Chapter 7
Final draft

C³EEP Typology and Taxonomies-Knowledge Based (KB) Strategies

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Abstract

This chapter proposes the C³EEP typology as a framework of knowledge management strategies by using six knowledge based strategic dilemmas. A number of graphic presentations of the complete typology are reported. Based on the typology, nine taxonomies of Knowledge Management (KM) are proposed and are followed by a framework that uses the six dilemmas and the knowledge levers as leading dimensions for the development of organization’s knowledge management strategy. The proposed typology and taxonomies are closing a gap in academic knowledge management and strategic management literatures.

Keywords: taxonomy; C³EEP typology, knowledge-based strategy; knowledge management strategy, framework, knowledge levers, strategic dilemmas.

Introduction

Have you ever used a map to chart the route for an important destination? How about getting directions off the Internet? Maybe you have used a travel agent to plan a trip or called upon AAA to create a trip ticket. Regardless of the method you may have used, the first step in creating your route is determining your beginning location. Without a clear starting point and desired destination, plotting a course is next to impossible. The same is true when charting a path toward KM goals. You have to determine your Knowledge Base (KB) (Chapter 4). You have to determine your desired destination and you have to plot your course or a game plan (Chapter 9). You also will need to have a map. This is what this chapter is about.

“Are we there yet”?

If you are going to use a map to plot your course, you might look at the mileage numbers, route numbers, or the legend for the information you need to make your decision. If you use a travel agent, he/she might volunteer the shortest or most interesting route, explain costs, and provide brochures so you can make your decision. If you use MapQuest, you might select the shortest distance or maybe the shortest time. The important factor is that you trust the information the map, agent, or Internet providing. By using a map, you are expressing your confidence that the people who created the map were skilled in the area of map making. In addition, you rely on the expertise of your travel agent and even the accuracy of an Internet directions tool. Bottom line, you trust the tool you have chosen to use or you wouldn’t have made the choice. Ultimately, you know your trip will be successful because the resources you used to make your trip plans and plot your course were timely and reliable.

Well, now you are beginning a KM journey. You know your starting point and you know your destination, all you need now is to decide the route. To do that you need to gather the information necessary to make directional decisions and that requires the use of a resource you can trust. Like the creation of a map or the use of an expert, you want a tool
that is reliable, valid, and created by skilled practitioners. You want a resource that has been tested in the field and has a history of success. The C3EEP Taxonomy is just such a tool. Need proof? See our academic supporting research (Russ et al., 2005; 2006, and Russ and Jones 2006; 2008; forthcoming). After all, we are practitioners turned academics so we love sharing our years of work with you. We will start with an introduction of the dimensions of the map (the typology). Then, using these dimensions we will identify and describe the different types of KM strategies an organization might have (the taxonomy).

C3EEP Typology

In chapter 1, we talked about strategic thinking on a global level. In chapters 4, 7 and 9 we focus on strategic thinking coming into play for the organization. As mentioned in Chapter 1, we have developed a matrix that requires management to focus on the types of knowledge it possesses or would like to possess and guides management toward making the most appropriate decisions based on where they want the organization to go. The C3EEP Typology is a way to interpret six possible strategic dilemmas so an organization can chose a direction to follow toward their desired KM destination. As mentioned in the introduction of the book, C3EEP Typology stands for:

- Codification-Tacitness
- Complementary-Destroying
- Concealment-Transparent
- External Acquisition-Internal Development
- Exploration-Exploitation
- Product-Process

Specifically, our research has determined that there are six strategic dilemmas/questions that organizations will face when it comes to determining their KM goals:

(A) “Should the company focus on codifying the knowledge or would it be better off leaving the knowledge tacit1?"

(B) Should the company focus on developing knowledge that is complementary to its current KB or would it be better off developing new knowledge even if this destroys the existing KB2?

(C) Should the knowledge be transparent or would the company be better off keeping the knowledge concealed3?

(D) Should the company focus on getting the most from its existing knowledge or would the company be better off experimenting with new knowledge4?

(E) Should the knowledge be developed internally, or would the company be better off acquiring the knowledge from external sources5?

(F) Should the company focus on the KB that is supporting the process and creating the value, or should the focus of value creation and the KB supporting this be the product/service6?” (Russ et al., 2006, pp. 3-4).

Our research and experience has also found that these six dilemmas are independent. In other words, an organization can decide to respond to each one of the six choices...
independently since they are not related. Therefore, we took them individually and created the CEEP Typology for your use. So let’s take a moment to review each of the six strategic dilemmas. For a more formal, academic discussion of this subject see Russ and Jones (forthcoming).

Codification (Explicit) versus Tacitness

Does the organization want to codify all of its knowledge or keep it tacit? Basically, write everything down and have it codified within the processes and systems or let the people maintain the knowledge. This is not a black and white decision. Most companies fall somewhere in the middle ground where a portion or different aspects of knowledge are codified and the remainder is kept at the tacit level. As with every decision point, there are advantages and disadvantages to every resolution. But that also has to be based on your industry, your culture, your risk management philosophy regarding knowledge, patent protection, industrial espionage, etc. This decision will guide management to invest in specific systems or processes or people.

Tacitness might nourish competitive advantage by making it more intricate for competitors to imitate a company’s knowledge. On the other hand, by codifying knowledge and making it explicit (or embedded), the company can speed up the distribution of knowledge throughout the company more effectively than the competition. The application at this level is on the internal processes, tools, and controls of the company. The Tacitness strategy centers on the culture and routines necessary to share, protect, and control knowledge, while the Codification strategy converges on codifying the knowledge for internal sharing.

Tacit-explicit knowledge is a choice opportunity that companies have either implicitly or explicitly. Specifically, for example, it is the company’s strategic choice that will determine if it will invest in knowledge-base systems to encourage employee’s knowledge sharing or if it will sponsor employee travel for the purpose of personal interaction. Based on the strategic choices made, the company will conclude whether and how to remunerate employees for using databases. Knowledge might be in a tacit form, but the company might choose to transfer it into an explicit/codified setting. Marriott, for example, made such a conversion with its operating procedures at significant expense, with the intent that it will also increase the value of the knowledge. Such a codification is becoming less problematic and cheaper as the price of IS technologies drops and performance improves. Tacit-codification choices made are NOT dichotomous but continuous. It is believed that there is a continuum of range or balance and it is the company’s choice (and strategy) as to where on this continuum it wants/intends to situate itself.

