



The value creation cycle: moving towards a framework for knowledge management implementation

Nikhil Mehta¹

¹*School of Business and Industry, Florida A&M University, Suite 425-East Wing, One SBI Plaza, Tallahassee, FL, U.S.A.*

Correspondence: Nikhil Mehta, School of Business and Industry, Florida A&M University, Suite 425-East Wing, One SBI Plaza, Tallahassee, FL 32307, U.S.A.
Tel: +1 850 599 8353;
Fax: +1 850 599 3533;
E-mail: nikhil.mehta@famuedu

Abstract

Researchers have emphasized on the need for advances in knowledge management (KM) research to better understand how organizations accrue benefits from their knowledge resources. Thus, an integrated approach, rooted in the theoretical streams of knowledge-based view, KM and institutional theory, is proposed to explain how a successful KM program creates value. The approach discusses four organizational capabilities that firms need to develop simultaneously to create KM-enabled value, and identifies possible organizational actions to develop these capabilities. Various feedback and feed-forward processes, originating inside as well as outside the firm, integrate these capabilities into a KM-enabled value creation cycle (VCC). Key propositions were developed, and were examined with the help of three case studies. *Knowledge Management Research & Practice* (2007) 5, 126–135.
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Introduction

Knowledge is defined as a justified belief that influences an entity's capacity for effective action (Huber, 1991; Alavi & Leidner, 2001). Because of its complexity and inimitability, knowledge is being increasingly discussed as one of the most strategically important resources possessed by firms (Grant, 1996). Contemporary firms realize that as markets change, technologies proliferate, competitors multiply, and products exhibit compressed life cycles, managing their knowledge resources will develop competitive advantage (Conner & Prahalad, 1996; Prusak, 1996).

Firms implement dedicated knowledge management (KM) programs to integrate their knowledge resources, which exist in specialized pockets dispersed across the organization (Alavi & Leidner, 2001). However, the high failure rates of these KM programs have raised serious doubts about their value-creating potential (Garvin, 1993). This highlights the need for advances in KM research to better understand two key issues:

1. How do successful knowledge-managing firms create value?
2. Why do firms differ in terms of creating KM-enabled value?

An interesting reason behind KM failures is that firms typically lack enough 'knowledge' to implement a value-creating KM program (Gold *et al.*, 2001; Choi & Lee, 2002). This issue is addressed in this paper by discussing value creation cycle (VCC) as a framework for implementing a value-creating KM program. The VCC framework builds upon knowledge-based view (KBV) of the firm to develop a conceptual foundation imbued

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in *organizational capabilities* approach, which is then juxtaposed with past research in KM and institutional theory to identify strategic, technical, and institutional capabilities that firms need to develop simultaneously to implement a value-creating KM program.

VCC relates KM-enabled value creation to the development of four capabilities – *Articulating the KM Strategy*; *Facilitating Knowledge Flows*; *Enabling Innovation*; and *Assessing Value*. It is proposed that developing these capabilities will help firms (1) identify the strategic intent of their KM program; (2) develop appropriate infrastructures to enhance organizational knowledge flows; (3) align their institutional structures to improve knowledge flows thereby enabling innovation and value-creation; and (4) assess the creation of KM-enabled value.

The rest of the paper is organized in two parts. In part one, ideas from KBV and organizational capabilities perspective are integrated to develop the underlying principle of the VCC framework, which is then juxtaposed with pertinent inputs from literatures on KM and institutional theory to develop the VCC conceptual framework. Part two of the paper develops broad propositions from the VCC framework, and examines these propositions based on the insights gained from case studies of three global software companies. We conclude with the implications for KM research and practice.

Part one: VCC theoretical background

Knowledge-based view

One of the fundamental questions guiding strategic management research is how firms achieve and sustain competitive advantage (Teece *et al.*, 1997). Various theoretical perspectives have tried to answer this question. The resource-based view (RBV) of the firm is one such perspective. RBV assumes that firms are bundles of heterogeneously distributed resources (Penrose, 1959; Amit & Schoemaker, 1993). Based on this assumption, researchers have proposed that firms with valuable, rare, inimitable, and non-substitutable resources can create sustainable competitive advantage by implementing value-creating strategies that cannot be duplicated by competitors (Barney, 1991; Conner & Prahalad, 1996; Eisenhardt & Martin, 2000).

Based on the RBV, researchers have developed theoretical infrastructure to study competitive implications of firm's knowledge resources. KBV is one such effort. A rich confluence of long-established streams of research, such as organizational economics (Penrose, 1959), strategic management (Kogut & Zander, 1992; Conner & Prahalad, 1996; Grant, 1996), evolutionary theory (Nelson & Winter, 1982), philosophy and psychology (Burner, 1990; Spender, 1996), and organizational learning (Levitt & March, 1988; Huber, 1991), KBV defines the firm as a heterogeneous, knowledge-bearing entity that ideally manages its knowledge resources to create economic, social, intellectual, and cultural value (Prusak, 1996).

