Anticipating and Managing Three Dilemmas in Knowledge Management : Insights from an in-depth Case Study of a Major Diversified Firm

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Abstract. By reference to an in-depth case study of Siemens, a transnational, European-based high technology firm in the electronics and electrical engineering industry, the authors conclude that successful knowledge management requires close attention to three dilemmas. First, managers need to balance top-down and bottom-up approaches to knowledge management implementation. Second, successful knowledge managers balance high visibility and aggressive "selling" of the knowledge management initiative with a thoughtful reconciliation of top-management expectations over time. Thirdly, knowledge managers need to balance the tension between a short term orientation on "quick wins" of a single KM initiative and the longer-term orientation that anticipates the emergence of other knowledge management initiatives that compete for the commitment and attention of employees. In this article, the authors propose a holistic frame of reference for knowledge managers that is geared to anticipating and managing the three dilemmas.

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Anticipating and managing three dilemmas in knowledge management: Insights from an in-depth case study of a major diversified firm[1]

Introduction

This paper reports longitudinal research carried out at Siemens, a transnational, European-based, diversified firm in the electronics and electrical engineering industry. Using a qualitative research design, we interviewed 51 managers from this organization regarding their approach to knowledge management (KM). During these interviews, we consistently asked the interviewees questions such as "What organizational processes must be in place to make a KM project successful?" "What is the role of top management in pushing KM initiatives?" "How can KM initiatives be made more user-friendly?" While the answers to these questions at first glance varied greatly in content, their underlying structure was strikingly similar, the refrain being "We should do 'a,' but we must also not lose sight of 'b,'" "A good idea would be to do 'x,' however, 'y' always comes in the way."

The reactions we found are perhaps neither surprising, nor new, and may even constitute the very nature of managerial decision making: caring about difficult-to-manage dilemmas (Peters, 1996). It seems therefore particularly surprising that in the context of KM, this key-defining feature of managerial work has so far not been investigated. It seems even more remarkable that attention to the dilemmas of KM is outstanding, given that the concept has been around for over half a dozen years. More and more large, established companies have appointed chief knowledge officers, and are building extensive KM systems. Initiatives such as best practice sharing, communities of practice, intranet-based knowledge sharing platforms, yellow page systems abound. The experiences of the "Most Admired Knowledge Enterprises" (APQC, 2001) such as Siemens, British Petroleum, Accenture, Xerox, Nokia, and Skandia, are recounted in an increasingly large business literature (e.g. Davenport and Probst, 2002; Doz et al., 2001; Probst, et al., 1999; Davenport and Prusak, 1998; Nonaka, 1994). As Siemens' CEO Heinrich von Pierer observed already in the early 1990s, "Today 50% of the value-added at Siemens comes from knowledge-intensive products and services." In 2002, von Pierer emphasized "today, between 60 and 80 percent of the value added Siemens generates is linked directly to knowledge – and the proportion is growing further" (Davenport and Probst, 2002, 3).

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The less often recounted fact is that most KM initiatives fall short of producing the results they were supposed to. The popular press pegs the failure rate of knowledge management projects as high as 50%. According to Morehead, director of organizational research at British Telecommunications PLC, the rate could even be 70%: "Most knowledge management projects simply don't hit their stated goals and objectives, so that 70% doesn't mean they fail totally - it means that they don't accomplish what they set out to do" (Computerworld, July 3, 2000). These challenges are exacerbated if seen against the background of the current economic downturn. When knowledge management emerged on corporate agendas six years ago, most of the world economy was in a growth mode. After the new millennium, many companies experienced substantial decreases in demand for their products and services. As a result of shrinking corporate budgets, many firms had to close down or substantially decrease their commitment to nurturing intangible capabilities such as KM – particularly if the KM initiative under way has been faltering (Davenport and Probst, 2002, 8).

Dissatisfaction with KM performance has even prompted some managers to predict that the "knowledge hysteria" of the last years may be nothing more than an ephemeral management fad. Is this a premature obituary? Experiences of knowledge managers all seem to point in the same direction: as much as 70 percent of these initiatives fail to produce the desired results. In other words, the lack of success cannot be attributed to any particular type of KM initiative. It rather appears to be endemic. What are the reasons for this discouraging result almost a dozen years after the concept of KM appeared on managerial agendas (e.g. Senge, 1990; Nonaka, 1994)?

Unfortunately, there has been much silence in the literature, and particularly in the empirical literature, regarding the causes for these drawbacks. While there has been some research on the "deadliest sins" to be committed in KM (e.g. Schneider, 2001; Fahey and Prusak, 1998), much of this research was conceptual or based on anecdotal evidence. Given the sensitivity of the data involved, and the corollary difficulty of access to these data, it comes perhaps as no surprise that we find so little empirical research in academic publications on the challenges, paradoxes, and tensions that KM initiatives are often faced with. Nevertheless, we have seen some recent empirical work on the overemphasis of information technology at the expense of managerial and organizational/ cultural processes necessary to establish a "knowledge culture" (e.g. Doz et al., 2001; Hausschild, et al., 2001). However, these contributions seem to

paint a somewhat simplistic, black-and-white picture of the high-tech versus high-touch debated that ignores a fundamental complexity residing in all managerial work: that of balancing difficult-to-manage dilemmas, i.e. the gray zone of paradoxes, vicious circles, and tensions that derive from the activities of managers that are differently situated in the organization and respond differently to organizational and external variables.

