The Missing Capabilities of Knowledge Management:

Segmentation and Destruction

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Abstract

Successful knowledge management in a competitive business environment requires an organization to possess certain capabilities - create, transfer, store, retrieve and apply knowledge. Traditionally, an organization can claim capability in knowledge management if it can execute these activities with rigor, clarity, effectiveness, and efficiency. Yet, the importance of having and maintaining balance among the five capabilities of knowledge management is not contested. In fact, the importance of these capabilities is well-established and over-analyzed. Yet, almost no piece of literature spends adequate time investigating the two capabilities missing from most knowledge management programs. This paper discusses two missing capabilities that require management and scholarly attention: segmentation and destruction. These capabilities complement and augment their peer capabilities and furthermore, if an organization neglects these three capabilities, the benefits of their knowledge management program will be limited. Organizations that consider the missing capabilities have witnessed significantly improved knowledge management programs compared to when the capabilities were missing from their agenda.

Successful knowledge management in a competitive business environment requires an organization to possess certain capabilities. In particular, the organization must be able to create, transfer, store, retrieve and apply knowledge. Traditionally, an organization can claim capability in knowledge management if it can execute these activities with rigor, clarity, effectiveness, and efficiency. There is a rich and extant literature on the five major capabilities (creating, transferring, storing, retrieving, and applying) and this devotion is entirely justified. Creating knowledge is a significant aspect of any knowledge management program. If an organization cannot create knowledge by examining data and pieces of information and by harvesting information from the expertise of its agents, there will nothing to manage. Once created, the next logical steps are to transfer, store, and retrieve the knowledge. Without these three components, it will be difficult for an organization to ensure knowledge generated in one sector of the organization or at unique time is transferred to another sector and available for future use. It will also be difficult for the organization to ensure agents who need requisite knowledge are able to retrieve and apply it efficiently and effectively. Unless an organization can demonstrate competency in these five activities, it's knowledge management program is incomplete and likely flawed. Often an organization excels at one activity and is hopeless in another. For example, if an organization has a sophisticated storage mechanism in place, but fails to generate or create knowledge, the storage mechanism is useless—they will have no knowledge to store! This type of imbalance among the five capabilities will cause serious problems for any organization in the future.

Yet, the importance of having and maintaining balance among the five capabilities of knowledge management is not contested. In fact, the importance of these capabilities is well-established and over-analyzed. Yet, almost no piece of literature spends adequate time investigating the two capabilities missing from most knowledge management programs (Desouza, 2004; Desouza & Awazu, 2005).

This paper discusses two missing capabilities that require management and scholarly attention: segmentation and destruction. These capabilities complement and augment their peer capabilities and furthermore, if an organization neglects these three capabilities, the benefits of their knowledge management program will be limited. Our research and consulting experience has enabled us to identify leaders and laggards in knowledge management by how well they attend to these missing capabilities. Organizations that consider the missing capabilities have witnessed significantly improved knowledge management programs compared to when the capabilities were missing from their agenda.

What are Capabilities?

There is extensive literature discussing capabilities in strategic management, economics, and organizational behavior. Yet, the wealth of literature does not provide clear answers to the basic questions of knowledge management. We could not find a single integrative definition of organizational capabilities. So, rather than providing a review of the existing literature, we will instead explain our concept of *capability*. This concept follows most closely the work of, renowned strategic management and economics scholar, David Teece (Teece et al., 1997). Consider an organization as a collection of resources and capabilities. Resources in the form of assets are static and represent any entity in

possession or control of the organization: physical machinery, land, labor, capital, and expertise. Capabilities are the routines or processes that use or leverage assets. For example, a farmer can use a piece of machinery to prepare the soil. Using the machinery to impact the value of the soil is a capability. Similarly, if a software engineer can put his knowledge to use and create a technology artifact, he has a capability in knowledge application. Capabilities are dynamic and are applied to assets. An organization must have a collection of capabilities it can deploy to extract value from it's assets. Capabilities put assets to work.