Penrose (1959) noted that the interaction between managers and organizational resources produces firm-specific knowledge that determines the firm's ability to take advantage of emerging business opportunities. Nelson and Winter's evolutionary theory of the firm, identifies knowledge as 'the genetic material of firms' (1982: 14), and defines the firm's *raison d'être* as to provide a context for the interaction of this knowledge with the economic reality of the markets. Firms that provide better context for knowledge-market interactions are able to convert their knowledge resources into economically useful products and services. Teece (1998) expanded Penrose's (1959) perspective by proposing that firm's knowledge resources underlie competences (integrated clusters of firm-specific assets), which further underpin firm's products and services. Thus, firms with better ability to create, transfer, and exploit their knowledge resources develop better competences and offer better products and services to the market.

Some researchers have contributed to KBV from the organizational capabilities perspective. Organizational capabilities are defined as socially complex routines that enable an organization to conceive, choose, and implement strategies (Barney, 1992; Collis, 1994). Kogut & Zander (1992), for example, proposed that firms serve as mechanisms of knowledge creation and sharing, and they develop combinative capabilities to recombine their existing knowledge resources and create new ones.

Issues discussed in the KBV literature help define the underlying logic of the VCC framework. It is proposed that firm's unique knowledge resources underlie its products and services, and successful knowledge-managing firms develop specific organizational capabilities to reconfigure their existing knowledge resources and to create new ones, which helps them develop new competences.

We now discuss pertinent literature in KM and institutional theory, to identify four organizational capabilities needed to create KM-enabled value. In doing so, we build upon the VCC's underlying principle derived above.

Knowledge management

KM literature in the last decade has shaped two perspectives of the field – taxonomic and process (Hansen & Haas, 2001; Orlikowski, 2002). We discuss relevant studies in each of these perspectives to develop normative prescriptions for KM-enabled value creation.

Taxonomic perspective

Taxonomists have proposed various classifications of organizational knowledge. Nonaka (1994), for example, augmented Polanyi's (1967) classical distinction between tacit and explicit dimensions of knowledge to interpret tacit knowledge as unarticulated, rooted in experience, and highly contextual, and explicit knowledge as more precise and formally articulated but less contextual than the tacit one. Spender (1996) extended Nonaka's ideas by

including an individual/social dimension to identify four separate knowledge categories. He also proposed that firms require different strategies for managing different types of knowledge.

Extending Spender's idea of KM strategy, Zack proposed three knowledge types: core knowledge (minimum knowledge required to stay in business); advanced knowledge (which enables competitive viability); and innovative knowledge (which enables competitive advantage) (1999a: 133), and argued that comparing existing knowledge in these categories with firm's future knowledge requirements would highlight potential knowledge gaps, which should guide firm's KM strategy.

The taxonomic literature is prominent by its key idea that organizational knowledge exists in multiple flavors and, given this multitude, firms need a clear strategy to manage it. Based on this idea, we propose 'Articulating the KM Strategy' as the first capability that firms need to develop to create KM-enabled value. The *Articulating* capability helps firms define their KM strategy in light of their corporate strategy (Bennett & Gabriel, 1999; Zack, 1999a; Sher & Lee, 2004). Another advantage of the *Articulating* capability is that by identifying specific objectives for the firm's KM program, it prevents firms from mistaking the KM program as a panacea for all its problems.

In their efforts to develop this capability, firms need to first identify their 'strategic knowledge gaps,' which represent the disparity between firm's existing knowledge resources and the knowledge resources required by the firm to successfully exploit future opportunities (Zack, 1999a). Once the strategic knowledge gaps are uncovered, firms need to develop a clear strategic roadmap to fill these gaps by reconfiguring their existing knowledge resources, and creating new ones. Thus, a fully developed

Articulating capability in firms would connote a robust KM strategy that clearly identifies the strategic knowledge gaps and the ways to fill them.

Despite its early benefits, a developed *Articulating* capability cannot translate into value by itself. So, in the VCC framework, the *Articulating* capability is at the low end of potential value continuum (see Figure 1). But, as an antecedent to other capabilities, it defines the blueprint of their development. Thus, an undeveloped *Articulating* capability can retard the development of other capabilities, and thus, the value-creating potential of firm's KM program.