To accommodate these variables, in the research reported in this paper, we take a longitudinal, process-based and behavioral focus and attempt to shed more light on the political and contextual factors of KM that must not be neglected. After having researched in detail the single-largest KM initiative in the history of Siemens (Davenport and Probst, 2002; Jonczyk, 2001), and followed closely a number of other KM initiatives, we have come to the conclusion that successful KM initiatives require anticipating and managing three dilemmas of KM: balancing top-down versus bottom-up approaches to KM, balancing high-profile visibility with inflationary top management expectations regarding the value-added of KM, and balancing the need for quick wins with the long-term systemic integration of the KM project in the fabric of the organization. None of these dilemmas are new. However, most companies we have researched tend to overlook one or two or sometimes all three of them. Successful KM initiatives have paid close attention to all three of them.

Before we turn to these three dilemmas, we briefly outline our methodology and research design. In the final section of this paper, we wrap up our main conclusions, and give implications for the existing literature and managerial practice.

Methodology

Lack of prior theorizing in the realm of dilemmas in KM suggested an inductive, longitudinal research approach. A qualitative method, the single-embedded case study (Yin, 1994) was chosen as the best way to arrive at an in-depth understanding of the dilemmas that surround KM. Below, we briefly recapitulate our data collection and –analysis approach and also report on relevant details of the research setting.

Research design

For this paper, managers from different levels in the organization, different functional groups, and different businesses who had been involved in the company's KM activities were formally interviewed over a two-year period. All in all, 41 Siemens managers were interviewed. Over time, many of the managers previously interviewed were contacted again to clarify differences and discrepancies in the interview accounts, and to stay abreast of the newest developments at the company. This amounted to 51 interviews, yielding a total of 344 typewritten, legal-size pages of interview summaries. The level of analysis was the corporate- and business unit-level (where we studied a business unit in the telephony industry). In line with the single-embedded case study approach, we identified several units of analysis that were 'embedded' in the overall organizational context (Yin, 1994, 46-50). Thus, the units of analysis were the specific KM initiatives on our two levels of analysis (see Table 1 for an overview of these projects and their stage of development). In this manner, five case histories were produced, based on the five KM projects studied.

Table 1 about here.

Interviews were conducted in part by us, in part by research assistants, and in part by Siemens managers. Our approach to data collection allowed for extensive researcher triangulation. To illustrate, comparing our own interview notes with those of the research assistants and managers showed congruency, suggesting that the data was internally valid and reliable (Yin, 1994). In addition to such researcher triangulation, all transcripts and draft reports were reviewed by the managers who participated in the study in order to check for systematic biases in the interview accounts (Ruigrok, Gibbert, and Kaes, 2002).

The selection process for the interviewees was straightforward: when the agreement to collaborate in the research was granted, the initial discussions led to the most important individuals involved in the key projects investigated (in the literature, this approach is sometimes called "snow-ball sampling" (e.g. Denzin and Lincoln, 1994). The researcher sought to identify three types of participants: "front line," day-to-day partners (e.g. development team leaders), more senior executives who played a key role (e.g. the division managers), and senior line managers who were directly involved in key projects investigated (e.g. the Chief Knowledge Officer at Siemens).

The formal interviews lasted between 20 minutes and 190 minutes, with most lasting for 60 minutes. Interviews with a new interviewee were semi-structured.[2] Follow-up interviews were structured, for clarification about key events, people and issues identified. A major benefit arising from this approach is that it was possible to interview more people than originally planned, since respondents often mentioned names of other employees that might be interesting additional sources of data. This enabled us to access a comprehensive set of interviewees, and also made it possible to record the convergence and divergence in interviewees' views on various key problems and critical situations throughout the KM projects studied for this paper. Over time, in line with the constant comparative method (Strauss and Corbin, 1990; Glaser and Strauss, 1967), the interview outline was adjusted to help us in refining the theoretical perspective being generated and to confirm that he was assessing level-specific logics of action, rather than simply recording believes and attitudes of the individual interviewed (Doz, 1996; Yin, 1994; Eisenhardt, 1989).

