

## PEER-REVIEWED ARTICLES

### A CONCEPTUAL FRAMEWORK FOR EXAMINING KNOWLEDGE MANAGEMENT IN HIGHER EDUCATION CONTEXTS

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#### Abstract

Knowledge management is an on-going process that involves varied activities: diagnosis, design, and implementation of knowledge creation, knowledge transfer, and knowledge sharing. The primary goal of knowledge management, like other management theories or models, is to identify and leverage organizational and individual knowledge for the organization and its members to perform better and, consequently, sustain competitive advantage. This literature synthesis provides a conceptual framework for examining knowledge management in USA higher education contexts.

Knowledge management hinges on a fundamental assumption: in order for organizations to survive in a rapidly changing economy, they must be able to recognize the significant role of internal and external forces, maximize the utility of resources, and transform their structures and cultures. Higher education institutions are not immune to these challenges. Higher education institutions suffer from budget constraints, cultural barriers, and resistance from their internal constituents. Applications of knowledge management strategies in higher education contexts are not limited to external resource issues. These strategies may also be used by higher education institutions to assess their existing internal competitiveness. Compared to the previous business-oriented management strategies that had mainly focused on outcome-based, performance-oriented, return on investment-type quality initiatives, knowledge management is more likely to shift the focus to human-centered or human resource-oriented strategies. One may argue that knowledge management strategies are more likely to be involved with learning than most management strategies.

Goddard (1998) posits that higher education institutions must be seen as knowledge businesses. Higher education institutions have a long history of knowledge-related activities, including various types of management to deal with knowledge production, repository, and sharing. Leaders in higher education institutions are engaged in planning curricula, evaluating

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programs, and creating an organizational atmosphere that is conducive to improving performance. Thus, higher education leaders should recognize that their management approach and leadership must incorporate this framework and change their actions accordingly (Wolverton, Gmelch, & Sorenson, 1998).

### **Knowledge Management and Higher Education**

Higher education leaders face challenges on how to implement strategies for building culture, inculcating and promoting leadership, applying technology, and measuring results. The current context of higher education in the USA is fraught with challenges. Universities are facing a mass exodus of Baby Boomer retirees, escalating college costs, budget reductions that are aligned with a sagging national economy, and a host of other problems. Provosts, deans, and department chairs need to carefully examine human resources, organizational culture, and the political climate to modify and move their institutions forward. These higher education leaders need guidance in identifying and facilitating well-integrated processes of acquiring, integrating, and creating knowledge. As a starting point to address these issues, literature on knowledge management needs to be synthesized and a conceptual framework regarding knowledge management domains and strategies proffered. This synthesis and conceptual framework are the foci of this article.

### **A Conceptual Framework for Knowledge Management**

The literature review of this study of knowledge management is segmented into four domains: leadership, culture, technology, and measurement. These domains are aligned with research conducted by the American Productivity and Quality Center (2001).

*Leadership* indicates the ability of the organization to align knowledge management behaviors with organizational strategies, identify opportunities, promote the value of knowledge management, communicate best strategies, facilitate organizational learning, and develop/create metrics for assessing the impact of knowledge. Examples of the outcome of these six processes are strategic planning, hiring knowledge workers, and evaluating human resources. The leadership role is pivotal because leaders convey the messages of organizational change, and they send the signals that portray the importance of adopting knowledge management across an organization.

*Culture* refers to the organizational climate or pattern of sharing knowledge as related to organizational members' behaviors, perceptions, openness, and incentive. Various committees and training development programs are examples of the culture process. Shaping an adequate culture is the most significant and challenging obstacle to overcome for successful knowledge management (Davenport, DeLong, & Beers, 1998).

*Technology* refers to the infrastructure of devices and systems that enhance the development and distribution of knowledge across an organization. The literature review revealed that most knowledge management researchers address the significant impact of technology and its role in effective knowledge management. However, it is notable that an over-emphasis on technology might cause conceptual confusion between information management

and knowledge management. Gold, Malhotra, and Sedars (2001) stress that technology includes the structural dimensions necessary to mobilize social capital for the creation of new knowledge. The examples of this process are internal web-based networks, electronic databases, and so on.

Finally, *measurement* indicates the assessment methods of knowledge management and their relationships to organizational performance. Skyrme and Amidon (1998) suggest that knowledge management can be assessed in four dimensions: customer, internal process, innovation and learning, and financial. Although there has been skepticism regarding this type of measurement, they attempt to measure it in a way that includes benchmarking and allocating organizational resources.