Yet, simply possessing capabilities is not enough; competitive success demands mature capabilities. Mature capabilities are experienced, rigorous, highly effective and efficient. This maturity is what makes capabilities highly valuable. Many kids in Western Europe or the Middle East aspire to becoming great football players. Playing football demands a certain set of capabilities: ball handling skills, stamina, physical maneuvering skills, strong leg muscles, and knowledge of the game. If a youngster possesses all the capabilities required to play football and can even fair well on the field, it doesn't necessarily mean that he will play for a high-caliber club like Manchester United or Real Madrid. Playing for a world-class football club at that level demands an athlete to demonstrate a high level of maturity in their football capabilities. It is not sufficient just to have capabilities, one must excel in them. Certainly, having capabilities is better than *not* possessing them and yet, in a competitive environment, merely possesses capabilities is not sufficient. Some organizations have mature product development capabilities but poor marketing capabilities; others may face the opposite situation. Maturity of a one capability is of limited value, especially if all other capabilities are poor or weak. For

instance, it is of little value to have an excellent marketing capability but poor capabilities in product development, research and development, or customer service. Capabilities mature over time, experience, and through the accumulation of knowledge. Athletes improve by training, watching tapes of previous games to uncover strengths and weaknesses, playing matches, and learning from their peers. Like an athlete, an organization must constantly improve its capabilities by infusing them with timely knowledge and by learning from past deployments of the capability.

The nature of capabilities possessed by an organization differentiates it from others in the environment. Dell, for instance, has a mature supply chain management capability. This capability helps Dell differentiate itself from its competitors and moreover, it makes for the underlying value proposition of Dell Computers. Dell is known for not carrying an inventory and for making computers to orders in a timely and effective manner. Similarly, McDonalds is known for its capability in preparing low-cost meals in a timely manner. Why does Dell lead in customized computer production and why has McDonalds retained its position as the fast-food leader? The answer lies in the organizations' ability to manage knowledge in and around their capabilities. McDonalds operates on a franchise model. In order to do so, they must be successful in transferring their fast-food expertise from headquarters to the new locations. In addition, they must be able to learn from the local operations of franchises and transfer such knowledge to the other locations. McDonalds must be able to conduct a variety of knowledge management activities effectively and efficiently and their proficiency with knowledge transfer activities makes the overall corporation more successful. Success in conducting

knowledge management can have a positive effective on the maturity of other organizational capabilities.

Segmentation Capability

To *segment* is to separate out or to classify into. Consider management approaches for traditional assets, physical machinery for example. It is rare to find organizations managing physical machinery haphazardly. We seldom see photocopiers lying idle, printers on the floor, fax machines stored with cleaning equipment, or desks hanging from the ceiling. Structured management approaches are more common when it comes to caring for physical equipment. Management will first segment equipment into its designated classes: office furniture, computer peripherals, etc. Each piece of equipment is inventoried and tagged, and then put into use for a specific organizational purpose. When it comes to maintaining the equipment, management normally follows a prescribed plan, in which the equipment is evaluated for usefulness and obsolescence and, based on that observation, management decides whether to conduct routine maintenance or replace the machine. In the final analysis, an organization can account for its physical equipment, assign values to it, and manage the fluctuation in equipment inventory.

Now consider how knowledge assets are managed in organizations. In most organizations, it is common to have a “knowledge jungle”. Knowledge resides in the organization haphazardly and is scattered in multiple parts of the organization. Moreover, no one can separate organizational knowledge from junk. In the beginning of the knowledge management revolution, the major issue was simply getting people to contribute to Knowledge Management Systems (KMSs). Currently, organizations deal with a more specific problem in getting people to contribute only knowledge that has

organizational value. Most organizations embrace a comprehensive approach to knowledge management, valuing everything from how to fix to a broken copier to how to win the next consulting engagement, resulting in the Wild-West syndrome, in which an organization is overloaded with so-called knowledge and managing it is time-consuming and not especially productive. The mismanagement of tacit knowledge—knowledge that resides exclusively in the minds of employees—is a more damaging problem. Many organizations lack an appropriate framework in which to identify the employees who possess important knowledge? What makes these knowledgeable employees tick? How is their knowledge engaged and who represents the truly valuable and knowledgeable employees?