Here is an example that will illustrate to you why such a balance and/or a right choice of which knowledge to use can be important. NASA invested a lot of money in codification of knowledge plus IS/KBS just to find that the most valuable knowledge they had was large scale project management. NASA found that the risk assessment and management aspect of the project was most valuable and that this tacit knowledge could only be
transferred by either the cheap way (learning by observation, mentoring, consulting fees to retired experts) or by the expensive way (trial and error). Unfortunately, the lesson was not learned until a few major disasters occurred and the agency became a famous case study in management failure.

Complementary versus Destroying

Does the organization want to develop knowledge that is compatible and complimentary with its existing knowledge base or does it want to build or acquire new knowledge that will destroy the current knowledge base to gain a competitive advantage? Again, this is a strategic question that will guide the decision-making process. At first it may seem counterintuitive to destroy or undermine the value of your current knowledge base. However, if that knowledge is obsolete, or will be obsolete in the future, you have to calculate the value of maintaining the status quo against the costs and potential income stream of replacing that knowledge with a new knowledge/technology. If KARMA (see chapter 4) told you that this was soon to be obsolete or this knowledge was solidly implanted within your organization, it might be an indication that the knowledge is useless, or it may also be the driver to fill a niche in a market that does not currently exist.

Complementary strategy can be depicted as a strategy based on using and developing only knowledge that is well-matched to the currently existing knowledge base within an organization. Such knowledge could even be “new to the world” innovation, but be connected and accommodating of the obtainable knowledge base of the company. Or, the knowledge could merely be a recombination of existing knowledge. The Destroying strategy can be portrayed as a strategy focused on mounting a new knowledge base while destroying the value of the existing knowledge base in order to cultivate a unique competitive advantage permitting the company to revolutionize the industry.

The traditional academic thought regarding disruptive technologies is that established companies have great difficulty developing and/or absorbing innovations. It is a rare occurrence (an outlier) that an incumbent firm is successful in such an attempt. Companies are changing this pattern of behavior as more and more of them become aware of the risks they might be taking by avoiding/underestimating innovations. A rising number of established companies are, therefore, embarking on incorporating (at least some) aspects of destroying strategies.

Concealment (Secrecy) versus Transparency

Does the organization want to conceal its knowledge or does it want to let everyone know what is being done? This can be very tricky since it combines legal and regulatory issues, depending on the industry, as well as trade secrets, patent availability, etc.
Pharmaceutical companies have to be fully transparent about new drugs going through the clinical trial process, but that is because of the law. It should also be noted that the law also rewards these companies for their transparency by granting patents to protect the investment. Microsoft is very careful to conceal the inner workings of its operating system and has gained a competitive advantage because of that secrecy. Only in recent years has Microsoft lost some of that advantage due to the latest court and regulatory rulings.

Research in international accounting recognized secrecy and transparency as distinguishing values for a country’s accounting system. Secrecy was recognized as a value that denotes leaning toward confidentiality, disclosure within the legal confines only to constituencies that are the most directly involved with finance and management on a need-to-know basis. Transparency was recognized as being overtly open and accountable. The Anglo-Saxon accounting system was acknowledged as the most transparent and the Less-Developed Latin system as the most secretive.

Research in the subject matter of patent law recognized two distinct frameworks for the purpose and effects of intellectual property laws. One contemplates patents as a means for privatizing information, and the second proposes looking at the patents as a means for validating and publishing information. Consistent with the former framework, research established that companies exploit patenting as grounds to build bargaining power. When companies deem their original patents are susceptible, they tend to rely on litigation. For example, research insinuates that early secrecy might result in harming an asset protection plan, while transparency might result in an improved position as a preemptive effort in case of later litigation. In a similar vein, Lev (nd) found that information revelation by pharmaceutical companies in the vicinity of the time of FDA approval had a significant positive effect on a company’s stock value above and beyond the value consequential from the approval itself. Also, research established that the type of information being released had a dissimilar impact on the company—quantitative data producing a more positive influence than qualitative data.

But, does this distinction persist also in other managerial areas? We know that knowledge can, at the same time, be both leaky (transparent) and sticky (tacit). This may imply another feature of knowledge, one that might be associated with the practice of knowledge. One example is in the subject matter of value formation and supply chain management. IS technologies are altering the associations between suppliers and customers and imposing partnerships and transparent relationships between partners. Research insinuates that companies are making a deliberate choice with respect to their level of transparency as well as the type of transparency employed internally and externally. Another example is in the subject matter of strategic alliances, where learning and knowledge have been recognized as a critical matter. For example, research recognized the issue of how shielding the partners are of their knowledge as an essential aspect of the knowledge acquisition process.
between partners\textsuperscript{15}. For instance, the choice that Toyota made in relation to being more transparent than one would be expecting with its partner/competitor (GM) because it was not troubled by GM’s abilities to make use of this knowledge effectively in a timely manner.

Research identified three reasons why companies may want to share knowledge with competitors: receiving inputs into their planning, formation of industry standards, and getting acceptance into professional networks\textsuperscript{16}. One major implication is that companies should direct their employees about suitable behavior in the area as well as what and how knowledge can be shared. Another implication is that companies may want to have employees sign a confidentiality agreement in order to guard knowledge embedded in their systems, for example in a revenue management system thus utilizing trade secrets as a concealment mechanism. But, there is more to knowledge fortification than patents and employees’ conduct policies, since knowledge has a number of distinctive characteristics that make protecting it different from protecting tangibles. Recently, Tapscott and Ticoll (2003) took this discussion one step further, suggesting that companies should see transparency not as a threat but as an opportunity to build trusting relationships with both internal and external constituencies. The premise for this dimension, in our opinion, is that companies might be better off balancing the need for transparency and concealment.

\textit{Exploration versus Exploitation}

Does the organization want to be innovative or does it want to exploit existing knowledge to gain an advantage? This decision can be based on the knowledge that resides within an organization. KARMA will tell an organization a lot about how knowledge is created. You may have an environment that fosters innovative ideas. You may be in a company that uses its knowledge base to exploit existing technologies to gain its advantage. However, if you are planning to move into a new line of business, KARMA will allow you to assess what knowledge is available for this purpose. KARMA may also show you that exploration may work in one division and exploitation may work in another division. This is especially true in larger organizations but it can also be found in small companies.

