural environment for knowledge creation were three factors.

Knowledge managers control the context of the knowledge being created to ensure it is important in the larger organizational context. This implies that knowledge managers provide a clearly defined context that ensures the knowledge captured is not lost in the noise of needless or non-relevant information. This approach echoes the Shannon-Hartley Theorem of Information Transfer (Shannon, 1949). The Shannon-Hartley Theorem is an information theory that explains how the maximum rate information that can be transmitted via a channel in the presence of noise. The theorem establishes a capacity for a communication link and establishes the maximum amount of information that can be transmitted in the presence of interference. In the world of knowledge management, the relevant information provides the signal, and the extraneous information provides the noise. As the level of noise or non-relevant information increases, the efficiency of the information exchanges decreases. By ensuring all knowledge seekers operating in a contextually-based common environment, with limited extraneous information flows, knowledge managers promote efficiency in the knowledge creation process by ensuring that the proper knowledge is provided at the correct time and in the proper context.

With the proper context and efficient exchanges implemented, knowledge holders must be willing to share knowledge. The sharing of knowledge is always predicated upon relationships of trust and respect. This environment of trust can be based upon many years of working together and sharing knowledge or it can be built by allowing everyone to share their knowledge. To do this, they must be allowed to become active participants in the dialogue, without fear of reprisal or ostracization. Given these findings, the key facilitator of the process of knowledge creation is a culture supportive of these efforts.

Knowledge managers work to provide the context for what constitutes organizational knowledge. This controlled context can be seen as a limiter, allowing the action strategies to be applied only to those knowledge creation processes fitting the organizations' needs. By establishing and formalizing methods knowledge managers limit the time is wasted by recreating methods of searching for information, defining words or jargon, establishing processes for accessing information, or determining exactly who to talk to. These definition methods provide the ability to perform an action or produce an outcome any number of times with a predictable level of quality. Finally this culture fosters trust into an organization so individuals feel motivated and inspired to create new knowledge. The relationships created by societies and communities depend upon the existence of these two way trusts.

Research Question Two

The second research question asked, "In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?" Results indicated that knowledge managers support knowledge creation by all individuals in their specific organizational contexts by creating controlled environments reliant upon individual trust and supported by methods. These findings indicate that knowledge managers build environments

that allow individuals to capitalize on their connections to generate the knowledge they require. Organizations with a strong desire for continued innovations establish cultures where every member of the organization, regardless of their level within the organization, feels free to participate.

This culture is supported by the organization's policies and processes and is tied to the goals of the organization. As in research question one, this implies that knowledge managers should understand the knowledge needs based upon the mission and vision of the organization.

As in the first research question, knowledge managers recognize that not all knowledge creation is relevant. As described in chapter two, the organization provides the context for what constitutes knowledge, and the knowledge managers enforce that context. All knowledge is validated and articulated in some form to guarantee that it helps the organization compete or find efficiencies in how it achieves its mission. Given this finding, the organization's knowledge context needs to be defined by and tied directly to the mission and vision of that organization. The organization's mission is the reason for its existence, while its vision provides an outline for its future state. The practice of knowledge management must be aligned with these efforts to provide value to the organization. Because of the individualistic aspects of knowledge creation, knowledge managers strive to ensure that the knowledge created is linked to or integrated with the organization's mission.

Central to guaranteeing that the knowledge generated is of importance to the organization are the methods utilized to ensure relevant information is captured. These findings imply that knowledge managers facilitate the process of knowledge management by bringing order to the chaos through focusing the efforts of the individual on a singular purpose in order to capture and to codify the relevant information. Knowledge managers attempting to control the context of

information captured must continually evaluate the items with at least some relevance, to achieve the cognitive effect of generating new knowledge.

To facilitate knowledge creation, knowledge managers utilize designated experts as types of gatekeepers to ongoing dialogues. These experts are also occasionally tasked to stimulate dialogue by interjecting questions into the network to generate new ideas. To assure knowledge seekers are turning to the proper knowledge providers, most organizations utilize systems to identify company-approved experts.