Process perspective

The process perspective of KM literature focuses on organizational knowledge flows. Research in this stream identifies a dynamic set of activities, called KM processes, which improve firm's knowledge flows. Conceptual studies in process-based literature discuss four generic KM processes: knowledge storage, knowledge transfer, knowledge application, and knowledge creation (Alavi, 2000). Knowledge storage involves converting firm's knowledge resources into knowledge units, which are 'formally defined, atomic packets of knowledge content that can be labeled, indexed, stored, retrieved, and manipulated' (Zack, 1999b, p. 48), and storing these units in a usable format. Knowledge transfer includes moving these units across the length and breadth of the firm as per their need, while application and creation entail utilizing those knowledge units as well as creating new ones.

Recent process-based studies have discussed the importance of various infrastructure-related issues, affecting KM processes (Alavi & Leidner, 2001; Gold *et al.*, 2001; Lee & Choi, 2003). Studies have reported that firms

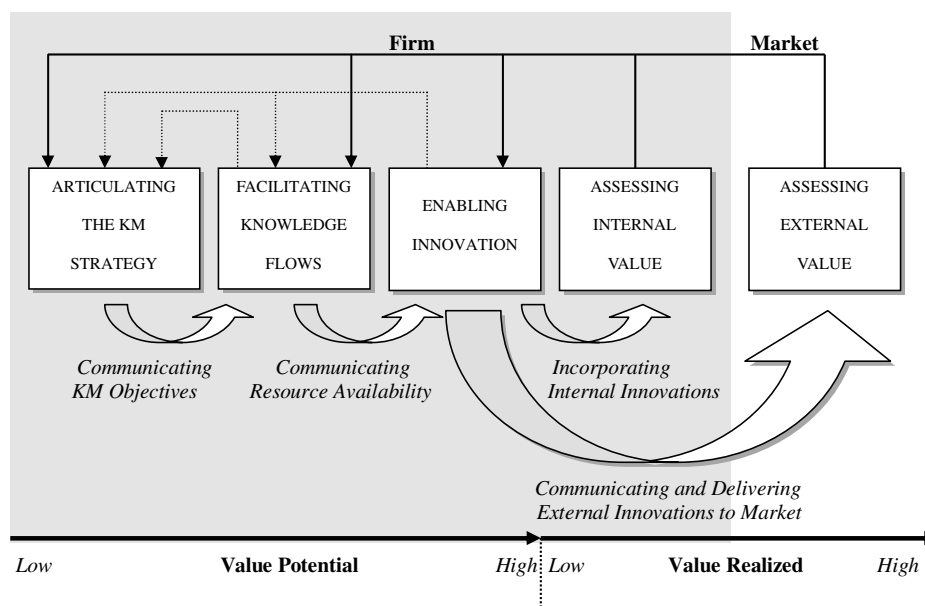


Figure 1 Value creation cycle.

that overcome infrastructure-related challenges and initiate appropriate KM processes improve creativity, innovativeness, and financial performance (Gold *et al.*, 2001; Soo *et al.*, 2002; Lee & Choi, 2003).

Extending the ideas propounded by the process perspective, we propose '*Facilitating Knowledge Flows*' as the second VCC capability firms need to develop. Firm's KM strategy needs to guide the development of *Facilitating* capability, which entails initiating appropriate KM processes to improve knowledge flows, and building appropriate human and technical infrastructures to support these processes. The knowledge flows, improved by the *Facilitating* capability, enhance firm's efforts to fill its strategic knowledge gaps (Sher & Lee, 2004).

The need for human infrastructures involving a set of new roles and responsibilities is highlighted by the fact that KM programs usually involve cross-functional and cross-organizational processes, and traditional organizational roles are unable to manage their scope (Zack, 1999b). Thus firms typically gather a central knowledge team, and create KM roles within each business unit (e.g. knowledge champions) to coordinate the unit's KM activities with the central team (Prusak, 1998).

Technical infrastructure connotes various IT-based artifacts and applications required to support the KM processes (Sher & Lee, 2004). Typical elements of the technical infrastructure include a KM system (artifact) supporting following KM applications (Gold *et al.*, 2001):

- Knowledge storage applications (like electronic knowledge repositories) allow firms to consolidate their explicit knowledge resources.
- Collaborative and distributed learning applications (like e-mail, Lotus Notes, corporate intranets, online discussion forums) help people within the organization communicate across structural and geographical boundaries.
- Knowledge discovery applications (like data mining software) help organizations configure knowledge hidden in their data warehouses.

Firms with a developed *Facilitating* capability would typically have appropriate human and technical infrastructures supporting the knowledge storage and transfer processes. It is difficult to initiate the knowledge application and creation processes within the domain of *Facilitating* capability. Knowledge application and creation require improved knowledge flows, and the 'knowledge push' effect created by developing the *Facilitating* capability might not ensure that. To improve knowledge flows, firms need to elicit 'knowledge pull – a grassroots desire among employees to tap into their company's intellectual resources' (Hauschild *et al.*, 2001, p. 76). Derived from the tenets of institutional theory, the third capability – *Enabling Innovation*, addresses this issue.