In all interviews, extensive use was made of archival data to prepare the interview, to challenge interviewees' memories and to corroborate interview data. This helped us contain the difficulties associated with possible interviewees' selective retrospective biases and also helped to recreate the managers' "temporal and contextual frame of reference," which is considered essential for good quality case study research (e.g. van den Ven, 1992). In addition to the formal interviews, informal direct and participant observations were made. The inclusion of these archival data as well as participant and direct observation-derived data allowed for extensive data triangulation adding richness to the evaluation and interpretation of the five cases, thereby enhancing internal and construct validity of the conclusions drawn (Stake, 1995, Yin, 1994; Miles and Huberman, 1994). Finally, concerns for external validity (particularly statistical generalizability) were traded off against the opportunity to gain in-depth insights, but cross case analyses involving the five case histories we produced were used to ensure at least analytical generalizability (Davenport and Probst, 2002; Yin, 1994, Eisenhardt, 1989; 2).

The number of interviews eventually conducted (51) compares favorably with the literature (see, e.g. Lovas and Goshal, 2000; Stake, 1995; Pettigrew, 1990). Taken together, we hope that our research design has made it possible to get the kind of overview and in-depth picture

[2] The interview guideline is available upon request from the authors.

of the company's KM initiative that should characterize a well-grounded case study (see Denzin and Lincoln, 1994; Eisenhardt, 1989).

Research setting

The research reported here was carried out at Siemens, a transnational, European-based, diversified high technology firm in the electronics and electrical engineering industry. In the early 1990's, Siemens had faced a significant increase in the complexity of its core business, mainly due to the deregulation of the telecommunications equipment supplier market. Since telephony was the company's core business, the deregulation in the competitive landscape also affected its other business operations significantly. In particular, this deregulation resulted in an increase in new entrants to the market. On average these companies were far more entrepreneurial than the incumbents, highly sensitive to price, and insisted on rapid innovation. Their emphasis was on customized product and service packages, which were highly knowledge-intensive. This was in stark contrast to the integrated, state-owned customers Siemens was serving in the past.

As a consequence, Siemens was challenged to lower costs and innovate new products and services simultaneously, at a pace not experienced previously. But the changing telecommunications landscape also brought new opportunities: while the new business reality threatened profit margins of the established business, it also opened up new business in the service- and knowledge-intensive business which had high profit margins. To illustrate, the new entrants needed fresh business analysis and planning to accommodate the rapidly changing markets in which they operated, but many did not have the resources or experience to handle this. Most of them were also start-up ventures without sufficient capital to make cash equipment purchases, which led to their demanding new means of financing and innovative contracts. In the deregulated telecommunications market, a customer could therefore expect a supplier like Siemens to provide most of the services involved in running a telecommunications-service business, including financing, business planning, engineering, and operation. The complex service and product packages that Siemens wished to sell to its end-user had become known as "solutions."

As a result, solution-creation and solution-selling became key competitive levers for Siemens. This meant that the individual sales representative at the company had to effectively sit jointly

with the customer and develop an integrated solution for the customer's business problem. In other words, the sales representative had to act more like a consultant than person simply selling a pre-packaged product or applications. One former sales representative succinctly summarized the implications arising from this new way of working as follows:

> "We have to unlearn to think in packaged products and applications. The way we work together is the most important clue to success. Once we start negotiations about a new project with the customer, we quickly have to identify internal and external qualified people to build and operate these new businesses jointly with the customer. Because of the multifaceted knowledge needed, we have to learn how to source our knowledge from the right sources in our company."

The case study evidence demonstrated that Siemens could no longer rely just on former product knowledge. Where in the past Siemens' sales representatives had often anticipated customer needs even before they had been articulated, they now had to guess, sense and discuss the complex needs of the new entrants to the telecommunications market. Doing so meant that the salesperson had to gather information about the new clients and develop in-depth knowledge about the customer's way of doing business beforehand. Unlike their established customers who had placed orders in a relatively foreseeable way, these new customers had latent wishes, which had to be leveraged.

It was clear for Siemens that the new consulting role would be far more time-consuming and demanding than simply "moving boxes," as the product selling business was often called in the company. Successful solutions selling required that the organizational set-up and competencies needed to be geared towards purposefully identifying and quickly sharing relevant information and knowledge across markets around the world, and continually refining Siemens' competencies to keep up with market developments. The goal was to detect local innovations and leverage them on a global scale by implementing KM initiatives.

Results of our case-study research

After having discussed the research approach and the research setting, we can now turn to our results of our case study research. Using the inductive case-study method, we have found

three central dilemmas of KM, which we discuss in terms of (a) an appreciation of the dilemma, and (b) a discussion of how the researched organization managed the dilemma.

Dilemma number one: balancing top-down versus bottom-up approaches

Anticipating the dilemma

The case study data reported here shows that a fundamental consideration in the implementation of KM initiatives is the relative merits of more standardized top-down versus highly differentiated bottom-up approaches. The case study data reported here reflect important problems associated with a relatively standardized top-down approach. In the telephony business unit, for instance, a major problem with the overall KM concept was the desire to provide a standardized "one size fits all" KM service that could be used by virtually everyone within the company's sales department for virtually every problem the sales representatives could possibly encounter. Some interviewees described even this initiative as "evangelical" in character. One problem with the standardized top-down approach was that it was not sufficiently sensitive to the already existing personal networks, and the media by which these networks were (self) organized. To illustrate, one senior sales representative asked: "What is the value added of having a formalized, impersonal tool on the intranet for this, when I can get the same information with my telephone by simply relying on personal contacts?"