The literature review was guided by two intentions: (a) to explore relevant literature on the issue of knowledge management in association with higher education in a knowledge-based society or economy and (b) to identify theoretical and practical connections between knowledge management and higher education settings by categorizing topics and concepts. Select key words and descriptors were used such as knowledge, knowledge management, university/higher education management, university/higher education reform, university/higher education innovation, knowledge sharing, knowledge transfer, resource-based theory of firm, human resource development, knowledge-based economy/society, and so on. Through this literature review the researchers sought to find and delineate agreement and disagreement within the literature based on the descriptors. A process of extracting and formulating the domains was used to summarize the existing literature on knowledge management and its application to higher education institutions.

Several data bases were searched, including EBSCO Business, Business Source Elite, EconLit, Wilson Select Plus, and OCLC FirstSearch. In doing this review, the authors found a paucity of research that positioned knowledge management within the context of higher education. Approximately 120 articles were examined, and 57 proved to be most fruitful.

### **The Four Domains of Knowledge Management**

As described above, through this review process an intertwined conceptual framework of knowledge management was generated. Four domains – leadership, culture, technology, and measurement – and their related strategies and application to knowledge management in higher education are presented.

#### *Leadership*

The literature reviewed in this study affirms the pivotal role of leadership in driving organizational change and adopting and implementing knowledge management. Leadership is also essential for knowledge management systems in matters such as decision making, assigning tasks, and integrating and communicating with people. Desouza and Vanapalli (2005) claim that a leader as a knowledge champion initiates and promotes knowledge management. Seagren, Creswell, and Wheeler (1993) specifically stress that leaders need to address complicated and, yet, urgent issues through strategic planning processes that are needed to transform the institution to successfully respond to social demands. Developing quality leadership is critical at all levels

of an organization. Higher education leaders, in particular, must pay attention to human resources, the structure, and the cultural and political climate of the institution.

Skyrme (1999) emphasizes the roles of leadership in knowledge management by delineating the work tasks of “Chief Knowledge Officer.” Leadership tasks of this role include: help the organization formulate strategy for development and exploitation of knowledge; support implementation by introducing knowledge management techniques; provide coordination for knowledge specialists; oversee the development of a knowledge infrastructure; and facilitate and support knowledge communities.

### *Strategies of Leadership*

The literature review suggests four key characteristics of leadership that are vitally important to knowledge management: vision, motivation, value of learning, and strategic planning.

*Vision.* Vision is a leading factor in leadership that transforms organizations, both in terms of culture and structure. The leadership literature provides various perspectives about the concept and function of vision. Dierkes (2001) suggests that organizations in an uncertain environment require visionary leadership. In a knowledge-creating organization, Nonaka (1991) also points out that managers with vision provide a sense of direction that helps members of an organization create new knowledge. This literature review portrays vision as a characteristic that enables leaders to set a standard, facilitate the coordination of organizational activities and systems, and guide people to achieve goals. Visionary leaders address uncertainties that pose threats to an organization.

*Motivation.* A key to the success of knowledge management is to understand how members in an organization come to believe that they can better perform and contribute to continuous improvement. One of the contributing factors of visionary leadership is to motivate people (Dierkes, 2001). In this regard, motivation is a precondition to continuously justify the vision. Incentives designed to encourage people to share their knowledge seem to have a more positive relation with the cumulative nature of knowledge (Cohen & Levinthal, 1990; Organization for Economic Co-operation and Development [OECD], 2004). By offering vision and incentives, leadership can promote knowledge sharing and encourage people to participate in creating knowledge (Nonaka, 1991; Smith, McKeen, & Singh, 2006).

*Value of learning.* Learning is widely recognized as critical to the successful implementation of knowledge management strategies. Learning, or organizational learning, described in the literature converts individual, un-codified, irrelevant information or knowledge to organized, codified and, therefore, sharable and relevant knowledge (Dierkes, 2001; Nonaka & Takeuchi, 1995). Hamel (1991) posits that core competencies of organizations reside in collective learning. The development of technology reinforces innovation efforts such as facilitating collaboration as well as organizational learning (OECD, 2004).

*Strategic planning.* In an uncertain environment, specific preferences for the future are difficult to predict. Sanchez (2001) stresses the importance of developing future scenarios and

preparing responses for them. In his view, organizational learning plays a pivotal role in identifying organizational capabilities, shaping effective strategies, and creating valued knowledge. Long-term, comprehensive strategic planning involves integrating expectations and technology into a vision that enables an organization to prepare for the future (Kermally, 2002).