The consequence of a haphazard approach to organizational knowledge assets is that management efforts have poor results because an organization will not be able to divert resources to knowledge assets of significance. It would be a mistake and a waste of resources to managing pencils with the same vigor and effort as computer systems. Unless the organization can differentiate between a computer and a pencil, in terms of value and significance, it will not be able to manage the resources appropriately. Obviously, trying to execute the same management attention for pencils and computer is futile and will result in wasted resources and lack of attention to the more critical asset—in this case, computers.

An organization's ability to segment their knowledge assets is an important capability. Not all knowledge assets are alike in nature, value proposition and significance. Unless an organization has the capability to segment knowledge assets, management efforts will not be focused appropriately. There are several steps in the

segmentation process. First, we must segment by *type* (Desouza & Awazu, 2004; Davenport et al., 2003). Segmentation by type is grouping knowledge assets by their genres or categories. This is the simplest type of segmentation and common in almost all organizations. In most KMSs, knowledge assets are grouped by categories like marketing, finance, and engineering. Classification into sub-classes and even smaller sub-classes of sub-classes is typical. For example, the engineering category can contain the sub-classes of product design, testing modules, software code, and quality control documentations. In addition to segmenting knowledge by genres, we segment by other features such as format: text document, spreadsheet, presentation, or graphic. Explicit knowledge can also be segmented by a variety of other classifications including date, author and source of expertise.

Segmenting tacit knowledge occurs naturally in organizations. In organizations, employees with specific expertise are commonly assigned related job roles and in related teams or departments. Tacit knowledge is susceptible to the same types of classification experienced with knowledge artifacts, and usually results in specialization with departments or teams. A member of a software engineering team, for example, would have knowledge of information systems and yet, each member of the team likely brings a specific and unique expertise to the team.

Segmentation by genres or other features of the knowledge artifact or expertise, in the case of tacit knowledge, is the first step in creating a fruitful management agenda. Doing so provides a sense of organization and control. Another benefit of segmentation is that now we can begin to process knowledge artifacts within their classes and discover higher-order knowledge assets. For instance, if a bookstore groups knowledge artifacts by

genre, they can analyze the knowledge represented in these classes to determine emerging patterns, trends, or peculiarities. The segmentation process also allows us to engage in cross-class operations. We can make associations between knowledge about books on foreign affairs and business management. Analyzing knowledge across classes of knowledge artifacts illustrates patterns and relationships between groups. In analyzing knowledge about gangs in law enforcement, authorities must inter-relate knowledge on individuals committing crimes with how individual crimes relate to the context of the collected gang and, even further, must correlate the data with other crimes and gangs to get a bigger picture of inter-gang cooperation and rivalries. We must remember that knowledge, both tacit and explicit, can be used for multi-purposes. As such, segmentation may call for us to have two types of processing strategies for knowledge artifacts. We can have a set of pre-defined routines that are easy to specify a priori and can be re-used time and time again. In addition, we can also have ad-hoc or plug-and-play rules that are used to process knowledge artifacts across the classes. It is difficult to envision all possible uses of a particular knowledge artifact a priori, hence having the ability to plug-and-play is important. Knowledge objects may also change classes or categories as they are produced or are in stages of work-in-process. For instance, if we combine knowledge objects created by John and Mary then we must store the resultant knowledge in a new category. For instance, we can use the name of team (John & Mary Team), or we can store it by the person who conducted the integration of the knowledge object. Classes of knowledge objects hence are seldom static in nature and need to be flexible to appreciate change and dynamism.

Once the basic segmentation is complete, knowledge must be segmented by their value. This is the ***neglected*** dimension of the segmentation capability. We suggest that knowledge managers take a step back and truly question what comprises organizational knowledge. To this end, consider adopting the resource-based view of the firm (Barney, 1991). The resource-based view of the firm provides a lens through which to examine and isolate the resources in the organization's collection that can lead to sustained competitive advantages. Particularly valuable resources are those that are rare, heterogeneous, immobile, and non-substitutable. Primarily, is the resource valuable? Unless the resource has some valuable proposition, it is of no use to the organization. Once determined valuable, assess if the resource is rare in comparison to those possessed by competing firms. Particularly, is the resource heterogeneous and immobile? Unless a firm possesses a resource scarce in the industry, the resource will not be a source of sustained competitive advantage. Immobility also provides a salient resource test. Unless a resource is immobile, other firms in the industry can easily acquire the resource of interest. Mobile resources can only provide a temporary competitive advantage. The final question is whether the resource has substitutes. If the resource has substitutes than its value proposition is impaired since there are other resource candidates if needed. However, if the resource of interest has no perfect or close substitutes, than the resource can be considered as highly significant and valuable.