The case data across the projects researched consistently demonstrated that there are quite different needs and expectations within individual groups of employees as to possible KM applications. The platform in the telephony business unit, for example, was geared towards accommodating the knowledge requirements of two types of employees: service technicians and sales representatives. However, the two differed greatly with respect to their knowledge requirements and modes of retrieving the knowledge they needed. To illustrate, service technicians tended to be much more inclined to show their colleagues the newest technical tips and tricks by using the intranet platform established for this propose. The sales representatives, however, were much more reluctant to share knowledge gathered about customers. On top of that, due to their having to travel to customers often, the intranet-based platform was neglected in favor of the mobile telephone. Thus, sales representatives would rely on existing personal networks to retrieve their knowledge, and the tool used for this purpose was the tool they were most used to: their mobile phone.

It would appear that in order to be successful, KM has to be sensitive to, and accommodate these different needs and requirements through involving the potential users of the KM initiative in designing the initiative. To accommodate different needs, a bottom-up approach can be helpful. In the telephony business unit, one interviewee called this using an "infection" approach:

> "To implement knowledge management in a company, you need to work with viruses. Infections must concentrate on small teams and their specific needs and requirements. These teams need to be confronted with the benefits of knowledge management to their job, such as less over-time hours, better quality offers, and an edge over the competition. As with biological viruses, the infected teams will spread the virus and infect others as the benefits materialize."

Interviewees in the same business unit further advocated a bottom-up approach, because they perceived the bottom-up method as creating a feeling of mutual trust, since it used existing networks rather than imposing artificial new ones. The virus would spread within teams as they co-operated naturally with one another, and would eventually link all the employees in a large knowledge-sharing network.

Similarly, in one KM project on corporate level, an important concern was the adequate positioning of the KM initiative as a true value-adder that helps to solve relevant problems in employees' day-to-day work. It was critical to emphasize this in order to prevent the KM platform from being portrayed as "yet another headquarters project that would be demanding precious resources," as one line manager put it. It started with the platform's development as a joint effort of a core team of sales people from all over the world who recognized that local sales and marketing people felt that they too had a vested interest in the development of such a system.

Another example for this bottom-up approach was the second corporate-level project. Here, KM started bottom-up with a request for corporate support of a previously informal community of employees that were interested in KM. This community had started off with fifteen members. The ambition was to have a formal organizational platform for sharing thoughts and experience about KM activities. The community members began to meet (more

or less accidentally) and started to exchange their experience and their knowledge of KM. If a problem occurred, they would get in touch with each other. Informally, they began telling one another stories about their successes or failures in the handling of knowledge until, finally about a year after their appeal, the formal community was founded. After its inception, the community grew rapidly as a result of an ever-increasing interest in KM topics within Siemens. As time went on, the community involved more staff in actively contributing towards the transfer of knowledge across all hierarchical and group levels. However, this approach eventually produced almost 120 different groups, chat forums, communities of practice and knowledge repositories. A rich diversity of available tools and mechanisms that one user described as "mind boggling – you simply don't know where to look."

Overall, a careful balancing act seems to be needed. On the one hand, strong involvement of users in the design of KM initiatives can lead to useful differentiation in order to satisfy the individual knowledge requirements of your employees. Similarly, more specialized, focused initiatives will be more easily measured, and may be better supported by managers who are responsible for a unit's financial performance. However, the potential pitfalls of a more differentiated approach should not be overlooked, either. Its logical result can be a highly fragmented portfolio of greatly specialized – and often fragmented - initiatives. In other words, building the grand database in the sky to house all the company's knowledge seems to be as wrong as letting a myriad of highly differentiated initiatives emerge bottom-up.

Dilemma number two: balancing high profile visibility with management expectations

Anticipating the dilemma

The case study evidence showed that the question - who is the primary customer of KM – is difficult to answer. Intuitively, one would think that the employee who actually uses the KM system and is supposed to share his knowledge would constitute the primary customer of the KM initiative. However, our data showed that the assumption of KM's needing to be sold only to potential users, is but a part of the truth: another critical stakeholder of knowledge management is top management. Therefore successful KM demands formal consideration of top management perceptions and interests.

While this is true for many change-management approaches, the case data demonstrated that achieving high visibility in top management circles is relevant for investments into intangible

skills and capabilities such as KM. Instead of starting with a low-profile project, interviewees said that in order to get the greatest leverage in the organization, a high value business problem had to give the impetus to KM. A viable business case was also the key requirement in the telephony business unit. Here, the KM initiatives were invariably portrayed as leading to substantial revenue increase and cost savings, by "putting all our joint knowledge at the fingertips of the individual sales person as he negotiates with the customer," as the telephony business unit's CEO put it.