The Exploration strategy can be portrayed as a strategy typically using inventions and innovation in order to create new knowledge. An Exploitation strategy of knowledge assets can be portrayed as a strategy established on routinely using and refining accessible knowledge. There is also a distinction in regard to time frames; Exploitation usually focuses on the short term - which may generate long term risks, while Exploration concentrates on the long term - which may generate short term risks. The application of learning mechanisms is also different--the Exploration learning is variation-seeking and reconfiguration of new resources while the Exploitation learning is midpoint-seeking and reconfiguration of existing resources. The culture, information systems, and reward systems that will be most valuable for each strategy might be different. For example, IS are fairly ineffective in advancing the innovation and creativity that are
important for Exploration, but can be very cost-effective for sharing obtainable knowledge that is important for Exploitation.

Companies infrequently use the genuine style of the archetypes. For example, some companies can balance Exploration and Exploitation by using obtainable knowledge as an opening position for developing new knowledge. Harmonizing the two is seen as essential in new service development, dynamic capabilities development, research and development, organizational adaptation, and innovation implementation in high technology manufacturing, and many other business applications. Such balancing can be challenging because of the “failure trap” and the “success trap.” The “failure trap” does not permit companies to experiment with new products, markets, etc., because delaying uncertain profits may be costly and not-beneficial. The “success trap” keeps the company within a narrow (existing) variety of products, markets, etc. since the company is content with the present profitability (and low investments and risk taking), which comply with its short-term goals. Such a strategy, however, generates long-term risks by creating rigidities. An additional complexity in having a thriving balance between exploration and exploitation is organizational. The activities supporting the strategies seem to have contradictory processes and striking a balance might not be straightforward.

External Acquisition versus Internal Development

Does the organization want to buy knowledge or develop it internally? Again, KARMA provides a baseline to help determine if the organization is better at assimilating knowledge from outside sources or creating the knowledge in-house. There is another element that could influence this and that is timing. If there is a limited window of opportunity for development of knowledge, you may determine that buying the knowledge is the better strategic fit even though your organization is better at creating its own knowledge. Remember, if you only acquire the processes and systems and not the people, there will still be an abbreviated “learning curve” to create the required knowledge.

Developing technologies for innovative new processes or new products can either be accomplished internally or acquired from outside the company by means of inter-organizational provisions. For example, research indicates that since the mid-1990s pharmaceutical companies located in the UK, viewed such an R&D option as another “make or buy” alternative. The same choice dilemma can be recognized in other aspects of knowledge management in companies, for example, marketing, new product development, production, etc.

There is a widespread academic body of research indicating that large companies are obtaining new knowledge from the outside, mostly from small, innovative and entrepreneurial companies. This is achieved by using a number of alternative means with differing extent of interaction between the partnering companies. Such acquisitions may account for an increasing proportion of these companies’ R&D
portfolios. For example, a partnership between an equipment supplier and buyer, in which the supplier extracts the engineering knowledge from their customer and the customer, on the other hand gains an early peak into the potential of the technology, will illustrate the use of external sources of knowledge. This early peak affects the future equipment performance and gives a preview of new process technologies.

Research implies that companies contemplate strategic outsourcing for value propositions (not for cost saving purposes only), professing that companies might use such outsourcing arrangements to intensify their innovation, intellectual depth and worldwide reach.\(^\text{18}\) Research also recognizes a number of concerns that companies need to be alarmed with, for example, entirely losing skill sets, difficulty in precisely identifying expected outcomes, opportunistic risks, etc. This may propose why companies might want to balance their dependence on external sources with their internal development. Companies that are seriously engaged in external knowledge acquisition (or exchange) need to attain an “alliance learning capability” or, in other words, acknowledge a learning curve in managing the relationship with the external partners, what some\(^\text{19}\) call collaborative experience. Such capability might in fact include the capacity to understand, assimilate, and apply external knowledge, all of which are ingredients of the company’s absorptive capacity. Also, the relationships that the employees have with external constituencies, specifically customers, could be seen as an important knowledge transfer mechanism by assimilating a knowledge-based indicator into the performances of the sales force.

The premise for this dimension, in our opinion, is that companies might be better off balancing the need for internal development and external acquisition. For example, research mentions two options of external sources for acquisition—within the industry and outside the industry, each having a different impact on new knowledge development.\(^\text{20}\)

Take, for example, Kroger. The retailer is competing with Wal-Mart on price, with Whole Foods on differentiation, and with Trader Joes on differentiation and price. Kroger should be losing, right? Not exactly. Using analytics and customer loyalty cards supplied by a British company (Dunnhumby) the company is able to survive and show a profit.\(^\text{21}\) But there must be more to the story than incorporating knowledge, in this case a system, plus software, plus results. For one, there is tacit knowledge exchange. Dunnhumby’s American headquarters is in Cincinnati, OH which is also the location of the Kroger headquarters. Actually, Kroger brought Dunnhumby to the US, even though they happen to be a division of a competitor (Tesco). But really, there is more to it. The abilities of different stores to respond to the unique circumstances they are in (Best Buy; another example of using the same software and systems) can only result from the freedom that store managers have to tailor their offerings to the identified needs PLUS the ability of corporate distribution to deliver systematically the needed goods on time and in price. No wonder few companies can match this set of capabilities. Of course, knowledge management was not mentioned in the article or in related stories even once, but the reality is that it is all about putting the knowledge in action and creating value.
One additional aspect that must be mentioned here is that managing the acquisition of external knowledge as well as incorporating/integrating it into the organization and meshing/melting it with the internal knowledge is far from simple or routine. In all actuality, it is a skill/capability that organizations have to learn. In other words, there is a learning curve in acquiring knowledge from the outside, like in learning how to establish and manage successful strategic alliances, or how to merge or acquire another company. Such a capability can be learned and some companies do, but many do not or even do not realize that they lack the skill. Even worse, many organizations have the capability but lack the awareness or have not realized that the knowledge is within one person and when s/he leaves the company, the knowledge and the capability are gone.

*Product versus Process*

Does the organization want to produce a product or does it want to be the driver to produce the product better? Is the organization better at production or re-engineering and streamlining the process and outsourcing the production? Again, KARMA provides the critical data that can be used to guide your answer.