Institutional theory

Institutional theory proposes that the behaviors of firm's employees are guided by firm's norms, values, and culture (Purvis *et al.*, 2001). Thus, norms, values, and culture

shape the institutional structures such as organizational routines, rules, regulations, and procedures, which further shape individual behavior (Orlikowski, 1992). Extending this principle, we propose that firms elicit the 'knowledge pull' behavior from employees by developing the third VCC capability – *Enabling Innovation*, which is developed by realigning a firm's institutional structures in light of its strategic knowledge gaps identified by the *Articulating* capability. Firms realign their institutional structures by (DeLong & Fahey, 2000):

Reshaping assumptions about the importance of knowledge: Organizational values, norms, and practices define underlying assumptions shaping employees' perceptions towards firms' knowledge resources. Successful knowledge managing firms reshape these assumptions to facilitate knowledge application and creation processes.

Creating favorable context for knowledge exchange: Organizational norms and practices also define the context for knowledge exchange (Sackmann, 1991). Successful knowledge managing firms encourage the application of existing knowledge resources and creation of new ones by reshaping the rules, expectations, rewards, and penalties of knowledge exchange (Trice & Beyer, 1993).

Reformulating the relationship between individual and organizational knowledge: Organizational culture determines the ownership of knowledge, thus affecting its flow across the organization. Often, a firm's norms support individual ownership of knowledge, which discourage its diffusion (DeLong & Fahey, 2000). Successful knowledge managing firms discontinue the practices that encourage knowledge hoarding and promote ones that support knowledge sharing, especially in the areas identified by the strategic knowledge gaps. Supportive practices include (1) leaders exhibiting new behaviors to communicate the shift; (2) initiating organizational learning mechanisms like reflective sessions and peer reviews; and (3) punishing knowledge hoarding behaviors while simultaneously rewarding knowledge sharing ones (Miles *et al.*, 1998).

Firms that develop the *Enabling* capability typically elicit knowledge pull behavior from their employees, thereby improving organizational knowledge flows. Improved knowledge flows help firms reconfigure their existing knowledge resources and creating new ones, thus filling their strategic knowledge gaps. By filling their strategic knowledge gaps, firms develop new competences (new combinations of resources), which begets internal as well as external innovation (Penrose, 1959; Demsetz, 1991; Kor & Mahoney, 2004). Firms incorporate internal innovations (e.g., process improvements) to create internal value, and communicate and deliver external innovations (e.g., better products and services) to the market to create external value (Kogut & Zander, 1993; Davenport & Prusak, 1998; Szulanski, 2001). Value thus created can be:

- economic, such as cost savings from innovative processes (internal); higher profits from improved products and services (external);

- social, created in the form of tightly coupled networks with business partners (e.g., with suppliers);
- intellectual, which includes better appreciation of the projects, brands, patents, and trade secrets; and
- cultural, for example by improving firm's human focus (Miles *et al.*, 1998).

Both internal as well as external value need to be assessed, and successful knowledge-managing firms develop the fourth VCC capability – *Assessing Value* to do that. Building the *Assessing* capability involves developing direct as well as indirect measures of value assessment. Both measures are appropriate for assessing economic value, while indirect measures are better suited to assess alternative forms of value (e.g., social value, intellectual value, and cultural value). Firms with a developed *Assessing* capability exhibit expertise in using both direct and indirect measures to assess economic, social, intellectual, and cultural value created within and outside.

VCC: conceptual model

This section presents the conceptual framework and discusses inter-relationships between its parts. Figure 1 illustrates possible interdependencies between the four capabilities – *Articulating the KM Strategy*, *Facilitating Knowledge Flow*, *Enabling Innovation*, and *Assessing Value*. The feed-forward and feedback arrows intertwine these capabilities into a logical framework, which is summarized below.

The *Articulating* capability helps a firm identify its strategic knowledge gaps, which reflects the divide between a firm's existing knowledge resources and its future knowledge requirements. The objective of KM programs is to fill these gaps. The *Facilitating* capability improves organizational knowledge flows by establishing human, technical, and procedural infrastructures to convert knowledge resources into knowledge units and making them available to employees. The *Enabling* capability improves a firm's knowledge flows, leading to utilization of its existing knowledge resources and creation of new ones, thus filling the firm's strategic knowledge gaps and fuelling innovation. Incorporating internal innovations creates internal value, while external innovations are delivered to market for external value. The *Assessing* capability helps evaluate both internal and external value.