Our data furthermore clearly demonstrated the need to "sell" KM initiatives to top management, even though the envisaged benefits have been largely speculative at the time they were voiced. This shows an important second dilemma inherent in KM. The first dimension of this dilemma is that KM initiatives need to be "sold" aggressively to top management in the early phase of the implementation. Indeed, perhaps the most important critical success factor for making global knowledge sharing happen is the sustained support by top management. To illustrate, in the corporate project, top management's support enhanced the value and strategic quality of the KM initiatives and sent a signal to channel organizational resources and individual commitment towards this initiative. Management helped to push the KM initiative across organizational levels and functional departments to ensure its added value was understood and appreciated.

However, the case study data also showed that unfortunately, knowledge managers are often finding it difficult to fulfil their initial claims regarding the viability of the business case when the initiative matures. This is further exacerbated by two factors: first by the difficulty to quantify the value-added of KM, and second by the effects of an economic downturn. With regard to the first factor, while the literature often argues that KM represents a process that can create substantial value for the company, unfortunately, the quantification of this added value and particularly the role of KM in the creation of this added value is often problematic in a real business setting. Many observers in academia and practice have been wrestling with the establishment of success criteria and corollary measures for KM. Unfortunately; manifestation of its intrinsic potential to increase the financial bottom line of a business often remains elusive. Not surprisingly, due to the problematic quantification and communication of their benefits, KM initiatives tend to face problems of "legitimization." Clearly the second factor, economic downturn, further exacerbates the problem of legitimizing the sometimes-significant investments in intangible corporate capabilities.

In one telephony business unit project, for example, it was clear that the CEO's outlook on KM was still heavily influenced by initial claims that tended to be rather ambitious regarding the financial viability of the KM initiative that were made in the context of a bullish economy. Several interviewees noted that a key challenge was that perception by top management was ill-synchronized with realities, because it was still focused on the original claims and promises and generally appeared inappropriately constant over time. Interviewees in the telephony business unit said that the initial claims, while certainly appropriate in the conceptualization phase of the initiative, were increasingly anachronist as the initiative grew more mature. The result of this was a widening gap between the CEO's perception and the reality: the conceptualization phase was characterized by high-flying aims that were hard to keep up with as the initiative grew more mature. Hence, it seems critical to synchronize the outlook by top management on a given initiative in keeping with the evolution of its implementation process.

Managing the dilemma

The approach taken to manage dilemma number two at Siemens' telephony business unit was to delegate the responsibility for the KM initiative to an organizational entity, which was specifically set up for this purpose, and which was the highest decision-making body in the telephony business unit, which we shall call the "committee." The committee was composed of eleven members: One member served on the business unit's board, two members came from an internal consultancy, but the majority of the members were local company representatives. This guaranteed that the opinions of the local users of the KM tool would be heard and that they would be actively involved in the initiative. The size of the committee was deliberately kept small to enable its members to develop consistent decision-making competency and to react quickly to stimuli and suggestions from the field.

A viable business case was a fundamental key leadership factor for a successful KM initiative. Implementing an IT system, the motivation and reward system, the change of organizational structure and culture all contributed to making the KM tool in the telephony business unit very expensive. The KM tool, therefore, had to illustrate its benefits with a realistic business case to top management. The costs of sharing knowledge are quite obvious, the benefits are less so. Three types of more or less quantifiable benefits were delineated. First, the saving of costs, e.g. by re-using tenders or re-using knowledge on how to simplify

processes. Second, increased revenues, e.g. by increasing the quality of tenders by re-using knowledge of the success factors of tenders, or by simply being faster than the competition by re-using documents. Third, the alignment with customer needs, by recognizing important trends and developments worldwide.

Overall, while much "blowing the whistle" of KM seems indispensable to create the high-profile visibility and management support needed to kick-start an initiative, this behavior can backfire in later stages. As KM initiatives grow more mature, the emphasis often shifts to a more "hands-on" stadium, where good workmanship in an incremental, piecemeal fashion is needed. Yet, it is clear that a major mistake is the emphasis of such "good workmanship" at the expense of inspiring calls to arms in the later phases of the KM implementation, particularly when the general economic situation is faltering.

Dilemma number three: short term versus long-term

Anticipating the dilemma

How many well-conceived, well-funded change initiatives fail, because employees do not give them sufficient attention? This question becomes all the more important, especially if several KM initiatives compete for the attention of employees. A key characteristic of Siemens was that there was not one but many KM initiatives, which competed for the attention of employees.

Our case study evidence suggests that implementation of KM initiatives demands formal anticipation and recognition of other KM projects that could develop into "competitors." The case data show that clear communication of the value proposition of a given initiative relative to competing projects, is critical. For example, in the two cases of the telephony business unit we studied, KM initiatives that were implemented on a national, or even local level, saw themselves increasingly confronted by a myriad of progressively emerging KM projects on a global, corporate level. Coincidentally with this emerging competition, the conceptual and practical value-proposition boundaries of individual initiatives became increasingly blurred. In other words, employees often were not clear as to which database to enter their skill portfolio, and which platform to consult if they had to solve a business problem quickly. The result was considerable confusion about the relevance and applicability of individual KM projects, which impaired the willingness of employees to participate.