The early 1990s brought a number of realizations: 1) The productivity paradox - despite spending great amount of capital in IS technology companies could not demonstrate positive returns or productivity improvements; 2) Continuous quality improvements were not adequate to bring the needed cost cutbacks necessary to be successful against intense global competition; and, 3) The majority of reengineering programs failed or at best, the results were ambiguous. These realizations made it apparent that companies need to manage all of their processes considerably better; hence process innovation, dynamic capabilities, value stream reinvention, six sigma, and BPM-Business Process Management among other processes. These processes exemplify the companies’ recognition that the “what” they produce could be as important as, the “how.” Indeed, recently there have been a number of endeavors to incorporate process management with KM. Another explanation of why process management came to the front is the relative intensification of the service sector and the (relative) decay of the manufacturing sector. Services can be described as an interaction between human actors, processes, and physical elements. Such a definition of the service economic sector is increasing the need to better appreciate and manage processes. Also, increasingly, manufacturing companies are broadening their offerings by adding, or by bundling services as part of their product/service offerings.

What are the choice dilemmas offered by this dimension? One can be demonstrated by firms losing their innovative capacity and as a result, starting to concentrate on value creation through process efficiencies, or in a reciprocal cause and effect direction, and/or obtaining innovative ideas from small companies. In other words, new ideas that generate value for customers can be either a better new product or a cheaper product, or what we describe in strategy as “differentiation” and “low cost”
strategies. For example, when a product is mature, it is much more complex to achieve product innovation, while competitor’s pressure and customer demands press for cost cutbacks by means of process development. A different type of choice dilemma is suggested by research which reveals that for companies, the selection of a specific product design is joined with a choice of a specific process in a reciprocal relationship. For example, a tightly designed product will necessitate a process that is intensively synchronized. Also, research established that when the life cycle of the product is short, process knowledge has a positive effect on the company’s performance.

The complete CEEP Typology

Now, we have to remind you that what we described above are the dilemmas companies have to resolve. Rarely will such resolution or choice be a decision to adopt the extreme anchor as an alternative strategy. In the majority of the cases, companies will choose some kind a balance between the two anchors (for each one of the six choices). Taken together, the choices describe a space (typology) in which companies are making decisions. Actually, the company may find that different SBUs, divisions, or functions might be better served if their choice of a specific balance is different. Our early research supports this conclusion. For example we found that within one company, four different SBUs were making different choices. See their different profiles below in Figure 1.
An alternative way to describe the profile of the strategy is described below by comparing the data of different industries. The average of all the companies participating in our earlier study is illustrated by the star and the average of the service industries illustrated by the octagons. As one would expect, the service companies tend to be more process oriented and tend to codify those processes as well as keep them more transparent than the average company. They also seem to be more innovative (both more exploratory and destroying) as well as they rely more heavily (than the average company) on external development of new knowledge.
Next we will discuss some alternative strategies companies are using when making different choices for the dilemmas we discussed.

**C³EEP Taxonomies – The Strategies**

Our early research (e.g. Russ et al., 2005, 2006) findings of the significant relationship between KB strategies and outcomes suggest that three of the six dimensions mentioned above might be the most important when considering specific strategies. The possible KB strategies based on those dimensions will be discussed below.

*Codification-Tacitness and Exploration-Exploitation Strategies*

Our earliest research suggested that Codification-Tacitness and Exploration-Exploitation strategic dilemmas might be of the most importance.²⁷ Four alternative strategies that companies can use when managing their KM assets (see Figure 3 below) were proposed within Taxonomy A. As part of this and later research²⁸ we were also able to relate outcome effectiveness to the strategies identified²⁹. Only in the case of this taxonomy, do we have definite conclusions.
Type (I) companies employ the Structured Utilization strategy. Structured Utilization companies concentrate on exploiting their currently existing knowledge while also codifying that knowledge. The “Structured Utilizers” use codification and exploitation strategies concentrating on codification of knowledge when sustaining their new product development efforts to improve their existing products, and the servicing of their existing clients to achieve higher process effectiveness. Such a strategy choice results in lower (within Taxonomy A) product effectiveness than the exploration alternative (Type III has a higher product effectiveness than type I) and in higher process effectiveness than the tacitness alternative (Type I has a higher process effectiveness than type II) based on our research results. Take for example NASA. NASA invested heavily in KM and in codification of knowledge and the appropriate IS/KBS systems. These strategies allow them to keep delivering on their mission, while reducing their budget and downsizing. BUT, the price of this strategy was significant system and mission failures, and learning that the most valuable knowledge they have is tacit and that they don’t know how to capture or manage that tacit knowledge.

Type (II) companies employ the Intuitive Utilization strategy. Intuitive Utilization companies concentrate on exploiting their currently existing knowledge while maintaining this knowledge as tacit. The “Intuitive Utilizers” rely on tacitness and exploitation strategies, concentrating on maintaining the knowledge as tacit and focusing on sustaining their advantage in new product development to enhance their contemporary products, and the servicing of their existing markets. Such a strategy choice results in lower (within Taxonomy A) product effectiveness than the exploration alternative (Type IV has a higher product effectiveness than type II) and in lower (within Taxonomy A) process effectiveness than the codification alternative (Type I has a higher process effectiveness than type II). This seems to be the least effective strategy (out of the four mentioned here) based on our research results. Take for example a small sized iron casting company located in Northeast Wisconsin. The company had been very successful.
in the past and has a core of knowledgeable employees that are very good at what they do. A number of them are getting ready to retire, and the HR director has started the process of succession planning. To her surprise, she found that the most valuable knowledge of those middle level managers is not codified, as well as there are no individuals trained to replace those individuals when the time comes. Her first step was mapping alternative replacements as well as skills and competencies needed by the potential replacements.