In summary, a number of factors contribute to the role of leadership in knowledge management practices. Based on this literature review, leadership refers to the ability that enables higher education leaders to align knowledge management behaviors with organizational strategies, offer an opportunity and a direction, identify and recognize best practices and performances, and facilitate organizational learning in order to achieve the established goals.

### *Culture*

Based on the literature review, culture is defined as an organizational environment and a behavioral pattern that enables people to share their ideas and knowledge. According to Trice and Beyer (1993), culture is reflected in values, norms, and practices. Values are embedded, tacit in nature, and, therefore, difficult to articulate and change. Values inspire people to do something. Norms are formulated by values, but more visible than values. If members in an organization believe that sharing knowledge would benefit them, they are more likely to support the idea of sharing their skills and knowledge. Practices are the most tangible form of culture. These three forms of culture influence the behaviors of members in an organization.

Organizational culture provides the context within which organizational strategies and policies are decided. A shift of organizational culture is a precondition to successfully implement knowledge management. Knowledge management must be integrated within an existing culture of an organization (Lam, 2005). Shaping a viable culture is vital to successful knowledge management (Davenport et al., 1998). Sackman (1991) asserts that culture in an organization is complex, pluralistic, diverse, and often contradictory. Although this study does not explore how culture is interpreted in research and practice, the nature of culture in organizational settings is briefly addressed in the next few paragraphs.

Culture or cultural factors have a significant impact on generating and leveraging knowledge (Brown & Duguid, 1991; De Long & Fahey, 2000; Sackman, 1991). Several studies link cultural influences and knowledge management. Kermally (2002) suggests that shaping an organization involves a vision and value. He further states that creating a knowledge-driven organization involves several factors: tolerance, empowerment, trust, networking, open communication, recognition, diversity, and talented individuals. Relevant to this study, he emphasizes that the role of the leader is critical to creating such an organization.

In examining what leverages the impact of organizational knowledge, Tetrick and Da Silva (2003) emphasize an organizational culture that promotes sharing knowledge and organizational learning. Hurley and Hult (1998) list several cultural characteristics of organizational knowledge: market focus, learning and development, status differentials, participative decision making, support and collaboration, power sharing, communication, and tolerance for conflict and risk. Skyrme (1999) suggests that the characteristics of culture in knowledge-enriching organizations are: openness of organizational culture; empowered

individuals; active learning; constant improvement and innovation; intense, open, and widespread communications; organizational slack (i.e., time to experiment, reflect, and learn); interaction and boundary-crossing; encouragement of experimentation; aligned goals and performance measures; and willingness to share knowledge among colleagues. Along with these processes, responsiveness and flexibility are critical to converting individual knowledge to explicit knowledge so that it may be shared with others within the organization (Kidwell, Vander Linde, & Johnson, 2000).

### *Strategies of Culture*

The review of the existing knowledge management literature suggests five strategies that are most significant in shaping a culture conducive to knowledge management: community-orientation, trust/openness, collaboration, entrepreneurship, and responsiveness.

*Community orientation.* This strategy pertains to how members share their skills and knowledge with other members in the organization. Community-orientation is similar to the concept of community of practice by Wenger, McDermott, and Snyder (2002), where people create a work environment in which they may build and share their identities. Although the knowledge base of a community is not formed by its boundaries, inter-dependency emerges among community members. Communities of practice within academic contexts involve the dynamics of sharing identities, based on common functional interests and disciplines (Sapsed, Bessant, Partington, Tranfield, & Young, 2002).

*Trust/Openness.* In order to identify and solve the problems within an organization, trust-building is critical to the success of knowledge management. Organizational culture established on trust can prove to be an effective and powerful catalyst to organizational change (Kermally, 2002; Wolverton et al., 1998). Given norms and conditions that require interpersonal and inter-professional knowledge-related activities, the issue of trust or openness among members of an organization is an important issue (OECD, 2004).

*Collaboration.* Collaboration in the literature reviewed refers to interaction between the members or groups in an organization. It involves sharing ideas and special knowledge that are critical to creating new organizational capabilities. Collaborative activities through various mechanisms (e.g., mentoring, coaching) may be used to accelerate organizational performance and individual development (Gmelch & Parkay, 1999; Gupta & Bostrom, 2006; Van Tiem, Moseley, & Dessinger, 2000). Grant (1996) describes team-work as a collaborative activity among the members of an organization. It is based upon a relationship of reciprocal trust between people who share a common goal in an organization – such as members of academic units in higher education institutions.