This was exacerbated because the global initiatives were naturally implemented on a much greater scale, and the in-house media attention largely overshadowed the more local initiatives, which one interviewee described as “low-level.” In addition to this, the global initiative used the English language, which many users were not as comfortable with. Especially so, since the project debriefings and other knowledge assets that employees were supposed to enter on this platform were in German, and people who had already entered this knowledge in one database were reluctant not only to enter it a second time, but let alone to translate it. It seems that ironically, while the global scope of corporate operations is one of the most important drivers for companies to introduce KM, it also poses tremendous challenges.

This dilemma suggests that pre-empting interference by rival KM initiatives demands co-ordination on a corporate level for the purpose of clear-cut value propositions. If such co-ordination on corporate levels is absent, great care should be taken to position individual value propositions appropriately, in order to sustain a ”competitive space” for each. The case data reported here show that the assumption that KM initiatives operate in a competitive vacuum, is naive.

Managing the dilemma

Managing this dilemma demanded carefully designing the knowledge-sharing platform itself. Careful design meant being more concerned about the managerial system and processes than about the technical aspects. In the telephony business unit, these managerial processes have been managed carefully from the first emergence of the knowledge-sharing platform. During the interviews, designers of this platform were convinced that while technology can certainly act as a facilitator for global knowledge creation and sharing, especially in the case of explicit knowledge, it is erroneous to believe that high-volume, quantitative data repositories could significantly improve organizational knowledge assets. Similarly, users of this tool said that since knowledge is not static, but subject to continuous modification, it cannot be frozen into depositories. In recognition of this, The KM tool in the telephony business unit had to ensure interactivity on an inter-departmental, inter-divisional, and inter-functional level.

The case study demonstrates that in many ways, the introduction of a KM initiative in a business unit or enterprise resembles the entry of a market in strategy analysis. Just as the

formulation of a market entry strategy demands a structural analysis of the industry in which the venturing company is to operate, so KM implementation emphasizes the need for a structural analysis of the organizational environment in which it endeavors to operate. This view seems useful in that it extends the notion of KM to incorporate an effort to deal with intra-organizational political and cultural forces. Although such "competitive analysis" is frequently accorded little prominence in the practice of KM implementation, it is evident from our case data that it can be a critical prerequisite for success.

These observations illustrate what needs to be done to manage the third dilemma in KM. Two dimensions characterize the dilemma. On the one hand, KM initiatives must accommodate, and be sensitive to, the needs of individualized clusters of local target customers, in order to produce "quick wins" short-term. On the other hand, there are merits in producing a standardized approach with "something for everyone" in order to compete with, and not lose ground to, alternative and larger knowledge -management approaches in a long-term perspective.

Discussion

In this section we first appreciate the limitations of our research approach. We subsequently discuss the results of our empirical findings in terms of implications for knowledge management theory and managerial practice.

Limitations of the research approach

This study is subject to the general limitations associated with field research in one organization (see Burgelman, 1994, as well as Eisenhardt, 1989 for a description of these general limitations). In addition to these general limitations, the empirical study has at least three specific drawbacks. The three specific drawbacks are limitations associated with the single-embedded case study method, limitations associated with the in-depth case study method, and finally limitations associated with our theoretical focus.

Generalizability: While grounded theorizing from single-embedded case studies has historically had an important role in the field of organizational theory and strategy (e.g. Burgelman, 1983, 1994; Doz, 1996), such research approaches suffer from the problem of questionable generalizability. Clearly, findings and propositions drawn from a single case

study, like the present one, no matter how carefully sampled and researched, deserve healthy caution (Burgelman, 1994, 53). The three dilemmas as they are presented here, can lay claim only to being a tentative framework, in need of further research and validation in a wider variety of contextual settings.

In-depth study of one, successful, organization. The research reported here was done in one successful high technology firm based in Europe. While it would be useful to study a larger sample of companies in other industries and cultural contexts, perhaps it would be more important to study failing organizations or failing projects in organizations (see Burgelman, 1994, 28), in order to avoid a "survivor bias." Furthermore, few systematic studies of problems and challenges associated with KM exist, and by concentrating on a single firm, we had the opportunity to access sources with intimate knowledge about the firm's specific approach to KM, and could examine in depth how the firm dealt with the dilemmas in KM. This allowed us to put ourselves into manager's contextual frame (van den Ven, 1992, 181), which is a hallmark of good case study research (Yin, 1994). However, it must also be acknowledged that this convenience of access could have biased our data, as interviewees were often demanding information and recommendations as a quid pro quo for allowing further observations (see also Doz, 1996).