With designated experts identified, individuals must then be given a reason to share information. To facilitate the sharing of knowledge, knowledge managers reward individuals by awarding points, badges, or levels. Levels are assigned to users based on accumulated points; an individual can advance through the levels as a method for demonstrating expertise or for performing specific tasks. Making these rewards visible to others within the organization encourages others to participate, as well as identifies the "go-to" people within the organization.

Given these findings, knowledge managers serve a central role in ensuring that all individuals feel that they have equal footing and that they all have a say in the knowledge-creation process. These trusting environments encourage all participants to generate new knowledge, as long as they improve on the knowledge stores of the organization and advance the shared purpose.

Research Question Three

The third research question asked, "How do knowledge managers facilitate commitment for promoting the formation of new knowledge within an organization?" The results indicated that knowledge managers lead their organizations toward commitment to promoting the formation of new knowledge. These leadership functions are defined by Yukl's functions of

leadership (2009): (1) interpreting the meaning of events; (2) fostering alignment on objectives and strategies; (3) building task commitment; (4) building mutual trust and cooperation; (5) strengthening collective identity; (6) organizing and coordinating activities; (7) encouraging and facilitating collective learning; (8) obtaining necessary resources and support; (9) developing and empowering people; and (10) promoting social justice and morality.

Key to the success of establishing commitment to the creation of new knowledge is the establishment of a collective identity. It is vital that an organization establish its collective identity as one that strives to create new knowledge. This is accomplished by infusing knowledge creation into every level of the organization. Given this finding, it is critical to the knowledge management effort to be supported by leadership and for those proponents to establish, to communicate, and to exemplify that vision throughout the organization. This identity then permeates the organization and becomes a cultural reality rather than an ideal. Knowledge managers and other organizational leaders protect this identity by establishing policies that support the ideals of the organization. These leaders also facilitate interpretations of the events surrounding the organization to ensure that the organization's needs are known and understood. Once leaders define the organization's culture and the process to support it, the individuals making up the organization feel empowered to participate and commit to the type of organization that builds new knowledge.

Individuals in an organization must know what is expected of them. They must know and understand the vision of the knowledge manager in order to promote commitment to the effort of knowledge creation. This implies that knowledge managers implement specific strategies to enhance structures, processes, and activities that promote system and organizational climates conducive to collective learning. This common set of rules and systems enables

individual autonomy in the environment while still exhibiting transparency with regards to the benefits and risks of participation.

Given that the accelerated pace of the social and organizational change can prove to be a disorientating factor, knowledge managers must be able to help individuals understand the organizational fit and implications of their own work and the importance of knowledge creation to the organization as a whole. Knowledge managers assist individuals in interpreting events and their relevance within the organizational context.

Finally, knowledge managers must help to empower individuals to create new knowledge and to participate in its creation. This involves first evaluating and then developing the potential of an individual or a team and then providing them with tasks that challenge them. Ideally, authority to engage and change is delegated to every member of the organization, allowing individuals to manage themselves. This requires that knowledge managers have an inherent understanding of the organization's mission and vision.

Given these findings, knowledge managers should be affiliated closely with the organization's leadership team. Research indicated that knowledge managers facilitate the process of knowledge creation to fill gaps in knowledge and to address fundamental shift in the organization's knowledge needs. Leadership serves the central role in the management and associated processes of an organization. These leaders influence and empower their followers by broadening their goals, enabling them to contribute, solve problems, and learn from experience. Organizations are integrated systems, and the management of these systems is a management concern (Todd & Southon, 2000). To ensure all systems are working toward the same goal, the knowledge manager must be in sync with the leadership team.