The resource-based view can be applied to segmenting knowledge assets in organizations. Managers must determine the value of the knowledge based on these characterizations. Most knowledge objects will meet the conditions of valuable; however, only certain knowledge resources will be able to meet the condition of rarity. Consider a

software engineering firm. While every piece of code written has some "value," is it unique? Moreover, the knowledge processed by each software engineer is certainly valuable although, only a small portion of that knowledge is truly rare. Most of the engineer's knowledge complements and overlaps the knowledge of other software engineers. While almost all knowledge provides value in assisting in the completion of routine tasks, knowledge objects that meet the condition of uniqueness are normally of high value. First, these knowledge objects are missed in the organization when they are taken out of play or lost. For instance, when an expert leaves an organizations gaps or holes in the knowledge structure emerge. Second, these knowledge objects due to their uniqueness can lead a firm to develop competencies that might not be available to competitors. The conditions of non-imitation and non-substitutability are critical because knowledge that cannot be imitated easily by other members of the organization or by external organizations is truly valuable because it is not easy to replace it. Knowledge that is unique and difficult to replace gives any organization a competitive advantage. Knowledge that does not aid in strategic advantages must still be managed but is not an organizational differentiator.

Segmenting expertise by value is equally appropriate. Not all knowledgeable workers are alike and treating them as such will result in a failed management approach. Some employees work in a highly autonomous way and are highly skilled; they often know their work in great detail (Davenport et al., 2002). Others are highly skilled, yet their work is more dependent on an external party like a boss or supervisor. A hospital nurse for example, is certainly a knowledge worker, yet a nurse's schedule and work practices are likely dictated by a doctor and/or the hospital. By comparison, an artist

knows best on how to create a masterpiece and will work independently to meet the need of the client. Other types of knowledge workers are not highly skilled, yet they know how to follow knowledge-based procedures and perform tasks. The most common example for this class of workers is call center personnel. Incoming calls are handled based on a pre-defined routine that dictates the opening greeting, method of problem resolution, problem reporting, and other intricacies. The role of the worker is to follow these knowledge-based routines and complete the call in an effective and efficient manner. Each type of knowledge worker needs to be managed differently and offers different value propositions to the organization. For example, if an organization has an apt knowledge base on which to draw and has a mature call handling procedure, the knowledge worker who takes the call can be substituted easily. Any individual with basic speaking skills and simple etiquette should be able to follow the procedures outlined in the call-manual. If an organization does not have a truly mature and valuable call-manual (the knowledge asset), the skills of the call takers must be evaluated more individually and in comparison to one another. Without a call manual, the organization is at the mercy of the experienced call takers since these individuals will have the necessary expertise required to complete a call optimally. Segmenting knowledge workers by the value propositions they offer allows an organization to focus their management and incentive practices, for instance choosing between centralized versus decentralized control mechanisms. It would be a shame for an organization to lose a knowledge worker whose skills are rare, valuable, non-imitable, and non-substitutable in the organization. Losing such an employee to faulty management practices leads to gaps in an organization’s knowledge structure and will impact business outcomes.

Segmenting knowledge within the organization leads to a better-focused management agenda. Knowledge that does not meet the conditions of a valuable resource should not be the focus of management efforts. Those that meet the basic condition of being valuable should be managed in a limited fashion since the return on those assets is minimal. Critical organizational resources are those that cannot be imitated or substituted with ease. These must be the focus of knowledge management efforts since they have the potential to truly deliver corporate value. Segmenting knowledge helps address the cost-benefit issue since it helps to focus organizational resources on the most critical knowledge assets.

Destruction Capability

In an effort to create a greater quantity of competitive resources, organizations focus primarily on generating and storing knowledge. While this may be true for traditional resources like land, labor, and capital, it is not necessarily true for knowledge. Excessive knowledge about products, processes, and practices can have negative consequences for organizations (De Holan et al., 2004).