Type (III) companies employ the Structured Innovation strategy. Structured Innovation companies concentrate on exploring new knowledge to the extent that it is feasible while codifying this knowledge. The “Structured Innovators” use codification and exploration strategies that concentrate on codification of new knowledge as sustaining new innovative product development and/or servicing new markets to attain higher process and product effectiveness. Such a strategy choice results in higher (within Taxonomy A) product effectiveness than the exploitation alternative (Type III has a higher product effectiveness than type I) and higher (within Taxonomy A) process effectiveness than the tacitness alternative (Type III has a higher process effectiveness than type IV). Out of the four mentioned here this seems to be the most effective strategy based on our research results. Take for example the company that adopted an Enterprise Resource Planning (ERP) system\textsuperscript{31} to improve on their process efficiency and effectiveness. The company was able to successfully implement the new software (and process) by modifying and adjusting its processes as required by the software and codifying them appropriately. Interestingly enough, during the implementation, the need to adjust the software to the processes and the need to tailor the training to the people and culture, suggested that significant aspects of knowledge were tacit and that caused some issues during the early stages of implementation.

Type (IV) companies employ the Intuitive Innovation strategy. Intuitive Innovation companies concentrate on exploring new knowledge as much as they can while maintaining this knowledge as tacit. The “Intuitive Innovators” use tacitness and exploration strategies that focus on developing contemporary innovative products and/or servicing novel markets while keeping their knowledge tacit. Such a strategy choice results in higher (within Taxonomy A) product effectiveness than the exploitation alternative (Type IV has a higher product effectiveness than type II) and in lower (within Taxonomy A) process effectiveness than the codification alternative (Type III has a higher process effectiveness than type IV) based on our research results. Take for example the heavy manufacturer and engine producer, which realized that their company need to incorporate a new to the company, electronic, engine control technology. In order to accelerate the process, the company acquired that knowledge from an external partner (see strategy C below). Originally, there was a complete misunderstanding of and underestimation of the complexity of the technology. The first round was a complete failure. The second round was a successful process, but the product was not in par with the market. Only in the third attempt did the company find the right partner and had the right process in place to integrate the external knowledge into their product. Compare that with the Chinese car manufacturer that realized it was embarking on a quantum leap technological and social change and was able to bridge the gap by recruiting the right
managerial and technological leadership and by acquiring the knowledge by using an appropriate intermediary that was rewarded appropriately.\textsuperscript{32}

**Exploration-Exploitation and External Acquisition-Internal Development Strategies**

Our research findings (Russ et al., 2006 and Russ and Jones, 2006) suggest that the combination of the Exploration-Exploitation and of the External Acquisition-Internal Development dimensions is also significant (see Taxonomy B in Figure 4 below).

![Figure 4: Taxonomy B - Exploration-Exploitation and External Acquisition-Internal Development Strategies (Russ et al., 2006. Used with permission. ©Inderscience).](image)

Type (A) companies employ the External Utilization strategy. External Utilization companies concentrate on exploiting their presently obtainable knowledge while focusing on their core activities and utilizing knowledge and capabilities from the outside to the extent that it is feasible for everything else. The “External Utilizers” employ external acquisition and exploitation strategies concentrating on their core capabilities to enhance their existing products and the servicing of their existing markets while concentrating on developing close relationships with external constituencies. This seems to be the least effective strategy in terms of product effectiveness (out of the four mentioned in Taxonomy B) based on our research results. This might suggest that outsourcing strategies might not be the most effective when “product based outcomes” (for example new product development outcomes) are the focus of the strategy. However, this may not prevent this strategy from being the most appropriate with regard to process efficiencies (for example, cost cutting).

Type (B) companies employ the Internal Utilization strategy. Internal Utilization companies concentrate on exploiting their currently existing knowledge while focusing on developing most of the knowledge they need internally. The “Internal Utilizers” employ internal development and exploitation strategies concentrating on internally
developing the knowledge they need to improve their existing products and the servicing of existing markets while concentrating on developing close relationships within the company.

Type (C) companies employ the External Innovation strategy. External Innovation companies concentrate on exploring new knowledge focusing on their core activities while acquiring the rest of the knowledge from external sources. The “External Innovators” employ external acquisition and exploration strategies that concentrate on supporting new innovative product development and/or servicing new markets while centering their attention on developing close relationships with external constituencies.

Type (D) companies employ the Internal Innovation strategy. Internal Innovation companies concentrate on exploring new knowledge to the extent that it is feasible while developing most of the knowledge they need internally. The “Internal Innovators” employ internal development and exploration strategies that concentrate on internally embracing the new knowledge needed to support new innovative product development and/or the servicing of new markets to achieve higher product effectiveness. This seems to be the most effective strategy (out of the four mentioned in Taxonomy B) based on our research results.

Codification-Tacitness and External Acquisition-Internal Development Strategies

The findings of our earlier research (Russ et al., 2006, and Russ and Jones, 2006) also suggest that the combination of the Codification-Tacitness and that of the External Acquisition-Internal Development dimensions might be of importance (see Taxonomy C in Figure 5 below).

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Figure 5: Taxonomy C - Codification-Tacitness and External Acquisition-Internal Development Strategies  (Russ et al., 2006. Used with permission. ©InderScience).
Type (1) companies employ the External Codification strategy. External Codification companies concentrate on codifying their core activities and utilizing knowledge and capabilities from the outside to the extent that it is feasible for everything else. The “External Codifiers” employ external acquisition and codification strategies focusing on their core capabilities to enhance their products and the servicing of their markets.

Type (2) companies employ the Internal Codification strategy. Internal Codification companies concentrate on codifying the majority of their knowledge while developing most of the knowledge they need internally. The “Internal Codifiers” employ internal development and codification strategies that concentrate on internally embracing the new knowledge needed to support new product development and/or the servicing of their markets to realize higher product effectiveness. This appears to be the most effective strategy (out of the four mentioned in Taxonomy C) based on our research results.

Type (3) companies employ the External Tacitness strategy. External Tacitness companies concentrate on maintaining their core capabilities knowledge as tacit and utilizing knowledge and capabilities from the outside as much as feasible for everything else. The “External Intuitives” use external acquisition and tacitness strategies focusing on their core capabilities to enhance their products and the servicing of their markets while focusing their attention on developing close relationships with external constituencies. This appears to be the least effective strategy (out of the four mentioned in Taxonomy C) based on our research results.

Type (4) companies employ the Internal Tacitness strategy. Internal Tacitness companies concentrate on maintaining their knowledge as tacit as much as they can while developing most of the knowledge they need internally. The “Internal Intuitives” use internal development and tacitness strategies that concentrate on internally embracing the knowledge needed to enhance new product development and/or the servicing of their markets while concentrating on developing close relationships within the company.