The arrows in the upper portion of VCC framework represent the feedback communication processes that carry the insights gathered via the *Assessing* capability. These communication processes are well researched as organizational learning in various books (Nonaka & Takeuchi, 1995; Brown & Duguid, 2000) and special themed issues of *Organization Science* (1991) and *California Management Review* (1998). The light dotted arrows represent secondary feedback communication processes that transfer experiential insights gained within the firm throughout the KM implementation, and play a

critical role in the future evolution of the capabilities. The VCC framework also includes the feed-forward arrows that illustrate various communication and delivery processes between adjacent constructs.

To summarize, the VCC framework proposes that firms create KM-enabled value by:

- simultaneously developing the proposed capabilities and their related routines, and continually improving them to fill strategic knowledge gaps, thus stimulating innovation;
- incorporating internal innovations to create internal value, and communicating and delivering product and service-related innovations to the market, thus creating external value; and
- using various feedback and feed-forward routines to reinforce the future iterations of this value-creating cycle.

Part two: validating the VCC framework

VCC proposes that KM-enabled value creation depends on the level to which the four capabilities are developed. In a firm, these capabilities can typically be either undeveloped or developed (Grant, 1996). Table 1 displays possible inter-relationships among these two development levels, and the resulting system states. A reference label is added to illustrate the firms belonging to each of these system states. A caveat regarding the reference labels – they are at best a rudimentary indicator of firms undergoing various stages of KM implementation.

The underlying assumption guiding various inter-relationships is that outputs from the antecedent capability have implications for the development of the subsequent capability. For example, for firms labeled as 'Interested', the *Articulating* capability is developed (see Table 1), but the *Facilitating* capability is either undeveloped or developed. In the former case, the *Enabling* capability is typically undeveloped, while in the latter case, it can be either undeveloped or developed.

The systems states were used to develop broad propositions (see Table 2), which were examined with the help of a multiple-case research design involving KM programs in three capability maturity model Level 5 accredited global software firms. The KM program was the unit of analysis, and KM-enabled value creation was the dependent variable. The four capabilities were treated as the constructs.

The three firms were selected because at the time of this study their respective KM programs were in different stages of implementation, thereby representing a broad spectrum of the KM implementation process. For example, Firm 1 was preparing to formally launch its KM initiative. Firm 2 had begun its KM program 2 years ago and was implementing early stages of the program, while Firm 3 had initiated its KM program 4 years ago and had successfully implemented various stages of the program. As a result, Firm 3 was recognized as a Globally Most Admired Knowledge Enterprise for years 2004 and 2005.

Table 1 VCC system states

Capabilities				Value created	Label	Firm
Articulating	Facilitating	Enabling	Assessing			
Undeveloped	Undeveloped	Undeveloped	Undeveloped	None	Inefficient	1
Developed	Undeveloped	Undeveloped	Undeveloped	None	Inefficient	1
Developed	Developed	Undeveloped	Undeveloped	Low	Interested	2
Developed	Developed	Developed	Undeveloped	Moderate	Intelligent	3
Developed	Developed	Developed	Developed	High	Innovative	3

Table 2 Theoretical predictions from variance perspective

Proposition 1	<i>Firms with undeveloped Articulating, Facilitating, Enabling, and Assessing capabilities will fail to create KM-enabled value.</i>
Proposition 2	<i>Firms with developed Articulating capability but undeveloped Facilitating, Enabling, and Assessing capabilities will fail to create KM-enabled value.</i>
Proposition 3	<i>Firms with developed Articulating and Facilitating capabilities, but undeveloped Enabling and Assessing capabilities will create low KM-enabled value.</i>
Proposition 4	<i>Firms with a developed Articulating, Facilitating, and Enabling capabilities, but undeveloped Assessing capability will create moderate KM-enabled value.</i>
Proposition 5	<i>Firms with developed Articulating, Facilitating, Enabling, and Assessing capabilities will create high KM-enabled value.</i>

Table 3 People interviewed in each firm

Firm	People interviewed
1	<ul style="list-style-type: none"> • General Manager (KM Initiative): Second in KM hierarchy after theCQO. • Senior Quality Consultant: Third in KM hierarchy. • Knowledge Manager: Fourth in KM hierarchy. • Manager (Talent Engagement & Development): The last in KM hierarchy. • Two System Managers: To get the users' perspective.
2	<ul style="list-style-type: none"> • COO: Envisaged the KM initiative. • CQO: The head of KM initiative. • Two Senior Quality Managers: Next in KM hierarchy. • KM Technical Head • General Manager (Enterprise Services Division): To get users' perspective.
3	<ul style="list-style-type: none"> • CKO • General Manager (Research) • KM Technical Head • KM Brand Manager • Associate Vice-President (Operations) and Program Manager (Software Engineering Process Group): Responsible for developing core KM processes and synchronizing them with the core software engineering processes. • Two business managers: To get the users' perspective. They headed one of the largest business divisions and one of them was a strong critic of the KM program.

