Challenges And Opportunities In Implementing A Knowledge Management Road-Map

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ABSTRACT:

This research study paper seeks to find out what strategic and operational trials organizations face when implementing a knowledge management (KM) road-map system and achievements can be accomplished. A multiple case-study approach was used to examine what currently exists in knowledge management systems implementation, how the systems compare to established knowledge management concepts, and what challenges managers are facing in improving the organization's effectiveness. In examining a KM road-map execution in different industries, the case studies revealed that there are similarities although the tactics, tools, and techniques varied somewhat among the organizations. A common finding is that firms do have a clear idea of how knowledge management can and does benefit the organization, as well as how critically important managing knowledge assets are today. Opportunities and challenges were identified in developing consistent guidelines, willingness of employees to share knowledge, acceptance of new ideas and practices, and securing approval from top management to increase the usage of knowledge systems.

Keywords: *Chief knowledge officer, Intellectual capital, Knowledge management road-map, KM implementation*

Introduction

In recent decades information and data have become so readily available and abundant that it can be overwhelming for individuals, work teams, and organizations to effectively manage their assets. Subsequently and concurrently the field of knowledge management (KM) developed to help organize and leverage the vast amounts of information that companies need to perform their operations and leverage the valuable asset of knowledge that has been accumulated. Tiwana (2002) describes knowledge as a "fluid mix of framed experience, values, contextual information, expert insight and intuition that provides an environment and framework for evaluating and incorporating new experiences and information" (p. 4). The early definitions of knowledge management involved a process of implementing a system to capture, structure, manage, and distribute this knowledge (not just data and information) throughout an organization to increase performance, utilize best practices that have been used before, and reduce expensive relearning for new projects (Dalkir, 2011; Nonaka & Takeuchi, 1995; Pasternack & Viscio, 1998; Pfeffer & Sutton, 2000; Ruggles & Holthouse, 1999). In recent years these knowledge management systems have come to be known as first-generation KM that is primarily focused on knowledge operations, deployment

and usage. More modern concepts and practices are now seeking to employee a second generation of KM implementation for organizational knowledge production and learning (McElroy, 2003). This second generation of KM thinking starts with the idea that knowledge is something we can produce and that innovation is a social process, not the management structure. Therefore the human elements need to be considered for a more balanced approach of effective knowledge creation, codification and dissemination within an organization. Nevertheless, many organizations and managers are still grappling with the initial concepts concerning KM implementation and need practical tools should be assessed.

Related Literature Review

Because the research project in this paper examines developing and established KM programs and processes, and these are still relatively new business practices, it is important to consider the principle concepts in the field and related research findings. This includes complex management tools that have been created to increase productivity, reduce expenses, and benefit organizations with a higher return on investment (ROI) and more satisfied employees. It is a fundamental premise that companies must consider several KM ideas to create and maintain sustainable competitive advantage (Awad & Ghaziri, 2004). Including the notion that additional emphasis is needed in obtaining, sharing, and retaining the critically important tacit and explicit knowledge base that the company has acquired. This knowledge foundation contains important concepts internally within the organization and externally in the firm's relationships with other companies. In addition, organizations today need to continually concentrate their attention on innovation and the processes they already have or can be developed to convert innovation to new products and services. This is where strategic and operational KM process planning and implementation play a vital role. A previous research study of knowledge growth stages in 50 companies examined their rank on the Bohn scale (Bohn, 2004), and found that most companies are active between stage three (the measure stage) where knowledge is typically written and stage four (control of the mean) where knowledge is written and embodied in hardware (Alstete, 2007). While it was also found that managers are self-perceived as usually slightly ahead of their competitors, the overall belief is that they are not nearly at the ideal level that they would prefer their organization to be. There is other research that examines the creation of knowledge management systems and intellectual capital that can be leveraged for competitive advantage. A book by Karl Wiig examines how effective decision making at companies leads to organizational success using a people-focused knowledge management approach (Wiig, 2004). Part of the premise is that KM practitioners, researchers, and scholars are creating (or have now created) the necessity to shift the emphasis to a new approach, not unlike the aforementioned McElroy Second Generation, where technology and prescriptive processes are involved in a deeper understanding of how company success is influenced by people's actions supported by personal (both tacit and explicit) knowledge, intellectual capital assets, and additional resources. This is a tall order for organizations today in light of the many challenges that all companies face with a volatile economy, changing demographics, globalization, rapidly developing technology, increased government regulations, evolving consumer expectations, and related macro-environmental issues. Therefore