Our recent study (Russ et al., 2008) suggested that the Product-Process dilemma might also be of significance. Below we describe the feasible taxonomies resulting from the combination of this dilemma with the other three dilemmas used above.

**Product-Process and External Acquisition-Internal Development Strategies**

The next taxonomy describes a combination of the Product-Process and that of the External Acquisition-Internal Development dimensions (see Taxonomy D in Figure 6 below).
Type (α) companies employ the External Product strategy. External Product companies concentrate their core activities on developing and managing their product strategies externally and using knowledge and capabilities from the outside to the extent that it is feasible for everything else. The “External Product” companies employ external acquisition to improve and/or develop their new products concentrating on their core capabilities to service their markets while making sure that their reward system is consistent and supportive of such activities.

Type (β) companies employ the Internal Product strategy. Internal Product companies concentrate on developing most of the product knowledge they need internally, while using as little knowledge and capabilities as possible from the outside for everything else. The “Internal Product” companies concentrate their core capabilities on internal development to improve and/or develop their new products and use external partners to develop and service their markets, while making sure that their reward system is consistent and supportive of such activities.

Type (γ) companies employ the External Process strategy. External Process companies concentrate on maintaining their products and focusing their core capabilities knowledge on process improvement by using knowledge and capabilities from the outside as much as possible. The “External Process” companies use external acquisition and process improvement strategies concentrating on their core capabilities to improve their processes and the servicing of their markets while centering their attention on developing close relationships with external constituencies and while making sure that their reward system is consistent and supportive of such activities.

Type (δ) companies employ the Internal Process strategy. Internal Process companies concentrate on improving the process knowledge they need internally, while using as little knowledge and capabilities as possible from the outside for everything else. The “Internal Process” companies use internal development that focuses on internally
embracing the knowledge needed to support new process development and/or the servicing of their markets while focusing on developing close relationships within the company while making sure that their reward system is consistent and supportive of such activities.

*Product-Process and Codification-Tacitness Strategies*

The next taxonomy describes a combination of the Product-Process and that of the Codification-Tacitness dimensions (see Taxonomy E in Figure 7 below).

![Figure 7: Taxonomy E - Product-Process and Codification-Tacitness Strategies](image)

Type (א) companies employ the Codified Product strategy. Codified Product companies concentrate on codifying their knowledge of product development and management focusing on their core capabilities to improve their products and servicing their markets. The “Codified Product” companies sustain their process development efforts to improve their products and the servicing of their clients and achieve higher product effectiveness by using the most appropriate source of knowledge and using the appropriate IT systems to support their core capabilities as needed.

Type (ב) companies employ the Tacit Product strategy. Tacit Product companies concentrate on maintaining their knowledge of product development and management as tacit, focusing on their core capabilities to improve their products, and servicing their markets. The “Tacit Product” companies sustain their process development efforts to improve their products and the servicing of their clients and achieve higher process effectiveness by using the most appropriate source of knowledge and using the appropriate IT systems to support their core capabilities as needed.

Type (ג) companies employ the Codified Process strategy. Codified Process companies concentrate on codifying their process knowledge as much as possible. The “Codified
Process” companies employ codification strategies that concentrate on internally embracing the most appropriate source of knowledge and using the appropriate IT systems to support their core capabilities that will result in higher process effectiveness.

Type (τ) companies employ the Tacit Process strategy. Tacit Process companies concentrate on maintaining and developing their process knowledge as tacit as much as they can. The “Tacit Process” companies use tacitness strategies that focus on internally embracing the knowledge and the use of appropriate IT systems to support process development and/or the servicing of their markets while focusing on developing close relationships within the company.

Product-Process and Exploration-Exploitation Strategies

The next taxonomy describes a combination of the Product-Process and that of Exploration -Exploitation dimensions (see Taxonomy F in Figure 8 below).

<table>
<thead>
<tr>
<th></th>
<th>Exploitation</th>
<th>Exploration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Product utilization</td>
<td>Product innovation</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Process Utilization</td>
<td>Process innovation</td>
</tr>
</tbody>
</table>

Figure 8: Taxonomy F - Product-Process and Exploration-Exploitation Strategies

Type (ι) companies employ the Product Utilization strategy. Product Utilization companies concentrate on exploiting their currently existing product knowledge while servicing their existing and/or new markets. The “Product Utilization” companies employ existing and/or new processes concentrating on their core capabilities to enhance their product strategies, focusing on their core activities and using knowledge and capabilities to the extent that it is feasible for everything else.

Type (ω) companies employ the Product Innovation strategy. Product Innovation companies concentrate on exploring new knowledge focusing on new product development activities while utilizing their existing knowledge for the non core activities. The “Product Innovation” companies employ product and exploration strategies that concentrate on supporting new innovative product development and/or the servicing of
new markets while centering their attention on delivering those products to their customers.

Type (ﷺ) companies employ the Process Utilization strategy. The “Process Utilization” companies employ process and exploitation strategies concentrating on utilizing their currently existing process knowledge while also focusing on improving their process strategies and the servicing of existing markets.

Type (ﷺ) companies employ the Process Innovation strategy. Process Innovation companies concentrate on exploring new process knowledge to the extent that it is feasible. The “Process Innovation” companies employ internal and/or external resources for development of new processes to service their markets while improving on their process strategies.

There are two additional dimensions of the C³EEP typology that were not yet used for KM strategy taxonomies (Complementary-Destroying and Concealment-Transparent). We suspect that these two dilemmas will become more and more important due to recent Information and Communications Technology (ICT) trends. The question raised here is, which of the nine plausible combinations that the two dilemmas are adding in combination with the previously mentioned four are of more importance (if there is any difference in importance)?

One answer would be to look into the number of levers (see Table 1 below) shared by any two dilemmas. Interestingly, the one that has the most (three) is also one that is very intriguing to us as well as one that is probably one of the less understood by the popular and academic literature.