These leadership efforts are aided by intrinsic and extrinsic incentives. While interviewed knowledge managers spoke of rewarding individuals for their participation in the process of creating new knowledge, they also spoke of the need to ensure there was value derived from the process itself. This implies that through the use of extrinsic motivators, the knowledge managers engage their organizations' people in the knowledge creation process. These rewards typically involve recognition for contributions, badges denoting experts in a particular field of knowledge, or compensation.

The second incentive that facilitates commitment is the perceived value of the effort. This should not be viewed as value in a monetary sense; rather, it should be seen as a measure of economic value. Economic value is a measure of the benefit provided by the effort or service. For users to commit to the effort of creating new organizational knowledge they must see a return on their investment – it should provide a benefit to them. The knowledge management effort built by the organization should provide users the information they need to perform their functions more effectively.

Research Question Four

The final research question asked, "How do knowledge managers account for gaps in knowledge?" Knowledge managers turn to the social aspect of their organization to fill the knowledge gap by empowering the individuals of their organization and by ensuring that the societies' and communities' vision of the gap is aligned with the organizations' view. This also serves to ensure that the context of the knowledge needed and the trust built within the organization are both maintained.

The criticality of providing individuals with the capability to make connections found in research question one, comes into play when faced with a gap in knowledge. As in the earlier

research questions, two distinct types of social interactions occurred. The first type was interactions between individuals with common aims and goals. The second type involved providing relationships with an emotional attachment between individuals.

Knowledge managers help in filling knowledge gaps by ensuring alignment and by empowering individuals to create the knowledge needed to fill the gaps, Knowledge managers clearly articulate the gaps created by any fundamental shift in the organization's knowledge needs, and provide individuals the ability and freedom to work to fill that need. This freedom is provided by a carefully controlled culture where individuals are accountable but free to fail.

To ensure individuals buy into the idea of knowledge creation, knowledge managers fulfill a leadership role. Knowledge managers empower organizational members to be creative and to take the initiative to create new knowledge. To ensure the knowledge being created benefits the organization, a collective identity is built by aligning the process of knowledge creation to the vision and mission of the organization. This collective identity is spread throughout the organization to ensure the organization's culture becomes one of collective learning. This requires that both the collective learning and collective identity remain aligned to the organization's needs. Knowledge managers constantly adjust by ensuring events are properly interpreted in the context of knowledge creation.

Finally, knowledge managers strive to incentivize the process of knowledge creation by proving both intrinsic and extrinsic rewards. Individuals are rewarded for the creation of new knowledge through compensation or forms of recognition. Another way of incentivizing people to engage in the knowledge creation process is to show that the process helps them. The process of knowledge creation must provide the individuals with value, or it will be quickly abandoned.

This research indicates that the skills utilized by knowledge managers to facilitate the creation of new knowledge are diverse. Knowledge managers need to serve as champions, examples, and zealots of the knowledge management initiatives within their organization. Knowledge managers rely on strong vision and change management skills, and apply well-honed interpersonal and communication skills to meet the knowledge needs of their organization.

Limitations of the Study

While aligned with its initial purpose to report the perspective of the participants, this research is not without its limitations despite taking steps to assure credibility. Generally, the judgment, observing power, and biases of the researcher may limit the finding of the study. Every effort was made to accurately capture the insights from the participants; still it is important to note the limitations of the researcher. The limitations of this research are the instrument for data collection, analysis, and interpretation.

The purpose of this research was to explore how knowledge managers facilitate knowledge creation. All participants described their contribution to the process as facilitators. This finding suggests that knowledge managers serve as key individuals tasked with providing the culture, tools, and contexts to facilitate the creation of new knowledge. As a result of the focus of this study, this study is limited in solidifying this finding by exploring or determining other factors, if any, which may have contributed to improved knowledge creation. For instance, the views of individuals and other stakeholders in the organizations were not considered for the sake of this study. Therefore, additional research would be required to expand and solidify the beliefs held by the respondents about their actions and the process of knowledge creation. Consequently, this study emphasizes the participants' belief that knowledge managers facilitate knowledge creation within their respective organizations.