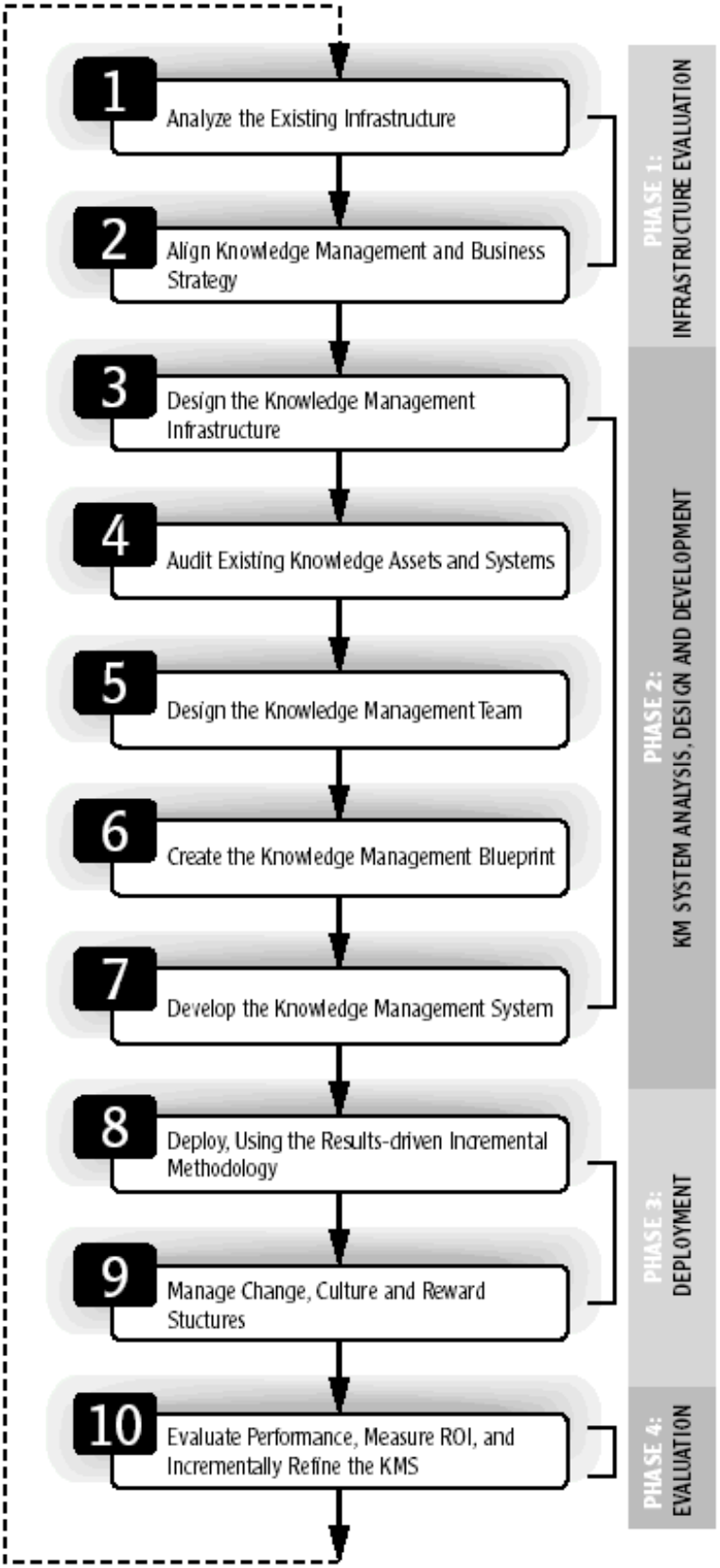
managers today are in strong need of clear initial guidance and direction to properly develop and implement a KM system within their organizations.