*Complementary-Destroying and Exploration-Exploitation Strategies*

The next taxonomy introduced in this chapter is the Complementary-Destroying and the Exploration-Exploitation dimensions (see Taxonomy G in Figure 9 below).
Figure 9: Taxonomy G - Complementary-Destroying and Exploration-Exploitation Strategies

<table>
<thead>
<tr>
<th>Type</th>
<th>Exploitation</th>
<th>Exploration</th>
</tr>
</thead>
<tbody>
<tr>
<td>あ</td>
<td>Complementary utilization あ</td>
<td>Complementary innovation い</td>
</tr>
<tr>
<td>い</td>
<td>Destroying Utilization う</td>
<td>Destroying innovation え</td>
</tr>
</tbody>
</table>

Type (あ) companies employ the Complementary Utilization strategy. Complementary Utilization companies concentrate on exploiting their currently existing product and process knowledge while servicing their existing markets. The “Complementary Utilization” companies employ existing processes concentrating on their core capabilities to enhance their product strategies, focusing on their core activities and using knowledge and capabilities to the extent that it is feasible for everything else. Such a strategy can be very successful in the short term but since no options for responding to future changes are acquired, the company is taking on significant risk for the medium and long terms.

Type (い) companies employ the Complementary Innovation strategy. Complementary Innovation companies concentrate on exploring new knowledge focusing on new product and process development activities while adding this knowledge to its existing knowledge base and enhancing its value. The “Complementary Innovation” companies employ product and exploration strategies that concentrate on supporting new innovative product development and/or the servicing of new markets while centering their attention on delivering those products to their current and new customers. Such a strategy might create some short term risks, but if successful, could provide for mid term success. In long and mid term product life cycle (PLC) industries, this might even be successful long term. In industries that have short PLC, this strategy might be risky long term.

Type (う) companies employ the Destroying Utilization strategy. The “Destroying Utilization” companies employ counter intuitive strategy since they utilize some existing aspects of their knowledge base while destroying the value of it in other aspects. For example, a company can utilize their currently existing process knowledge while at the same time moving to a completely new product market, where it will need to develop new knowledge to serve new customers. Under this strategy, the transition is slow, and the new product market must be close to the old one, see for example the GM strategy of penetrating the Chinese market. Such a strategy might create some short term risks, but if successful, could provide for midterm success. In long and midterm product life cycle
(PLC) industries, this might even be successful long term. In industries that have short PLC, this strategy might also be risky long term, but on the other hand, the transition into a new product market could provide a valuable option for the future.

Type (习近) companies employ the Destroying Innovation strategy. Destroying Innovation companies concentrate on exploring new product and process knowledge to the extent that it is feasible, while also destroying the value of their current knowledge base. The "Destroying Innovation” companies employ internal and/or external resources for development of new processes and products to service new markets. An example here would be Corning which in the late 90s and early 2000s, moved completely away from its kitchenware markets into the fiber communication, high-tech glass markets. The company invested heavily and successfully in R&D of new technologies and products taking significant technological risks and facing financial markets criticism for years of poor performance. Luckily, long term success paid off for the risk taken. Such a strategy will create high short term risks, and also could provide for midterm risks. In industries that have short PLC, this strategy might provide the only option to survive while creating a valuable alternative for the company.

The last two taxonomies introduced in this chapter were selected using similar criteria to the one used earlier (number of levers, see taxonomy G).

Concealment-Transparency and External Acquisition-Internal Development Strategies

The next taxonomy describes a combination of the Concealment-Transparency and the External Acquisition-Internal Development dimensions (see Taxonomy H in Figure 10 below).

<table>
<thead>
<tr>
<th></th>
<th>External Acquisition</th>
<th>Internal Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concealment</td>
<td>External Concealment</td>
<td>Internal Concealment</td>
</tr>
<tr>
<td>Transparency</td>
<td>External Transparency</td>
<td>Internal Transparency</td>
</tr>
</tbody>
</table>

Figure 10: Taxonomy H - Concealment-Transparency and External Acquisition-Internal Development Strategies
Type (甲) companies employ the External Concealment strategy. External Concealment companies concentrate their core activities on effectively developing and managing their product strategies internally, and using knowledge and capabilities from the outside to the extent that it is feasible for everything else. The “External Concealing” companies employ external acquisition to improve and or develop their new processes concentrating on their core capabilities to service their markets while making sure that their relationships with their customers are protected.

Type (乙) companies employ the Internal Concealment strategy. Internal Concealment companies concentrate on developing most of the product knowledge they need internally, while using as little knowledge and capabilities as possible from the outside for everything else. The “Internal Concealing” companies concentrate their core capabilities on internal development to improve and/or develop their new products and use external partners as little as possible to develop and service their markets, while making sure that their relationships with their suppliers and customers are protected.

Type (丙) companies employ the External Transparency strategy. External Transparency companies concentrate on maintaining their products and focusing their core capabilities knowledge on process improvement by using knowledge and capabilities from the outside while being transparent as much as possible. The “External Transparency” companies use external acquisition and process improvement strategies concentrating on their core capabilities to improve their processes and the servicing of their markets while centering their attention on developing close relationships with external constituencies and making sure that they are transparent with their suppliers and customers as much as possible, protecting only those aspects that are absolutely necessary.

Type (丁) companies employ the Internal Transparency strategy. Internal Transparency companies concentrate on improving the process knowledge they need internally, while using as little knowledge and capabilities as possible from the outside for everything else. The “Internal Transparency” companies use internal development that focuses on internally embracing the knowledge needed to support new process development and/or the servicing of their markets while focusing on developing close relationships within the company, making sure that they are transparent with their suppliers and customers as needed while protecting only those aspects that are absolutely necessary.

_Concealment-Transparency and Codification-Tacitness Strategies_

The next taxonomy describes a combination of the Concealment-Transparency and the Codification-Tacitness dimensions (see Taxonomy I in Figure 11 below).
Figure 11: Taxonomy I - Concealment-Transparency and Codification-Tacitness Strategies

Type (ㄱ) companies employ the Codified Concealment strategy. Codified Concealment companies concentrate on codifying their knowledge of product and process development and management, focusing on their core capabilities to improve their products and processes and servicing their markets. The “Codified Concealment” companies sustain their process development efforts to improve their products and the servicing of their clients to achieve higher product effectiveness by using the most appropriate codified source of knowledge while concealing the knowledge both internally and externally and using the appropriate IT systems to support their core capabilities as needed.