*Entrepreneurship.* The literature reviewed conceptualizes entrepreneurship as an organizational process as well as a personal characteristic that contributes to creating and discovering new knowledge. A person with entrepreneurial spirit can identify, explain, and justify new ideas so as to create new knowledge and add value to an organization. Most organizations recognize these knowledge pioneers and promote entrepreneurship as an alternative to focusing on what is already known (Coulson-Thomas, 2003).

*Responsiveness.* Continuous learning systems are used to create and support a culture of inquiry, helping to diagnose organizational problems and identify and establish the direction of knowledge management (Petrides, 2002). Timely responses to the demand for training and professional development support the value of learning required for new knowledge creation and sharing. Hence, responsive training and professional development programs are indicators of being aware and meeting the needs and problems within the organization.

In summary, culture defines the organizational environment. The knowledge management literature emphasizes that in order to successfully implement an effective environment an organization and its members should engage in creating a culture that embraces the notion of a community engaged in collaborative practices. The entrepreneurial spirit of its members should be recognized and promoted. Successful knowledge management comes from building trust among members and offering timely opportunities for training and professional development.

### *Technology*

Based on the literature review, technology is defined as the tools and processes that foster, facilitate, and sustain collective and individual activities that help share, transfer, and create knowledge. Technology supports knowledge management in many ways – it enhances the organizational capability in storing, retrieving, transferring, sharing, and creating knowledge (Coakes, Willis, & Clarke, 2002; Kermally, 2002; Smith et al., 2006). The advent of information and communication technology and its extensive applications to business processes has contributed significantly to the development of knowledge management. These applications include customer relationships, training and development, and internal communications. The literature of the early developmental stages of knowledge management emphasized the role of technology concentrating on capturing, storing, codifying, and distributing knowledge (McElroy, 2003). Technology is more than a mechanical and physical supplementary artifact. Technology refers to the infrastructure of devices and systems that enhance the development and distribution of knowledge across an organization. This literature review reveals that most knowledge management researchers address the significant impact of technology and its role in effective knowledge management. However, the over-emphasis on technology might cause conceptual confusion between information management and knowledge management. Technology includes critical strategies of the structural dimension necessary to mobilize social capital for the creation of new knowledge: web-based networks, electronic databases, and so on (Gold et al., 2001).

Pavitt (1992) suggests that technology is a tool for organizational innovation. In a study of successful large companies, he concludes that technology used in one company or industry may not necessarily be successfully applied to another firm or industry. Further, he claims that innovative activities and technology development require select professional skills and knowledge.

Technology, system-centered technology in particular, is also an important factor that shapes organizational vision (Dierkes, 2001). The Organization for Economic Cooperation and Development (OECD, 2004) reports that information technology is a critical factor that facilitates knowledge dissemination and integration in organizations. This international and

cross-industry study concludes that technology affects knowledge management in multiple ways: it reduces the cost and physical proximity of learning activities, increases accessibility of learning, enhances creative interactions across a wide range of professional communities, and facilitates knowledge sharing. However, although technologies facilitate knowledge sharing and dissemination, applying technologies does not guarantee the successful implementation of knowledge management. Other factors such as organizational culture and inter-personal relations affect knowledge sharing and transfer in organizational contexts.

Additional review of knowledge management literature suggests that up-to-date information technology plays a significant role in capturing, storing, and transferring organizational knowledge (Pfeffer & Sutton, 1999); training (Beckman, 1999; Roth, 1996); communication (Wiig, 1999); coordination (Baek, Liebowitz, Prasad, & Granger, 1999); and flexible combination and integration (Fiol, 2003).

### *Strategies of Technology*

This literature review identifies six strategies of technology in fostering and implementing successful knowledge management: training, integration, communication, problem-solving orientation, up-to-date technology, and local networking.

*Training.* Technology may be used in several ways to enhance learning opportunities and learning environments for members of an organization (Coakes et al., 2002). Information technology can be used to facilitate individual and team learning (Roth, 1996). On-line and off-line training of technology applications may be used to introduce new and reinforce existing techniques and practices and offer effective means for creating new concepts and knowledge. Without proper training of people, higher education organizations cannot expect technology applications to be effective (Pickett & Hamre, 2002; Serban & Luan, 2002).