Another recent research study of managers at companies in the New York metropolitan area found that innovation policies can and should be structured into knowledge management systems (Alstete & Meyer, 2010). Although a minority of the participants in this particular study group affirmed that arranging the innovation policies with the KM system are often not easily accomplished and may not appear to be a worthy goal. An important point is that the concepts of innovation and knowledge are closely related, and within organizations today it could be a tremendous missed opportunity if knowledge management systems are not developed and structured from the start with innovation in mind as a continual outcome. Most of the recent scholarly management research literature is conducted with the existing framework of strategic management concepts (Nielsen, 2005). A critique of this approach by other researchers is that a new and more vibrant viewpoint of knowledge-related competences in justifying the creation and strategic cooperative initiatives for the improvement of organizations. Managers, employees, and various company stakeholders appear to need proper guidance, leadership, encouragement and direction when undertaking complicated and somewhat personal endeavors that involve the actual work processes that they have developed and acquired over years of training and experience.

The field has now developed to the point that knowledge management system formation can be viewed as a life cycle, that starts with a plan and reasoning that concludes with an organized structure to satisfy the KM needs of an entire organization (Gopal C.S. & P.A., 2011). A system designed for the complexity and challenging environments of companies today must have a well-defined architecture so that chances for confusion are reduced, and there is increased emphasis beyond the technological elements of KM toward a deeper understanding of the company's culture, industry, employee requirements, and respect for legacy systems while leading the way to greater leverage of real knowledge advantages that many companies do not yet take full advantage of. In addition, employees and managers could be encouraged to participate fully if they are made aware of the importance regarding protecting valuable knowledge assets that companies possess is to help ward off new security threats that support their livelihood (Alstete, 2003).

Practitioners and researchers have established specific protocols for implementing the concepts, techniques and practices. KM implementation procedures that have been researched at companies often include various common stages such as planning, initiation, development and integration (Oliveira, Caldeira, & Romao, 2012). Some implementation schemes are more detailed, such as an approach called the the10-Step Knowledge Management Road-Map as described by Tiwana that consists of four phases with ten steps (Tiwana, 2002). Managers at two companies were asked to use the Tiwana 10-Step KM Road-map to plan a knowledge management system for their company. The road-map is illustrated graphically with the four phases and ten steps as shown in Figure 1.

Figure 1: The 10-Step KM Road-map (Tiwana, 2002, (p. 69)


1
Analyze the Existing Infrastructure
2
Align Knowledge Management and Business Strategy
3
Design the Knowledge Management Infrastructure
4
Audit Existing Knowledge Assets and Systems
5
Design the Knowledge Management Team
6
Create the Knowledge Management Blueprint
7
Develop the Knowledge Management System
8
Deploy, Using the Results-driven Incremental Methodology
9
Manage Change, Culture and Reward Stuctures
10
Evaluate Performance, Measure ROI, and Incrementally Refine the KMS
PHASE 1: INFRASTRUCTURE EVALUATION
PHASE 2: KM SYSTEM ANALYSIS, DESIGN AND DEVELOPMENT
PHASE 3: DEPLOYMENT
PHASE 4: EVALUATION

This road-map can help guide managers at organizations to develop, execute and maintain a KM program that can enable the organization to properly manage the valuable knowledge that is often locked in place and is in need of release for competitive advantage both operationally and strategically.