Type (ㄴ) companies employ the Tacit Concealment strategy. Tacit Concealment companies concentrate on maintaining their knowledge of product and process development and management as tacit, focusing on their core capabilities to improve their products and processes and servicing their markets. The “Tacit Concealment” companies sustain their process development efforts to improve their products and the servicing of their clients to achieve higher process effectiveness by using the most appropriate tacit source of knowledge, while concealing the knowledge both internally and externally and using the appropriate IT systems to support their core capabilities as needed.

Type (ㄷ) companies employ the Codified Transparency strategy. Codified Transparency companies concentrate on codifying their product and process knowledge as much as possible, while making it available both internally and externally as much as needed. The “Codified Transparency” companies employ codification strategies that concentrate on internally embracing the most appropriate source of knowledge and using the appropriate IT systems to support their core capabilities sharing this knowledge as needed and
resulting in higher process effectiveness, protecting only those aspects that are absolutely necessary.

Type (≡) companies employ the Tacit Transparency strategy. Tacit Transparency companies concentrate on maintaining and developing their product and process knowledge as tacit as much as possible, while making it available both internally and externally as much as they can. The “Tacit Transparency” companies use tacitness strategies that focus on internally embracing knowledge and the use of appropriate IT systems to support process development and/or the servicing of their markets while focusing on developing close relationships within and outside the company, protecting only those aspects that are absolutely necessary.

Conclusion

Our own research as well as that of others would suggest that companies are using a combination of the nine taxonomies mentioned above, and that there are more synergies between some of them than others. For example, the “Internal-Codifier-Innovator” strategy (“2” * “III” using our taxonomies notation) seems to be the most valuable in terms of product and process effectiveness (in our research, Russ et al., 2006). On the other hand, the “External-Intuitive-Utilizer” strategy (“3” * “II” using our taxonomies notation) strategy seems to be the least effective strategy. Miller et al. (2007) found within manufacturing firms that product strategies and exploration strategy together with a focus on radical innovation seem to work hand-in-hand as do process strategies and exploitation strategy with a focus on incremental innovation; which in our taxonomy translates into Product- Innovator- Destroyer and Process-Utilizer-Complementer.

Questions of interest can be raised here. Will some industries provide a more fruitful environment for different combinations than others? Will different sized companies have a tendency to use or avoid specific strategies and combinations of strategies? Also, what different key success indicators aspired to by the companies might be supported by different combinations of strategies? For example, outcomes of profitability and earnings might show different results.

KM Strategy Framework

If the six CEEP strategic dilemmas describe above are combined with the KM strategic levers and outcome measures identified in our earlier research, a possible framework for KM strategy emerges (see Table 1 below). This framework can help your company in developing a detailed KM strategy. The specific levers that were found to be of significance in regard to the strategic dilemmas as well as the outcome indicators in our earlier research are marketed with an “X” or with the specific typology identified in this chapter under each strategic dilemma.

This framework should provide KM practitioners with advice as to what to focus their attention on and where and how to allocate resources. For example, companies that are
investing greatly in IS technology and are utilizing the Codification strategy, are recommended to verify that their reward systems and employee utilization strategy (as well as culture) are aligned. Or, for example, companies that utilize the Exploration strategy should have an external market focus. Companies that have Product (versus Process) focus, are advised to ensure that their reward systems and their data and IT systems are aligned suitably with their strategy. Companies are also advised not to neglect the need to balance this internal focus with the necessity to expand new product development as part of the Exploration strategy.
Table 1 – KM Strategy Framework

<table>
<thead>
<tr>
<th>KM Levers/Outcomes</th>
<th>Codification versus Tacitness</th>
<th>Complementary versus Destroying</th>
<th>Concealment versus Transparency</th>
<th>External Acquisition versus Internal Development</th>
<th>Exploration versus Exploitation</th>
<th>Product/Service versus Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/Service Development-strategy</td>
<td>Taxonomy G</td>
<td>Taxonomy G</td>
<td>Taxonomy A, B, F, G</td>
<td>Taxonomies D, E, F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Product developed in the last two years-weight</td>
<td>Taxonomy G</td>
<td>Taxonomy G</td>
<td>Taxonomy A, B, F, G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market-Scope</td>
<td>Taxonomy G</td>
<td>Taxonomy G</td>
<td>Taxonomy A, B, F, G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>Taxonomies A, C, E</td>
<td>Taxonomies B, C, D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processes-Capabilities</td>
<td>Taxonomies A, C, D</td>
<td>Taxonomies B, C, D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employees utilization</td>
<td>Taxonomies A, C, E, I</td>
<td>Taxonomy I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rewards</td>
<td>X</td>
<td>Taxonomy H</td>
<td>Taxonomies B, C, D, H</td>
<td>Taxonomies D, E, F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The role of IT</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of IT and Data</td>
<td>Taxonomies A, C, E, I</td>
<td>Taxonomy I</td>
<td>Taxonomies D, E, F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Effectiveness</td>
<td>Taxonomy H</td>
<td>Taxonomy H</td>
<td>Taxonomies B, C, D, H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process Effectiveness</td>
<td>Taxonomy H</td>
<td>Taxonomy H</td>
<td>Taxonomies B, C, D, H</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Based on and modified from Russ et al., 2006.
**Final Conclusions**

This framework should provide KM practitioners, as well as academic researchers, with guidelines as to where to focus their attention, and where to focus resource allocation when considering alternative business and KM strategies and their alignment.

For example, our early research confirmed that Codification strategy sponsored by a KM supportive culture is effective when the center of attention is on the process outcomes, while the “Exploration-Codification-Internal Development” strategy is more effective when the center of attention is on the product outcomes. One possible explanation for this is that for processes to be effective, their codification might make it easier to manage and measure, while for New Product Development to be effective, discovering new needs and new customers might be more relevant. There is intricate academic literature corroborating the importance of innovation and new product development for sustaining competitive advantage. On the other hand, there is very little research done on process management and the importance of codifying tacit knowledge in processes, especially in the service sector. Such research should have major consequences since the productivity of services (at least some of them) is comparatively low, and since the service sector represents about 70% of the developed economies GDP.

As mentioned in our earlier research, we would like to remind the reader, that there is a crucial need to incorporate the aspects of organizational culture and the technology aspects of KBS in each KM strategy discussion, which unfortunately is rarely done.

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11 lanjouw and Schankerman, 2001; Cohen et al., 2000.
13 Lev (nd).
14 Lamming et al., 2001.
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Industry

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