Data for this study were collected over a period of 6 months, of which the first 3 months included conducting 20 on-site interviews of various stakeholders of the respective KM programs. Interviews typically lasted between 45 min to 2 h. Table 3 consolidates a list of respective people interviewed at each firm. An interview guide (see Appendix) was used in most interviews. The interviews were supplemented with information from company websites, selective KM project reports, and other documents.

Periodic updates were then received through telephonic interviews over the next 3 months. The reason data were collected over a 6-month period because two of the firms were expecting to achieve key implementation milestones beyond the first 3 months of data collection. Firm 1 developed the *Articulating* capability to shift from category 1 (Inefficient) to category 2 (Interested), while Firm 3 developed the *Assessing* capability to move from category 4 (Intelligent) to category 5 (Innovative).

Data analyses involved preparing manuscripts of all interviews, followed by content analysis of each case to identify specific micro issues typical to each firm. Those issues were then used to cross-compare the three cases to identify commonalities at a macro level. In the next few sections, we discuss the insights thus gained, and use those insights to support appropriate VCC propositions.

Firm 1

During the first 3 months of data collection for this study, the chief quality officer (CQO) of Firm 1 was contemplating about implementing a KM program, and had discussed his vision of the program with other members of the top management. The CQO wanted the KM program to improve knowledge sharing among project teams distributed across firm's ten global locations. Thus, the CQO had identified a strategic knowledge gap, and although the top management had begun its deliberations about developing a KM strategy to fill this gap, a clear roadmap for KM implementation was still missing. Thus, with none of the VCC capabilities developed, Firm 1 was a long way from creating KM-enabled value. This supports the first VCC proposition that *firms with undeveloped Articulating, Facilitating, Enabling, and Assessing capabilities will fail to create KM-enabled value.*

Nearing the end of this study, Firm 1 had articulated a clear KM strategy boasting of an ambitious plan to improve knowledge sharing among project teams at its global locations with the help of a dedicated KM system. Interestingly, the firm did not appoint a new chief knowledge officer (CKO) to guide the KM implementation, and instead assigned the responsibility to the CQO. A General Manager (KM) was appointed under him. A senior quality consultant was also shifted to the KM function, and a newly appointed knowledge manager supported him. The firm was in the process of appointing a KM technical head to develop the KM system. Despite having a KM team in place, the structure of the team was not suitable for the KM function. For example, the CQO had instructed the quality consultants to 'spare some time from their regular quality consultants for KM activities.' So, although the firm had developed its *Articulating* capability, that is, it had a clear idea of its strategic knowledge gaps, and had a KM strategy to fill those gaps, it was yet to develop the *Facilitating, Enabling, and Assessing* capabilities to implement the KM strategy. Thus, Firm 1 was still unable to create KM-enabled value, which supports the second VCC proposition that *firms with developed Articulating capability but undeveloped Facilitating, Enabling, and Assessing capabilities will fail to create KM-enabled value.*

Firm 2

The KM initiative of Firm 2 was envisaged by its chief operating officer (COO) with the objective of strengthening the sales function to improve the success rate of winning new projects. Top management was enthusiastic

about the initiative, which helped Firm 2 develop a clear KM implementation strategy. Similar to Firm 1, KM implementation responsibility was assigned to the CQO, who was assisted by two senior quality managers and a technical head. Additionally, 'knowledge champions' were appointed in each business unit. They were asked to align the corporate-level KM efforts to the unit's business plan.

On the technical front, a KM portal was added to corporate intranet, with four IT-based applications added to its back end. They included: a customer module (to capture basic information about firm's clients); a proposal module (a database for all sales proposals); a project management module; and a document management module. Thus, Firm 2 had developed its *Articulating* and *Facilitating* capabilities.

At the time of data collection for this study, Firm 2 had begun to populate the proposal module, and early results of its contribution were visible. All account managers were asked to enter details of their sales proposals to potential clients in the proposal module, which tracked the proposal through different stages. The module also displayed various proposals being developed at a time, and did not allow multiple business units to develop new proposal for the same client. If the project was landed, the details were extended to the project management system. As a result, the proposal development function at Firm 2 was streamlined and integrated with the project management function. Despite initial successes in populating the proposal module, the usage rates of the module remained abysmally low. This was because Firm 2 still lacked KM-supportive institutional structures. Thus, employee participation in the KM program remained stagnant, which curtailed the utilization of the proposal module, as well as the other modules. In selective business units, where knowledge champions encouraged account managers to use the modules, the quality of new proposals improved substantially. Those units also improved their project-winning rates significantly.