Finally, the demographics and culture of this study is overwhelmingly western and may not be typical and representative of world-wide knowledge management efforts. Therefore, it could be beneficial to expand the inclusion of participants from other geographical areas.

Recommendations for Further Research

Through research and qualitative analysis, this researcher has provided information on how knowledge managers perceive their efforts to facilitate the creation of new knowledge.

The following recommendations for further study are made:

1. A study should be conducted to identify the outcome of those efforts explained by the knowledge managers. While each of the knowledge managers interviewed felt they facilitated the creation of new knowledge, this study provided no measure of success for these efforts. The perceptions of the interviewed knowledge managers may vary from actual events. Therefore, it may be worthy for researchers to consider undertaking a study to determine if these actions do, in fact, facilitate the generation of new knowledge.

2. It is recommended that a study be conducted to determine if the knowledge manager's efforts are perceived as facilitating knowledge creation by the individuals within their organization. This study focused on the perceptions of knowledge managers. To ensure that the perceptions of knowledge managers matches the perceptions of the individuals they support, a study should be undertaken from this viewpoint.

3. A study conducted to examine these processes in the context of Cognitive Learning Theory (Social Cognitive Theory (SCT), and the Cognitive Behavioral Theory (CBT)). Social Cognitive Theory and Cognitive Behavioral Theory both propose that individual learning is based upon existing and observed models. Social cognitive theory examines whether rewards or punishment is levied for a particular behavior. Cognitive behavior theory adds in the

individual's meditative perspective. As the goal is to create new knowledge, examining if and how knowledge managers support specific a specific cognitive learning theory would expand the knowledge into individual learning.

4. It is recommended that a study be conducted to specifically examine the knowledge manager's ability to change individual behavior towards a knowledge sharing and knowledge creation. Ruggles, (1998) and McKeen and Staples (2001) show this as a continued area of challenge for knowledge managers. This study touches the edges of challenging individual behavior; however, given the continuing nature of the challenge, a more focused research study would provide greater and direct insight into the knowledge managers' success of failures.

Implications

The purpose of this study was to determine how knowledge managers facilitate the process of knowledge creation. The result of this study can enhance understanding of how social structures, culture, leadership and incentives impact the creation of new knowledge. In this study I found that knowledge managers facilitate the process of knowledge creation in their organizations by leveraging the social aspect of knowledge creation through a variety of efforts. Knowledge managers leverage and build social structures utilizing individual common interests to build associations of individuals. Utilizing communities and societies knowledge managers create connections that foster the creation of new knowledge. These connections are supported by a supportive culture that provides organizationally-focused common methods. The context of information captured should be continually evaluated to determine the relevance to their organization's knowledge needs. To facilitate this it is important that knowledge managers have an inherent understanding of the organization's missions and vision. From these conclusions it is

recommended that to practitioners maximize these social structures within their organizations and carefully monitor the culture of their organization.

It is recommended practitioners develop specific programs for the implementation of training to support individual and organizationally accepted social skills and behaviors. It is also recommended that practitioners provide support to the development of individual and organizational networks, and institutions used in knowledge creation efforts. These programs should reflect peer reviewed, research-based strategies based in the social sciences, particularly sociology and social psychology.

A key facilitator of the process of knowledge creation is a culture that is supportive of knowledge creation. This finding implies knowledge managers should actively pursue the objective of changing the culture of the organization and also implies that knowledge managers have an inherent understanding of the organization's missions and vision. From this conclusion it is recommended that practitioners facilitating the process of knowledge creation put into practice the appropriate concepts of organizational change, change management, and systemic change processes. Practitioners also should employ organizational leadership theories specifically focused on exercising influence, complex problem solving, teamwork, critical thinking, decision making, and communication. Practitioners also determine and differentiate organizational cultures and apply the appropriate theories to support or change the culture as required. These efforts should reflect peer reviewed, research-based strategies based in the organizational change, organizational leadership, organizational behavior and management.