Methodology

Case study research methodology is a well-established protocol, and seeks to identify why a decision or set of decisions are made, how they are executed, and what results are produced (Yin, 2009). Previous research studies have been published using case methodology that examine strategic knowledge management for creating competitive advantage at multinational companies (Kasper, Muhlbacher, & Muller, 2008; Oliveira et al., 2012). Selection of cases is often based partly on the researcher's access to data and the research design includes study questions, propositions, units of analysis, the logic linking the data to the proposition and the criteria to implement the findings. The companies selected for analysis in this study were chosen because they are conveniently located near one another in the New York Metropolitan are both ranked on the Fortune 500 list for 2012. Organizations such as public and privately owned companies face many challenges when they seek to improve their efficiency and effectiveness in the rapidly changing competitive business environment, particularly the knowledge-based activities. A holistic multiple-case study design is an appropriate methodology for a complex topic such as this that involves challenges in knowledge management implementation, because the research approach facilities a broad yet in-depth examination of the study question concerning a variety organizational units plus analytic conclusions possibly arising from the different cases. One of the companies is a large public power company, and the other is a building construction products company. Certain limitations in the methodology are identified, including but not limited to, the researcher's access to the information about the cases, the perceived lack of rigor in case study methodology, the limited potential for scientific generalization, and the point in time in which the study took place. However the case study research method is a valid research tool that is widely used in many social science disciplines, and yields informative findings in the paper that will be presented.

This paper recorded observations by the researcher about the challenges of implementing a knowledge management system, involving multiple-case study evidence from two organizations in different industries. Managers at the companies were asked to use the Tiwana 10-Step Road-map to plan a knowledge management system for their company. The substance of the information in this paper comes from direct and indirect communication with employees who offered their experiences and observations about these matters. The participants formally agreed to allow the research to be conducted and anonymity has been maintained in reporting of the findings.

FINDINGS

Strategic and operational challenges to effective implementation of knowledge management practices are similar to the difficulties in other management policies and procedures. Providing top-down guidance about how certain activities should be

conducted, directing individual efforts that are linked to supporting the organization's overall quest for competitive advantage, ensuring consistency, and encouraging a work culture that enables excellent execution of the knowledge management policies are important. The cases examined in this paper frame the implementation in an established knowledge management road-map procedure that is broken down into four phases and ten steps.

The first phase involves analyzing the existing infrastructure for knowledge management, and aligning it with the stated business strategy. This is followed by KM system analysis design and development, and concludes with evaluation of the performance, the return on investment and continuous improvement of the knowledge management system. The cases examined in this research study were found to be currently using past data patterns for decisions, making significant investments in information technology to support KM implementation, and aligning these endeavors with their overall business strategies. The strategic and operational challenges for full knowledge management integration primarily were found to be in the later stages of the KM Road-map, notably the steps involving managing change, culture and reward structure to support complete adoption of the knowledge management policies, as well as truly effective systems for performance evaluation, measuring the value of the investments KM systems, and the incremental refinements that should be part of an important business management process. The cases also revealed interesting details about management policies, employee perceptions, and the extent to which established KM theories are applied in business organizations.

Power Company Case

The first case in this paper is a public power company that serves a large metropolitan area in the United States, and provides steam gas and electric service to millions of people. In regard to Phase One of the knowledge management road-map (Infrastructure Evaluation), the company has a vast organization and is continually modernized using the information technology department and strong relationships with manufacturers. This power company recently improved all computers and installed wireless notebook computers for all field trucks, and additional questions were asked regarding the computer network, use of video conferencing, project management tools, and other related assets for managing knowledge. It was determined that the company uses all past data patterns for future decision-making, with experts and engineers involved to confirm reliable reviews of past data for decision making. The infrastructure does consider knowledge management at the top of the organizational hierarchy and fits horizontally in the value change. It was clearly stated that knowledge and past experiences are very important for this company and the utility industry in general. The payoffs of knowledge management are perceived as immediate and result in faster, more efficient workers who produce more reliable gas, steam and electricity.