Thus, Firm 2 was yet to meet its cherished organizational goal of increasing the success rate of winning new projects. This supports the third proposition that *firms with developed Articulating and Facilitating capabilities, but undeveloped Enabling and Assessing capabilities will create low KM-enabled value.*

Firm 3

KM implementation at this firm was guided by a KM steering committee that comprised of all members of the top management. The steering committee developed a KM strategy that was guided by two issues closely related to firm's corporate strategy: (1) improving organizational knowledge flows and (2) developing technical competence in the areas of ERP, e-commerce and telecommunications to exploit future business opportunities in these domains.

The steering committee then appointed a CKO, who developed a dedicated eight-member KM team with

clearly defined roles regarding content management, technical support, and promoting the KM program across the organization. Knowledge champions were also appointed in various business units to promote the KM program in their respective units.

As part of developing the technical infrastructure, new KM applications were developed and were consolidated with existing standalone applications that employees had developed over the years. These included a knowledge repository, a technical bulletin forum, a process assets database, a project leader toolkit, and a marketing assets repository. A front-end KM portal, with these applications attached to its back-end, was added to the corporate intranet.

The KM program was launched with fanfare. Seminars and presentations were held at all global locations. Technical quizzes were conducted, monetary prizes were awarded, and stock market trends and live game scores were constantly flashed on KM portal to attract its first-time use. A novel incentive scheme was introduced – users of the portal were asked to award quality points, called knowledge currency units (KCU), to the authors of documents they accessed. These authors could exchange the KCUs for books, music, and other products from an e-commerce company. This scheme helped initiate core KM processes of storage and transfer.

To develop its *Enabling* capability, Firm 3 adopted a multi-pronged strategy to influence organizational norms, values, and culture to elicit knowledge-pull from employees and to improve organizational knowledge flows. The strategy involved:

Ensuring recognition: In an organization of nearly 30,000 people, need for recognition emerged as a strong motivator for employees. A scoreboard was added on the KM portal displaying the top-nine submissions to the KM system. The names of winning employees were also highlighted in corporate communications every month.

Highlighting benefits: Addressing a still higher level of employees' needs, the KM group started publicizing initial benefits of knowledge sharing and application.

Compulsory sharing and application: The firm understood that strong behavioral issues were attached to mandatory sharing and application. So they initiated mandatory sharing and application in areas where the information being shared had a low 'knowledge' component. Project management was one such area. An integrated project management application was developed and project managers were asked to provide experiential project-related knowledge during various project stages. At the end of the project, the document was uploaded as a project snapshot to the KM portal.

Developing new knowledge-creation units: Two such units, Domain Competence Group (DCG) and Technology Competence Group (TCG), were created. These units developed technical and domain-specific knowledge in the areas of ERP, e-commerce, and telecommunications. By creating these units, the top management of Firm 3

shared the employees' responsibility to create new knowledge, which conveyed to the employees the seriousness of top management's KM plans.

To summarize, Firm 3 had a robust KM strategy, which provided initial momentum to the KM program. KM processes, human and technical infrastructures, and KM-supportive institutional structures sustained this momentum to facilitate innovation at Firm 3. For example, as a result of the KM program, the firm was able to develop new competences in the domains of ERP, E-commerce, and telecommunications. But, the firm still lacked robust measures to assess the value created as a result of these KM-enabled innovations – a fact that hindered future resource allocations to the KM program. This supports the fourth VCC proposition that *firms with developed Articulating, Facilitating, and Enabling capabilities, but undeveloped Assessing capability will create moderate KM-enabled value.*

Later, Firm 3 developed a robust set of KM value assessment measures. For example, the quality metrics of high knowledge-sharing projects were compared with those of average knowledge-sharing projects. The results indicated a 15% less defect rate in high knowledge-sharing projects. These projects were also found 13% lower on cost of quality metrics. It was also observed that high knowledge-sharing projects saved over 4 man-days per person per year as a direct benefit of knowledge reuse. Such feedback reinforced future iterations of the VCC by enabling resource allocation to the KM program, thereby helping Firm 3 create high levels of KM-enabled value. This supports the last VCC proposition that *firms with developed Articulating, Facilitating, Enabling, and Assessing capabilities will create high KM-enabled value.*

Implications and future research

This study makes some novel contributions to the emergence of KM theory. First, it presents the underlying logic of KM-enabled value creation in terms of specific capabilities organizations need to build to benefit from their knowledge resources. In doing that, this study relates firm's capacity to develop these capabilities to its value-creating potential. In other words, by proposing this relationship, this study sets a foundation for future research aimed at measuring KM-enabled value creation.