Theoretical focus. To be sure, the three dilemmas dealt with here do not cover the entire range of paradoxes, tensions, challenges, and opportunities faced by knowledge managers. The study reported here specifically focused on processual, political, and contextual variables in a complex organization. This focus excluded a more in-depth investigation of the balancing of information technology (high-tech) with human resource issues (high-touch), for example (see Probst, et al., 1999). Similarly, while the three dilemmas may not be exhaustive, they are surely not totally mutually exclusive. Indeed, there is a common structure underlying all of them, as we shall discuss next.

Implications for knowledge management

The three dilemmas of KM attempt to provide new windows into "black box" of KM by focusing on the interaction of KM with processual, political, and contextual variables in complex organizations of the diversified type. By adopting this focus, we hope to contribute to the literature on KM (e.g. Probst, Raub, and Romhardt, 1999; Davenport and Prusak, 1998;

von Krogh and Roos, 1995). More specifically, in the research reported here, we have tried to portray the dilemmas in a positive-descriptive manner, in order for executives to anticipate and manage them. The three dilemmas hopefully help to explain paradoxes, vicious circles, and tensions in KM that derive from the activities of managers that are differently situated in the organization and respond differently to organizational and external variables.

By adopting this focus, we hope to be further contributing to the KM literature by opening it up to the rich insights from strategy process (e.g. Burgelman, 1983, 1994, 2002). For example, the three dilemmas help explain why the KM initiative in the telephony business unit was initially heavily pushed by top management, and how this top-down approach resulted in a "one size fits all" approach that was perceived as having little impact on the bottom line. Conversely, bottom-up approaches that are initially geared towards greater sensitivity to the individual users' needs and knowledge requirements resulted in an overly-differentiated patchwork of sub-initiatives and platforms that were hard to comprehend for employees desiring quick and efficient knowledge-retrieval. Firm-wide initiatives help to exploit the scale of Siemens' business and promise the development of a "knowledge culture." By contrast, more specialized, focused initiatives will be more easily measured, and may be better supported by managers who are responsible for a unit's financial performance.

In addition to this, the three dilemmas help explain why it is necessary to initially aggressively "sell" KM inside the organization, and particularly to top management, and why, paradoxically, this high-level lobbying can be counter-productive in the long run, because the difficult quantifiability of the value-added of KM makes it hard to live up to the expectations created. Finally, the three dilemmas help shedding more light on the competitive dynamics of various KM initiatives of different scope within one organizational setting. Thus, the three dilemmas explain why it is necessary to set a course between local and global KM initiatives. While we have seen that the global nature of Siemens provides a strong rationale for KM, it also creates difficulties. Siemens' business units have knowledge initiatives that cut across countries and continents, and other programs that work only within a particular country, and even within a specific region of this country. Employees must choose to allocate their attention and energies to either a global system or a local one. Many participants in knowledge initiatives may realize the value of a global system, but may also be more comfortable with the language of their home country. Our data show that the balance between local and global KM will be struck every day, and it is important to keep them in balance.

Implications for managerial practice

Our research allows us to draw two major implications for managerial practice. The first and foremost implication is to realize that there is no such thing in KM as a "silver bullet." At the same time, it must also be appreciated that KM is not a "catch 22" - the horns of each dilemma in and of themselves are not necessarily bad, rather over-emphasis on either can lead to failure. Therefore, it is important to keep both sides of the dilemma in mind and to manage the creative tension arising from them. In other words, when knowledge managers complain that they are stuck on one side of our dilemmas, our model helps to explain that while they are right, they are only half right (Stewart, 1996). Successful knowledge managers keep both ends of the three dilemmas in mind.

Secondly, managers should apprehend the basic pattern underlying all the dilemmas mentioned. While the three dilemmas are distinctly different, and are likely to be more pronounced during certain phases of the KM implementation than during others, there is a common denominator that combines them all. Thus, despite individual differences in the three dilemmas, we can collapse them into one overriding theme: *alignment versus empowerment* (see Figure 1, below). If we consider each side of the three dilemmas separately, what we find is that "top-down," "visibility," and "long-term" can be collapsed into "alignment." Similarly, "bottom-up," "reconciling top management expectations," and "short term" can be summarized in "empowerment." Thus, in line with Stewart (1996), we believe that our dilemmas in KM are all different, but they form one single, central dilemma: empowerment versus alignment, i.e. the eternal balancing act to give employees independence and authority while ensuring that they function along pre-defined guidelines.

Figure 1 about here.

As suggested in Figure 1, the idea is not to eliminate the vertical curve, but to use it to diagnose and deal with challenges in either ongoing KM initiatives, or to anticipate the challenges of planned initiatives.

Conclusions and suggestions for further research

We have argued that successful KM requires close attention to three dilemmas. First, managers need to balance top-down and bottom-up approaches to KM implementation. Second, successful knowledge managers balance high visibility and aggressive "selling" of the KM initiative with a thoughtful reconciliation of management expectations over time. Last but not least, managers need to balance the tension between a short-term orientation on "quick wins" of a single KM initiative and the longer-term orientation that acknowledges that a KM initiative seldom comes alone. Therefore, managers must be careful to position their KM initiative appropriately with existing or potential other KM initiatives that compete for the attention and energy of employees.