*Synergy.* From the knowledge management literature synergy is defined as members (people) of the organization working together to produce a better result than if each person worked toward the same goal individually. Professionals in higher education institutions have a wide range of resources and capabilities that can be strategically used and shared. One of the benefits of technology, and information technology in particular, is that it offers an effective and efficient tool to capture and share internal and external knowledge (Kermally, 2002). Technology helps people overcome barriers in time and distance and facilitates networking within and beyond one's own professional territory. Thus, technology enables individual and organizational goals to be achieved more efficiently and effectively.

*Communication.* Communication is critical to the successful implementation of knowledge management -- it helps people work together by sharing their ideas and knowledge. Communication supported by technology disseminates the values of an organization and shapes organizational behaviors. Communication fosters the sharing and transferring of ideas and knowledge that organization members possess, thus contributing to the accumulation of team and organizational knowledge (Petrides, 2002; Ross, 2005; Thomas, Kellogg, & Erickson, 2001).



*Problem-solving orientation.* A technology that successfully solves one problem might not offer the same advantage or solution to another problem. The selection of technology needs to be focused and attentive to the organizational vision. The selection should be driven by ascertaining the power of the technology to bring solutions to an organization (Lam, 2005; Smith et al., 2006).

*Up-to-date technology.* Technology is an enabler of knowledge sharing, transfer, and creation. Specific activities require a certain type of technology that can be uniquely applied to facilitate the activity. The selection of technology involves strategic decisions that affect organizational performance (Coulson-Thomas, 2003; Kermally, 2002).

*Storing knowledge.* Storing knowledge is a type of integration practice that involves capturing new ideas and knowledge inside of the organization. Once a best practice is identified and captured, this information should be shared with those who may benefit from it in the organization. Technology (e.g., an intranet-type system) may be used to facilitate this type of collaboration among members in the organization (Coakes et al., 2002).

In summary, technology applications are affected by individual and collective behavior patterns and activities. In other words, unless individual members in an organization understand the benefit of a technological application, they are unlikely to embrace it and use it to achieve organizational goals.

### *Measurement*

The literature defines measurement as an instrument to find appropriate metrics for effective and efficient knowledge management. Measurement, as a domain of knowledge management, serves to identify knowledge assets and capabilities of an organization and to align the measurement activities with organizational strategies (Freeze & Kulkarni, 2005). Measuring intangible assets such as intellectual capital or knowledge with traditional accounting or financial practices might produce distorted indications and costly errors. Although the means to measure knowledge and the achievement of knowledge management practices are yet to be perfected, measurement (in the literature reviewed) refers to the assessment methods of knowledge management and their relationships to organizational performance. In particular, measuring organizational performance should include a multitude of factors related to organizational culture and politics vis-à-vis financial operations and budget allocations (Gumport & Pusser, 1995; Leslie & Rhoades, 1995).

The fundamental assumption of most measurement models and practices adopted in higher education is that measurement plays a critical role in diagnosing the various problems, offering guides on planning and implementation, and utilizing the results to improve academic and administrative programs as a whole. Through these efforts, some measurement approaches attempt to identify optimal conditions and factors such as standardized test scores of students, financial resources, institutional performance, the role of governments and legislation, and the autonomy and involvement of faculty (Brown & Glasner, 1997; Palomba & Banta, 1999).

As stated previously, knowledge management can be assessed in four dimensions: customer, internal process, innovation and learning, and financial (Skyrme & Amidon, 1998). Although there has been skepticism of this type of measurement, benchmarking and allocating organizational resources are examples of these measurement methods. Pavitt (1992) states that systematic approaches are needed to evaluate processes and to allocate organizational resources. Boudreau (2003) stresses that measurement of knowledge management provides a scientific basis for decision making and reinforces links between knowledge and the competitive advantage of an organization. His study on knowledge management measurement focuses on the use of knowledge to create value by aggregating individual and organizational levels. He identifies three anchor points in knowledge management measurement: impact, effectiveness, and efficiency. The role of measurement is growing in tandem with teaching and learning relationships in higher education institutions, and measurement is seen as an integral part of the learning process (Strassmann, 1997). A new management approach with rigid measurement may be more likely to lead to strategic planning, program improvement, and quality assurance (Kaplan & Norton, 1996).

Knowledge management is an on-going process that involves many activities and processes, such as: diagnosis, design, implementation, knowledge creation, knowledge transfer, and knowledge sharing. Once knowledge management is implemented, the effectiveness or success needs to be examined. However, measuring knowledge management strategies may take time and may not occur in the early stages of implementing knowledge management (American Productivity & Quality Center, 2001).