Social Change

This research supports social change by providing insight into the creation of new knowledge in support of services designed to meet the social needs and policy implementations

to improve the public well-being (Weinstein, 2010). While this research focused on knowledge creation within organizations, Tsoukas (2005) points out that similarities exist between society and organizations. Both society and organizations face the problem of how to extend the use of dispersed knowledge resources beyond the control of a single mind and both now face the problem of how to best utilize an ever-expanding and diversified knowledge source.

As acquiring and processing knowledge continues to increase in importance, building a network of knowledge sources is critical. These networks allow individuals to communicate, share, learn and teach. These actions lead to the generation of new knowledge. By working together across and regardless of, identity, we invite in many resources. As the network expands our access to and use of knowledge becomes more democratic, and becomes a formidable tool for social change.

Individually, we share our knowledge with those with whom we have direct contact. But individually our reach is limited. As our social networks expand, we are able to share our knowledge and create synergies with tens, thousands, and possibly even millions of people. This expansion allows singular ideas to be changed and spread globally. These collective enterprises that focus our knowledge-creating energies can be utilized as effective forces for change.

Gass (2013) states that organizational leaders and organizational development practitioners place an increasing emphasis on the importance of what goes on in the minds of the individual. Still social change does not happen by the efforts of a few chosen individuals; rather it more often comes from individuals working and learning together to make a difference. Those working together form new knowledge or create new ideas. These collective ideas are not simply isolated intellectual processes; they are often connected to the formation of new social movements. Additionally, the increasing growth of technical knowledge stimulates capital

accumulation, which can lead to increased production levels. It is by the accumulation of collective technical knowledge and means of production that human beings can increase their numbers; this growth then leads to new problems, which are solved by succeeding social changes.

Conclusion

Today's highly competitive business world relies on the creation of new knowledge to drive innovation, to create value, and to allow organizations to compete with their rivals. Knowledge management emphasizes the creation of knowledge to gain competitive advantage and provide the innovation required to create new products/services, technologies, and systems. It is thus reasonable to say that knowledge managers are expected to aid in the production of the sources of knowledge that are integral to support these efforts. It is therefore important to understand the role of the knowledge manager in the overall knowledge creation process.

In the findings of this study, it was affirmed that knowledge managers facilitate the process of knowledge creation in their organizations by serving as enablers and facilitators of the process of single-loop and double-loop learning. This reinforcement facilitates the creation of new knowledge at both the individual and the organizational level. This new knowledge facilitates new outcomes, aimed at improving internal organizational processes and structures (double-loop learning).

In the organizational context, the emphasis is placed on the creation of knowledge of value for organizations. Therefore, the ways knowledge managers facilitate the creation of new knowledge can serve as models for organizations and for others seeking to facilitate knowledge creation.

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Appendix A

Study Title: Examining How Knowledge Managers Facilitate the Process of Knowledge Creation in Organizations

My name is Dean Call. I am a doctoral student in the School of Psychology at Walden University. I am conducting a research study on how knowledge managers facilitate the process of knowledge creation as part of the requirements of my degree in Organizational Psychology, and I would like to invite you to participate.

If you decide to participate, you will be asked to participate in an interview about developing relationships and maximizing human interactions, to facilitate the creation of knowledge.

To be included in this study, participants must be working as a Chief Knowledge Officer or in a position of functional equivalency. In other words, it is assumed that a participant specifically tasked to orchestrate a knowledge management program, regardless of title, is functionally equivalent to a Chief Knowledge Officer.

The interview will take place at a mutually agreed upon time and place, and should last about 60 to 90 minutes. The interview will be audio recorded so that I can accurately reflect on what is discussed. The tapes will only be reviewed by the researcher who will transcribe and analyze them. They will then be destroyed.