In analyzing the second step of aligning knowledge management and the business strategy, it was found that the company does identify and address gaps to align knowledge management processes, strategic visioning and business strategies to implement KM. Knowledge was identified as being exchanged, traded, and allocated

through numerous documents that are required to be completed for each job assignment. In addition, it was stated that the knowledge is transmitted using the company's intranet. Subsequently, the next phase involving steps three to six of the road-map (KM system analysis, design and development) were found to be closely linked and included accomplishments as well as challenges. In particular, the collaborative filtering and interface layer is perceived as being at the core of knowledge management, and around which the entire system revolves. This layer requires accessing all of the information that is to be converted to knowledge, primarily through sorting and linking it in processes that enable the users to fully comprehend it. The information technology department typically does this with cooperation from other units relating to data and how it is to be marked or connected. Following this is the application, which according to Tiwana is "applications such as skills directories, yellow pages, collaborative tools, video conferencing software and hardware" (p. 262). This is a very important level that fundamentally builds on the interface and is vital when decisions are made as to what techniques the company's KM system will utilize. At this particular power company, some of the applications are already in place and others that are planned will be combined and melded into the system. A challenge was identified, and is probably common at other organizations, in regard to middleware and legacy integration. This is the connectivity between old and new data formats (as described by Tiwana and seen in this case), and can be accomplished by the information technology department with training classes for employees. The main repository at this power company is the bottom layer that already exists, and is the "island of data" (p. 263) that Tiwana describes for storage. This includes document archives and different data that the company already holds. Although it is the very bottom layer, it is still very important information that the KM system will use. More importantly step four in the 10-Step Process found that knowledge exists in this company in explicated form, and although it is used this way, the KM system needs tacit knowledge possessed by individuals. It was stated that when the employees use explicit knowledge, the knowledge should to be validated or have a contribution made back such as when consultants use databases for fast and practical consulting work.

Another self-identified important step by the company is the fifth one in designing the knowledge management team. This was stated to be one of the truly vital steps contained in the road-map because it identifies who will "design, build, implement and deploy the company's KM system" (Tiwana, p. 72). At the power company the KM team will contain managers located in various departments in the organization and external vendors. A company manager will lead the team, and the members will comprise supervisors, information technology personnel, external training companies for the new formats, as well as consultants who will offer suggestions on decisions and provide guidance where needed. A challenge identified in this step is that the managers recognize the value of the knowledge management system and processes, whereas the participants in the case study believe that the union members do not appear see the value immediately. However, overall the company team is believed to be a tremendous asset for implementing KM at the power company, where team members and the company are seen as leaders in the field, and believe that the usage of knowledge leveraging will continue to grow over time.

Phase Three of the KM Road-map begins with step eight by deploying the results-driven incremental technology. At the power company being examined, the KM team was found to be supplying object-driven decision backing at each level that will remain through the executive stage. Enactment of the KM process and structure is portioned into a sequence of increments that do not overlap and the increments will help safeguard independent results that are helpful to the users of the KM system. The implementation was found to be time intensive, lasting approximately two to three months concluding with results-driven follow-up procedures that include tests performed, reporting and adjustments to the system involving the information technology department. The last part of the third phase involves managing change, culture and reward structures. The power company in this case determined this to be another challenge and it was stated that a Chief Knowledge Officer (CKO) is needed to lead the KM system and decisions need to made in regard to how the CKO will interact in the management structure with existing leaders such as the chief information officer, chief financial officer and the chief executive officers. The relationships among these important individuals will need to be close and the CKO should continually report progress on the KM system and request support when necessary.

The fourth and final phase of the KM Road-map at the company begins with step nine: evaluate the performance, measure the return on investment (ROI), and continually improve the knowledge management system. The Tiwana approach directs company managers to ask questions such as did the KM system reduce expenses, accomplish more or fewer expenditures, improve market leadership, gain market share, and increase company stock prices? Due to the nature of the KM system at the company in this case study, the answer to these questions will need to be determined over a period of time during the next few years. If at the end of that time, the answers are positive then the power company can formally acknowledge that the KM system was successful and therefore should be kept going. However if some or many of the answers are negative then the improvements will be required for the KM 10-step road-map for execution.