### *Strategies of Measurement*

The review of the literature on knowledge management measurement suggests four key strategies: effectiveness, evidence-based decision-making, systemic evaluation, and integration.

*Effectiveness.* Turban and Aronson (2001) suggest three key reasons for evaluating the effectiveness in implementing knowledge management: providing a basis for organization valuation, forcing management to focus on important issues, and justifying investments in knowledge management. In order to gain and reinforce the support for implementing knowledge management, the investment must be shown to be cost worthy (Kermally, 2002; Truch, 2004).

*Evidence-based decision-making.* Measuring knowledge management based on factual evidence helps identify the nature and current status of an initiative. Measuring provides justification for modifying knowledge management initiatives and aligning them with strategic priorities of the organization (Smith et al., 2006).

*Systemic evaluation.* Systemic evaluation includes the on-going assessment of learning and innovative activities and relationships within the organization and the external community. Jennex and Olfman (2004), in comparing various frameworks for assessing the implementation of knowledge management, suggest that assessing knowledge management provides a tool for validating those factors responsible for successful implementation.

*Integration.* Effective measurement identifies opportunities for knowledge-based performance improvement. Measurement can be used to support people and/or activities that have potential for improvement. This type of constructive use of measurement can help people improve performance and increase their job satisfaction (Coulson-Thomas, 2003).

### **Concluding Thoughts and Implications for Practice and Future Research**

The results of the literature review suggest that organizations of both public and private sectors are facing increasing complexity and uncertainty for reasons such as: (a) knowledge and technology advancements are altering the source and mode of competition and social accountability; and (b) these phenomena in turn lead to the development of new strategies including new management practices. Higher education institutions have realized the increasing demands of managing their resources. As a result of this awareness, they have attempted to explore and apply business strategies and technologies in order to improve administrative and academic activities (Metcalf, 2006; OECD, 2003; Serban & Luan, 2002). These strategies are intended to create new knowledge and to change organizational structure and culture as a means to compete in the knowledge economy or knowledge-based society.

#### *Implications for Higher Education Leaders*

Similar to other ideas and trends that are imported from the business world, higher education leaders are apt to believe that knowledge management sounds good in theory, but how can it be put to practice? A starting point might be to use the four domains and their corresponding factors as a schema for the types of decision making that they face in their work roles. The following questions are offered to help higher education practitioners think about the practical applications of knowledge management based on each of the domains:

1. *Leadership.* Effective decision making, communicating, and assigning of tasks are dependent on quality data. How can knowledge management processes be used to ensure that decision making data are accurate, timely, and purposeful for making informed judgments?
2. *Culture.* Members within the organizational unit need to believe that sharing information and knowledge can benefit them. How can commitment be gained from employees? What must be done to create an open culture in which people are empowered, and in which personal and organizational goals are aligned with performance measures?
3. *Technology.* Higher education institutions are continually asked to do more with less. How can higher education leaders leverage resources to ensure that appropriate technologies and processes are best used to create, share, and transfer knowledge?
4. *Measurement.* Many higher education institutions are facing difficult fiscal constraints. Institutional performance is being monitored closely in order to justify funding expenditures. How can improved measurement processes be used to assure constituents about the impact, effectiveness, and the efficiency of a higher education institution and its units?

In practice, knowledge management processes must be able to help people perform better and add value to the organization. The strategies that are identified under each of these four domains provide a structure for systemically identifying and leveraging individual and organizational knowledge.

### *Implications for Future Research*

This research provides a conceptual framework that can help researchers examine knowledge management strategies in higher education contexts. Based on the literature review in this article, domains for knowledge management strategies are segmented in the categories of leadership, culture, technology, and measurement. Because the topic of knowledge management is new in higher education contexts, minimal research has been conducted that examines the planning, implementation, and evaluation of knowledge management in higher education. Further, a variety of quantitative studies are needed to examine knowledge management within the contextual nuances of higher education, using the framework of the domains of leadership, culture, technology, and measurement. Qualitative studies are also needed to provide thick descriptions of the contexts of higher education and examine ways in which knowledge management strategies are used to foster organizational change.

Higher education institutions are facing a variety of challenges that are rooted in the limitations and constraints of their fiscal and human resources. Colleges and universities need to continually address issues of efficiency and effectiveness in order to survive in competitive environments. Hopefully, this literature review provides a useful conceptual framework for future research that can explore applications of knowledge management in higher education contexts.

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