Participation is confidential. Study information will be kept in a secure location. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Taking part in the study is your decision. You do not have to be in this study if you do not wish. You may also quit being in the study at any time or decide not to answer any question you are not comfortable answering.

Sample interview questions include:

- Please describe your process for ensuring knowledge seekers understand where information exists in order to facilitate knowledge creation.

- How do you balance the handling of divergent information with the need to support current cultural norms?
- Please describe how you form alliances with external organizations that maintain complimentary knowledge to fill knowledge gaps.

I will be happy to answer any questions you have about the study.

Thank you for your consideration. If you would like to participate, please contact me at the number listed below or via email to discuss participating.

You will be provided a copy of this consent form to maintain for your records.

With kind regards,
Dean Call
757-577-6394
dean.call@waldenu.edu

Appendix B

Group Announcement

Fellow Group Members,

My name is Dean Call. I am a doctoral student in the School of Psychology at Walden University. I am conducting a research study on how knowledge managers facilitate the process of knowledge creation as part of the requirements of my degree in Organizational Psychology, and I would like to invite you to participate.

If you are a Chief Knowledge Officer or are tasked to orchestrate a knowledge management program, regardless of title, and would be willing to participate in a 60 to 90 minute interview, or would like more information, please respond to this announcement, or contact me via *LinkedIn* or at the contact information below.

Please note that, the interview will be audio recorded but participation is confidential. A consent form will be provided to all participants.

With kind regards,
Dean Call
757-577-6394
dean.call@waldenu.edu
www.linkedin.com/in/deanacall

Appendix C

Cover Letter

<Date>

Dear Dr. <Last Name of Individual>:

I am a doctoral student in the Walden University School of Psychology and am completing my dissertation. I have written my proposal and am writing to ask that you be part of an expert panel, in which you give your opinion on my research and interview questions.

The purpose of my qualitative study is to explore and understand how knowledge managers facilitate the process of knowledge creation. Specifically, I will be investigating how knowledge managers: facilitate the process of knowledge creation in organizations, support individuals or provide a context for such individuals to create knowledge, facilitate commitment for promoting the formation of new knowledge within an organization, and accounting for discontinuity in knowledge creation.

The study will utilize a 60 to 90 minute interview that will take place in person, by Skype, or by telephone, as appropriate. I will be interviewing 12 knowledge managers. As part of my recruitment, interested participants will be screened to determine if they meet the criteria for inclusion: the participant must be Chief Knowledge Officers or in a position of functional equivalency. In other words, it is assumed that a participant specifically tasked to orchestrate a knowledge management program, regardless of title, is functionally equivalent to a Chief Knowledge Officer.

I would greatly appreciate if you would be on my exert panel and review the interview questions vis-à-vis the research question and sub-questions. I am asking both content experts and qualitative methodology experts for their feedback. I take your role seriously and modifications to the interview will be made using your recommendations for changes (additions, subtractions, changes in wording). This important activity will validate my interview instrument.

I am attaching below the specific research question/sub-questions and interview questions that I would like for you to review. If you would be so kind and return your comments to me by 23 May 2014 I would be greatly appreciative.

If you have any questions, or prefer not to participate, please do not hesitate to send me an e-mail. If you have any questions you may also contact my chair, Dr. Michael Horton michael.horton@waldenu.edu, 1-918-809-4236

As a token of my deep appreciation I would like to give you a gift card to Starbucks. Please provide your street address in your response.

Thank you very much for your assistance.

Sincerely,

Dean A Call
Dean.call@waldenu.edu

Appendix D

Template

In your review, I would appreciate your comments on the following:

1. Fit of research question/sub questions with focus of study;
2. Appropriate language and wording of Central Questions and sub questions;
3. Appropriate language and tone of interview questions, including probes;
4. Suggestions for changes in wording, tone, language on Central/sub questions; and
5. Suggestions for changes in interview questions.