Overall, the challenges at the power company were found to be not significantly strong enough to hinder planning and execution of the knowledge management road-map. The benefits were stated as clearly being understood, and in general this researcher believes that the company should seek to move the KM road-map to implementation with responsibility outside of the information technology department. The Tiwana road-map enables managers (and KM researchers) to view a great deal of information, planning, investigation, and enactment that is involved in creating, implementing and maintain a KMS. In many departments that operate in an organization such as this power company, it should be understood managers, and employees are needed to plant and cultivate an effective KM structure.

Construction Products Company Case

The second company in this study examines a large American corporation in the general construction products industry, that is involved in manufacturing, distributing, and selling of coatings and related products to professional, commercial, industrial and retail customers largely in North and South America. The company has existing

knowledge management systems in place and does have upcoming plans to create new KM processes. The Tiwana 10-Step KM road-map again was shown to be a useful framework for a company such as this in strategically planning, formulating, advancing, and executing a KM system. An examination of Phase One, the first step of analyzing the existing infrastructure, found that the company has a long history of using technology with the related infrastructure already in place where they invested a lot of resources. However the company's organization is known for having challenges in regard to approvals of new programs and ideas due to traditional bureaucratic delays in approvals, which affect implementation timelines and sometimes can decrease overall efficiency. Subsequently, the second step in the Road-map of aligning knowledge management and business strategy was found to more in line with the long-established organization culture that is quite proud of its nearly 100 years of experiential knowledge in the industry and generally has embraced technological expansion and innovation in their strategic and operational planning. The company ranks high when compared to competitors in regard to possession of core knowledge of the industry, and has been at the forefront of innovations in the industry. The third Road-map step involving knowledge management architecture and design is where management decisions are performed about the KM system. The company knows that they need to integrate tacit and explicit knowledge in a competent manner, and in particular the tacit knowledge that has been learned over the years of experience by individual employees, departments, and the company as an organizational entity. It was found that a significant amount of explicit knowledge has already been articulated, codified, and archived in specific storage media that can be promptly communicated within the company where it is needed for sharing and leveraging. The company is aware that it can gain a competitive advantage over other companies in the industry by using their vast amount of knowledge to produce advancements in products that their experienced marketing department can sell it to consumers.

The fourth step of the Tiwana Road-map at the construction supplies company involving auditing the existing knowledge assets and systems found that the company has a strong need to further understand the knowledge assets and systems. The researcher found that managers believe a thorough knowledge audit is needed to identify their current assets and discover the future options and opportunities. Naturally, to do this part of this phase is the very important next step (5) of designing the knowledge management team. At this point the company needs to identify who will construct, execute, focus, and organize the KM system that is selected. For the company being examined in this case, the organization culture works on an issue such as this by having many people included from various departments so that groups can work together. In this instance, a KM team is chosen to properly plan and implement the KM systems properly with resource efficiency. Teams generally tend to be formed loosely and often based on the willingness and capabilities of certain individuals who will work together. A challenge identified is that the company does have a self-identified problem with some employees performing wasted work time. Often different managers and employees will communicate (usually by telephone) with the same customer or with others who they are working on the same project. When discussing KM strategies and possibilities with the company representatives, it is believed that a KM system could help resolve this issue by using the knowledge that exists and keeping it updated. Overall the people in the company culture in this case do welcome

and perform knowledge sharing and growth, and it seems that a properly organized KM system would be of tremendous benefit.

To create the knowledge management blueprint, step six of the Road-map is when managers plan to improve the system over time by developing the infrastructure that is crucial to the KM system. This enables the company to share the tacit and explicit knowledge with employees so the system is enhanced and accessible. In addition, this is where the KM team examines the decisions of buying or constructing the KM system itself, and therefore the best selection is decided upon all of the facts and evidence collected. A close look at the construction products company found that the nature of the production is partially based on expertise and partially on established procedures. The roles of the workers include problem solving, learning, and improving their functions. Not unexpectedly, the location of the knowledge is tacit, written, oral and located in databases or software. The managers believe that there is suitability for automation and a high feasibility for product variety in regard to KM system selection and implementation. This naturally leads to an examination of the next step in the Road-map (seven) where the KM system is actually developed.