Our overall conclusion is that unfortunately, the reality of KM is not black and white. There is no single best or worst way in KM. Instead, knowledge managers need to realize that KM involves a complex balancing act between the dimensions of the three dilemmas discussed in this paper. By deliberately avoiding an either-or choice, and considering each aspect on its own, companies can strike the right balance between the trade-off relationships that constitute the three dilemmas. Our case study evidence reported here suggests that this balance must be struck every day, and can constitute a positive tension that will play out over time.

Future research would be necessary to establish if and to what extent, the three dilemmas reported here can be replicated in other contextual settings, or if, indeed, they are idiosyncratic to the organization researched. Particularly interesting would be to research unsuccessful, rather than successful KM initiatives. Furthermore, it should be fruitful to investigate if greater granularity in conceptualizing the dilemmas of KM is helpful. Such research could disaggregate the three dilemmas studied into a greater number of related dilemmas. It should thirdly be interesting to investigate what the different roles of managers are that cope with the dilemmas mentioned. For example, how do operational and/or middle managers from one organization perceive the dilemmas, and what is done on the various managerial levels to minimize their negative impacts? Addressing research questions along those lines should enrich the KM and organizational theory literatures, and our understanding of new forms of collaboration in complex firms (Hedlund, 1994; Doz, et al., 2001).

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Figures and Tables

Level of project \ Phase of project	Conceptual	Pilot	Organizational	Projects observed
Corporate	1 project	1 project	1 project	∑ 3 projects
Business Unit	1 project		1 project	∑ 2 projects
Overall ∑∑ 5 projects studied				

Table 1: Levels of analysis and projects studied

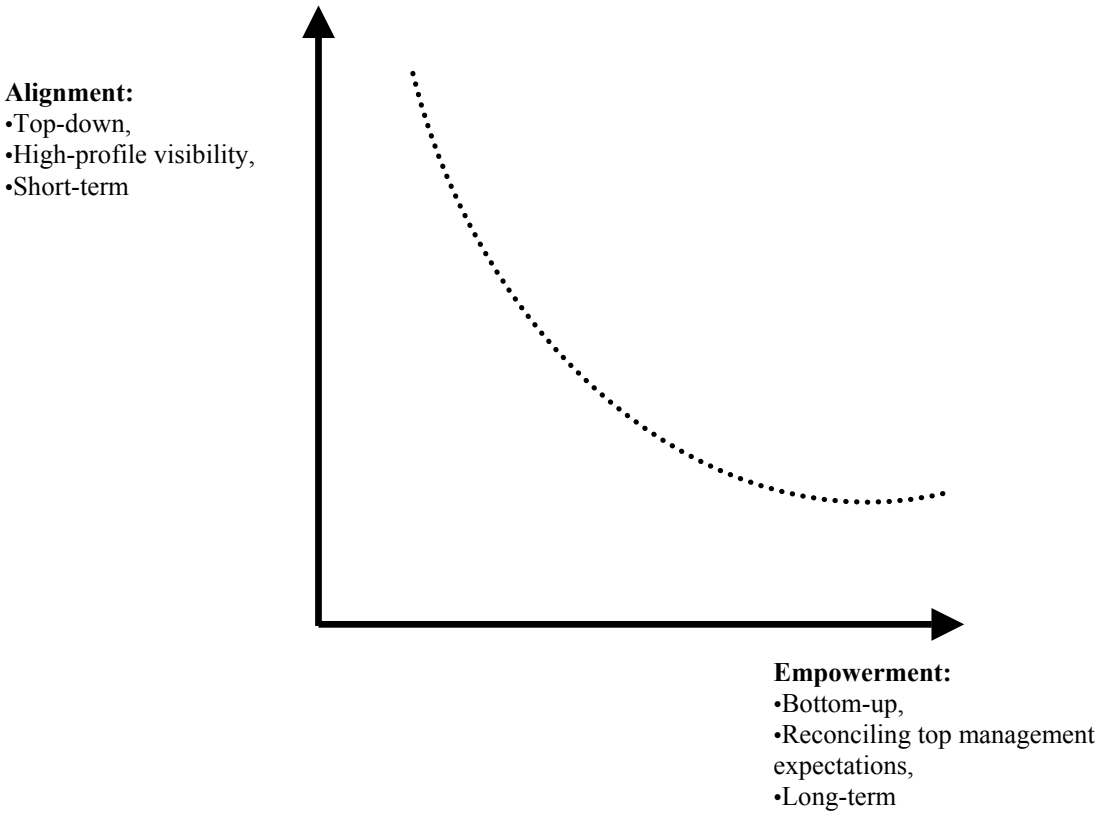

Figure 1: An overview of the dilemmas in KM