Research Question	Interview Question	Feedback
How do knowledge managers facilitate the process of knowledge creation in organizations?	1. Please describe your process for ensuring knowledge seekers understand where and in what forms information exists that will facilitate knowledge creation. 2. Please describe your process for transforming personal knowledge into organizational knowledge. 3. What is your role in ensuring access to relevant information?	
In what ways do knowledge managers support knowledge creation by all individuals in their specific organizational context?	1. In what ways do you manage the mandate to discover new knowledge against the tendency to protect knowledge? 2. In what ways do you balance divergent information with the need to support current cultural norms? 3. What criteria do you use to manage the individual's knowledge needs and	

	the knowledge needs of the organization? 4. What is your role in establishing and enforcing organizational norms and values such as trust, care, empathy, attentive enquiry and tolerance?
How do knowledge managers facilitate commitment to the formation of new knowledge within an organization?	1. Please describe how you foster a shared vision for knowledge management within your organization. 2. Explain how you foster commitment to knowledge sharing 3. In what ways are individuals incentivized to share knowledge? 4. In what ways do you demonstrate knowledge sharing?
How do knowledge managers account for gaps in knowledge?	1. Please describe an instance where a fundamental shift in the organization's knowledge needs caused a significant knowledge gap. 2. How do you facilitate social interactions to create a context in which knowledge creation can take place? 3. Please describe how you form alliances with external organizations that maintain complimentary knowledge to fill knowledge gaps.

Appendix E

Consent Form

Please consider this information carefully before deciding whether to participate in this research.

You are invited to take part in a research study of how knowledge managers facilitate the creation of new knowledge. The researcher is inviting knowledge managers to be in the study. This form is part of a process called "informed consent" to allow you to understand this study before deciding whether to take part.

This study is being conducted by a researcher named Dean Call, who is a doctoral student at Walden University.

Purpose of the research: The purpose of this research is to explore and understand how knowledge managers facilitate the process of knowledge creation.

What you will do in this research: If you decide to volunteer, you will be asked to participate in one interview. You will be asked several questions. Some of them will be about your knowledge management efforts. With your permission, I will tape record the interviews. You will not be asked to state your name on the recording.

Time required: The interview will take approximately 60 to 90 minutes.

Risks: No risks are anticipated.

Benefits: This is a chance for you to tell your story about your experiences concerning knowledge management and the creation of knowledge.

Confidentiality: Your responses to interview questions will be kept confidential. At no time will your actual identity be revealed. You will be assigned a random numerical code. The recording will be erased as soon as it has been transcribed. The transcript, without your name, will be kept until the research is complete.

The key code linking your name with your number will be kept in a locked file cabinet in a locked office, and no one else will have access to it. All interview data will be destroyed 5 years after the completion of the research. The data you give me will be used for this research and may be used as the basis for articles or presentations in the future. I won't use your name or information that would identify you in any publications or presentations.

All participants will be provided a copy of this agreement.

Participation and withdrawal: Your participation in this study is completely voluntary, and you may refuse to participate without penalty or loss of benefit to which you may otherwise be entitled. Also, you may choose to withdraw at any time without penalty or loss of benefit to which you may otherwise be entitled. You will receive no payment or other compensation for

participation in this study. You may withdraw by informing the researcher that you no longer wish to participate (no questions will be asked). You may skip any question during the interview, but continue to participate in the rest of the study.

To Contact the Researcher: If you have questions about this research, please contact: Dean Call Phone: (757) 577-6394, 18026 Morgarts Beach Road, Smithfield, Virginia 23430. Email: dean.call@waldenu.edu. You may also contact the faculty member supervising this work: Dr. Michael Horton, michael.horton@waldenu.edu, (918)809-4236

If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. Walden University's approval number for this study is **10-08-14-0055912** and it expires on **10/07/2015**.

Agreement:
The nature and purpose of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time.
Signature: _____ Date: _____

Name (print): _____