Second, the discussion of VCC framework integrates three theoretical streams – KBV, KM, and institutional theory. In doing that, this study interlinks these fields and provides opportunities for future interdisciplinary research, especially in developing KM theory. The five propositions developed in the study also provide a useful start for the development of value propositions in KM. Future research can utilize the five propositions to develop testable hypotheses and investigate the legitimacy of VCC framework through detailed empirical investigation. As an illustration, we deduce two such hypotheses from Proposition 3. The proposition suggests that given fully developed *Articulating* and *Facilitating* capabilities, a firm's ability to create value will be

constrained by yet undeveloped *Enabling* and *Assessing* capabilities. We consider a small subset of this proposition related to the 'Enabling Innovation' and 'Facilitating Knowledge Flows' constructs to formulate the following hypotheses:

Sample Hypothesis 1 *Efforts to develop a shared context across the firm (Enabling capability) will be more fruitful when a firm has created knowledge roles with clear responsibilities and accountabilities (Facilitating capability).*

Sample Hypothesis 2 *Efforts to develop a shared context across the firm (Enabling capability) will be more fruitful when a firm has extensive IT-based KM applications (Facilitating capability).*

This study also offers some key implications for practitioners. First, the VCC framework clears confusion regarding the role of various technical, institutional, and cultural factors in a value-creating KM implementation. The framework thus provides dual benefits of presenting an integrated view of KM implementation, while identifying specific actions to be undertaken, and the resulting level of value-creation. As an extended benefit, executives could utilize the VCC framework to judge the current status of their KM project, and to diagnose possible reasons for low levels of value creation.

Second, VCC addresses the differences in the degree of KM-enabled value creation across firms. It relates the differences in value-creation to the degree of development of the four capabilities. Clear benchmarks for building each capability will improve the accountability of executives implementing the KM program.

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Finally, the VCC framework highlights the cyclical nature of KM implementation. Executives may use insights gained in earlier iterations of VCC to fine-tune the future ones. Within a single iteration, executives can also use insights gained by developing subsequent capabilities to modify the antecedent ones.

Conclusion

This research has contributed to KM theory by conceptualizing a KM implementation framework with a theoretical foundation. Using a combined theoretical lens of KBV, KM, and institutional theory, VCC framework identifies the theoretical and practical requirements of a value-creating KM implementation. The framework posits that a value-creating KM implementation requires developing organizational capabilities supported by various communication and delivery routines. Firms that develop the capabilities proposed by the theoretical framework are able to reconfigure their current knowledge resources and create new ones to fill their strategic knowledge gaps. This stimulates innovations, and utilizing these innovations creates value.

Advancement in a theoretical standpoint is not possible without embracing it as a continued effort. With VCC, we hope to contribute to the development of a robust knowledge-based theory of the firm. We expect VCC to achieve this objective by provoking minds versed in diverse research traditions to nourish or negate its rationale. We also hope that the future research would, in the words of Spender & Grant, lead us to a 'paradigmatic gateway, the point in the evolution of our field where we move towards a notion of firms as constituting knowledge-creating processes and being reconstituted by these processes' (1996: 9).

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Appendix: A partial list of open-ended questions:

For the KM heads of the firms

1. Did you initially start with a KM strategy/framework/model?
2. What process have you adopted for KM Implementation?
3. What is/are the objective(s) of the KM initiative?
4. What kind of implementation-related problems are you facing?
5. Why do you think these problems exist?
6. Do you have a KM team? How is it structured?
7. Does the KM initiative focus more on the technology component or the human component?
8. How would you assess the KM-friendliness of your corporate culture?
9. Did the KM initiative play an active role in improving firm-wide knowledge transfer?
10. Did the KM initiative improve knowledge generation across the firm? If yes, how?
11. Are some specific business units more actively involved in the KM initiative? What are some of the preliminary benefits the units have accrued?
12. What kind of KM-performance measures you intend to develop in the future?

For the technical heads in the respective KM teams

13. What kind of KM architecture have you adopted?
14. What are various KM technologies and applications?

For the users

15. How would you assess the commitment of top management to the KM initiative?
16. Any perceived benefits of the KM program in general, and KMS in particular?

For the KM brand manager in Firm 3

17. What are various efforts that you've adopted to popularize the KM initiative?

For the Associate Vice-President (Operations) and Program Manager (Software Engineering Process Group) in Firm 3

18. How did you arrive at the decision of keeping some KM processes voluntary and while making others mandatory to the employees?

For the senior quality managers and senior quality consultant in Firms 1 and 2

19. How are you trying to integrate your Six Sigma projects with your KM initiative?

integration in information systems teams, and IT outsourcing. Nikhil has presented his work at *International Conference on Information Systems* and the *Academy of Management* meeting. His articles are forthcoming in *Journal of Knowledge Management* and *Journal of Information Technology*.

About the author

Nikhil Mehta is an Assistant Professor in the School of Business and Industry at Florida A&M University, Florida, USA. He received his Ph.D. in Management Information Systems from Auburn University, Alabama, USA. His research interests include knowledge management theory, knowledge

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