When it comes to explicit knowledge artifacts residing in KMSs, problems can occur in terms of knowledge overload where there are multiple versions of the same knowledge on different aspects of products and services. Excessive knowledge results in inefficient knowledge retrieval. In several software engineering organizations with whom we've worked, KMSs are laden with multiple versions of the same knowledge object. The same knowledge is encapsulated in multiple files. The end result is that people abandon such systems as the cost of finding the most recent, current, comprehensive, and accurate knowledge artifact is too high. Ultimately, if no one uses the KMSs, they are a

cost for the organization and will not be a viable means for fostering effective knowledge management (Desouza, 2003).

In the tacit realm, unless old and irrelevant knowledge is purged in a timely fashion, organizational change becomes difficult resulting in several problems. Routines and practices become institutionalized which makes future change and creative problem-solving impossible. As such, the organization will make only incremental and minor improvements on this past knowledge without much hope for seeing opportunities and seizing the future of the marketplace. Polaroid made this mistake in the advent of digital imaging and Swiss watchmakers lost ground to the leaner and more agile Japanese competitors. Strategies that work today may not work tomorrow or the day after tomorrow, knowledge relevant today may be irrelevant tomorrow. It is in the organization's best interests to keep a watchful eye on new opportunities and business practices in the marketplace and make relevant and necessary changes to stay competitive.

Necessity is the mother of invention and relying too extensively on the past stifles an organization motivation for creative thought. Organizations often try to answer questions based on existing knowledge resources. As a result, problem definition is based solely on available solutions. Arrogant organizations, with high levels of pride and self-confidence, get blindsided by new threats since they are typically reluctant to switch strategies in a timely manner. Abandoning old routines in favor of new ones is certainly risky. The role of every manager is to manage risk. Executives, especially those locked into benefit packages or close to retirement, resist change because of the potential for failure. Furthermore, executives often equate strategic failure with personal failure. As a

result, they continue following historic paths since these are easier to justify and do not require risk-taking behavior. When executives and managers continue to follow failing courses of action, even in face of negative feedback, their actions are an “escalation of commitment”.

Individuals are less likely to solicit or investigate new knowledge that goes against their current view. It is easier to view current success in the light of a chosen strategy rather than as a result of unforeseen external factors. This management tendency makes exchanging an existing strategy for a better one difficult. Why make a change when we are getting satisfactory results? Organizational inertia stems from this behavior and an organization cannot change its behavior effectively and quickly. All organizations have strengths and their strategies reflect these strengths. Economics dictate that organizations should invest maximum resources in its strengths to maximize returns. However, in doing so, the organization fails to devote adequate attention to seeking out new practices and strategies that may question their current strength or complement it by enhancing its potency. Over time, an organization’s strengths become obsolete and common in the marketplace, thereby losing the potential to provide competitive advantages, and if the organization has no secondary or fall-back strategy the organization will fail. Organizations also resist the destruction of old knowledge because of the investment sunk in that knowledge, “We have already invested in it, so we should follow through on it.” There is a cost associated with creating new knowledge, and often an organization may not have the resources available to cover the initial cost. Organizations are reluctant to destruct knowledge in which the organization has invested so much time and money in favor of an untried and potentially costly new strategy.

In most cases, past knowledge has limited value for future organizational efforts. Organizations operate in a dynamic and fiercely competitive environment. Their knowledge, much like computer hardware, has a high rate of depreciation. While important, lessons learned from past endeavors are helpful they need to be qualified. While helpful in an operational sense, much of yesterday's knowledge has little bearing on designing the future. Designing or charting the future demands new and uninhibited creativity. Unless the old knowledge is purged or challenged, no one will question its existence or validity. Overtime, myths become standard corporate knowledge because no one questions them. This practice is dangerous to the future of an organization. Systematic destruction of knowledge must be a component of knowledge management efforts in organizations. Knowledge managers must institutionalize the destruction capabilities. The term "destruction" is not used casually. While most organizations have the capabilities to purge old and outdated knowledge, they do not engage in destruction. Even within organization that do engage in mechanical destruction of knowledge artifacts in their KMSs, practices based on those knowledge assets continue to prevail. An organization's destruction capability must include both the act of purging explicit knowledge and modifying or updating practices and procedures based on tacit knowledge. Personnel can be designated to review knowledge in systems and purge or archive old knowledge in a timely fashion. The use of automated technologies can also be useful in conducting knowledge reviews and destruction. Training and development programs are vital aspects of the destruction capability and as such, should not be overlooked since they infuse the organization with new knowledge. It is important that an organization use a test of "existence" to check whether practices are based on knowledge