It was found that if the company would strive more strongly to examine each of the layers of the KM architecture when performing new installations, the company could keep to a timely implementation and deliver a better performing product. Subsequently, in step eight where the company deploys a system using the results-driven incremental methodology, it is suggested that this company run a pilot test for the end users and quality assurance team to properly test the system. The managers in the case study understand that this is where issues and problems can be found and where the KM team can decide on a phase approach for execution. As in the previous company case, it is very important to consider the company culture in regard to managing change and the related reward structures. At the beginning of Phase Three, where the next step (nine) in the road-map directs companies to encourage and support employees to utilize the system, incentives are needed to achieve adoption of the KM system so that it should be conducted with an enthusiastic and informed leadership style. It the case of this buildings material company, when the KM system was first released, there indeed was a large effort by management to encourage usage of the system, and managers were trained on the useful features of the system and were inspired to try it out. As with most complicated organizational changes and new endeavors, effective management leadership is needed to achieve success. Perhaps this is an example of how important it is for all managers today to understand the benefits of knowledge management systems and the intricacies of its creation and implementation.

The last step of the Road-map involving the evaluation of the KM system, measuring the ROI, incrementally refining the system understood by this company, and the monetary figures and data are especially sought out to discover if the effort was profitable and improvements were made. The company continues to demonstrate evolution and progress with the KM system, but they have self-identified that they are not truly a technology-oriented company and do not really have a culture with a strong focus on KM systems. One of the managers who works in the marketing department at the company stated that they never truly thought about information systems that enable

knowledge sharing throughout the company and what the efforts are that go into creating a system such as this until it was examined for the purpose of this research project.

Discussion And Concluding Thoughts

The value of intellectual capital is very high and has been found to account for almost 60% of the market value of companies (Kavida & Sivakoumar, 2009). Since intellectual capital and knowledge management have been described as twin branches of the same tree (Sveiby, 1998), companies would not only be prudent to properly manage it, but should be required to do so today by owners and investors. Managing intellectual capital and knowledge that companies use to conduct their endeavors is more important than ever, both for the companies in this case study analysis and others, and the challenges identified need to be addressed. Most notably is the need for a CKO, which although not uncommon, are not positions currently in place at the particular companies in this study. Tiwana (2002) states that the CKO job description should include optimizing the design of KM, creating channels, integrating KM within the organizations, breaking organization barriers, watching the learning loop, creating financial value, and supporting information technology (p. 291). The power company was found to have extensive amounts on information and knowledge, around which the business operations of providing power operates, and employees/managers have access to the knowledge in the current system. Yet this system can be improved as it is becoming more widely known how valuable knowledge is to the company and this is important for the future success of everyone involved. The second company examined that operates in the construction supplies industry was found to have several challenges to KM implementation, including bureaucratic decision making, and more fully understanding the efforts that went into creating a valuable knowledge management system to share valuable tacit and explicit knowledge. In addition, the managers seemed to be in need of a deeper understanding of established KM practices, tools, techniques, forms and procedures that have been successful at other companies but not yet adopted by this company. Perhaps this is where true business process benchmarking practices (Camp, 1989, 1992; Watson, 1992, 1993) could benefit companies such as the two examined in this paper. Measuring company performance internally and externally is important, and should be conducted regularly to monitor activity and seek improvements. But when implementing a complicated knowledge management system, finding the best practices for effective management oversight and direction is especially critical. Many of the modern management techniques such as total quality management, benchmarking, business process reengineering, six-sigma, balanced scorecard, and others can and should be considered for usage when strategically and operationally planning a full-scale knowledge management endeavors.

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