or myths. Many times, current practices in organizations are outcomes of age-old myths, which may have been valuable knowledge at one time. However, as time passed, the knowledge may not "exist" in the organization but practices based on "myths" may still be prevalent. These need to be identified, tackled, and revised in order to have a viable destruction capability.

Missing Capabilities and Known Capabilities

The missing capabilities outlined here complement the other capabilities required to conduct knowledge management. The segmentation capability provides an organization with a clearer appreciation for its current knowledge assets and how they relate to one another. Once segmented, the organization can expend the necessary energy creating the right kinds of knowledge artifacts—those with the highest value proposition. The process of segmentation will also enhance the success of knowledge transfer because the organization will be more aware of its domain weaknesses and knowledge deficiencies. Tacit knowledge and expertise can be moved from areas of high concentration to deficient areas. Moreover, the organization can begin training employees on knowledge that is highly valuable and that is a source of competitive advantages so it will better meet goals and objects. Knowledge storage can also gain from the segmentation capability since knowledge assets are best stored based on their value. Organizations can separate high-value knowledge assets from those that offer only minimal value. The destruction capability allows an organization to stay current and to generating new knowledge through a continued examination of existing knowledge assets. It also helps the organization keep its knowledge repositories current and, in doing so, fosters the transfer of current knowledge between organizational parties. The capability to apply current

knowledge to business problems provides an organization with an advantage when compared with organizations possessing only historical and outdated knowledge.

The sophistication of knowledge management capabilities in organizations will vary. Some will have sophisticated and optimized knowledge capabilities that are routinely inspected, improved upon, and revised as needed. Others will have less than ideal capabilities that are outdated and obsolete, as they have not kept up with changes in the environment. Many will fall in between these two extremes. A clear indicator a mature and sophisticated a knowledge program is the care and attention given to the missing capabilities, and how well these are integrated with the traditional knowledge management capabilities.

Conclusion

In this paper, we have discussed the two missing capabilities of knowledge management and have shown their relationship to the traditional knowledge management capabilities. We have argued that a viable knowledge management program should have an appreciation for the missing capabilities. Including the missing capabilities helps an organization have a more engaged knowledge management program on several fronts. By using the segmentation capability, an organization can be better engaged and in line with the realities of its current knowledge stocks. The organization can better appreciate the knowledge inventory it possesses and understand the knowledge assets with high value. It can best expend efforts and resources and manage them adequately. The destruction capability ensures that an organization has a current and useful knowledge base. As we have argued, knowledge assets are subject to depreciation like any other assets. Choosing not to destroy out-dated knowledge can lead to the demise of an organization's

competitive position. If an organization refuses to embrace innovations in a timely fashion, it can lead to competitive takeovers. Not destroying knowledge in a timely manner can lead to organizational inertia and inertia is not part of the realities of the current marketplace and competitive environment.

In addition to the two missing capabilities discussed here, we feel that one other capability needs to be given due attention – the protection capability (Desouza & Awazu, 2004a, 2004b; Desouza & Vanapalli, 2005). The protection capability will be of paramount interest as we move through a future characterized as tremulous and hostile. Generating, storing, and applying knowledge are costly endeavors and, as such, an organization must protect its investment in knowledge assets from unauthorized usage and unscrupulous individuals. Highly sensitive knowledge must be protected from its inception, while in storage, and during application. Segmenting knowledge will provide a way to identify valuable knowledge and protect it. Knowledge transfer and application mechanisms also need to be secured so that competitors do not discover how to construct or re-create a firm's knowledge and erode its value and rarity.

The missing capabilities differentiate a successful knowledge management program from one that is incomplete and wanting. Put another way, missing capabilities differentiate an *engaged* knowledge management program and one that is simply a basic knowledge management program.

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