16 Summary and Critical Reflection

This chapter summarizes the results of part C. First, Table C-55 gives an overview of the results for all the hypotheses tested. Then the most important findings will be distilled as theses about the state of practice of KMS supported KM initiatives.

TABLE C-55. Summary of hypotheses tested

hypotheses	support	section
H-1: The share of organizations with a KM initiative has increased compared to earlier studies	supported	11.4, p. 461ff
H-2: Service organizations have a higher share of employees with access to KM-related systems than industry organizations	supported	13.1.1, p. 482ff
H-3: Knowledge management activities span business processes rather than focusing on exclusively one business process	supported	13.1.1, p. 482ff
H-4: Organizations with systematic knowledge management that has been established for at least one year are more likely to have installed KMS than organizations without systematic knowledge management	supported	14.1.2, p. 526ff
H-5: Organizations converge in their use of ICT and increasingly use communication-oriented functions of knowledge management systems	not supported	14.3.5, p. 562ff
H-6: Compared to earlier studies significantly more organizations use ICT in general and knowledge management systems in particular to support their KM activities	supported for Groupware, not supported for KMS	14.1.1, p. 525ff (Groupware); 14.3.5, p. 562ff (KMS functions)
H-7: The majority of organizations strongly aim at more than half of the KM goals (>7 goals) at the same time	supported	12.2.1, p. 472ff
H-8: The more formal the organizational design of a knowledge management initiative, the higher are the expenses for knowledge management	supported	15.1, p. 564ff
H-9: Employees are more willing to share knowledge within than outside their work environment (group or team)	supported	13.2.1, p. 512ff
H-10: The higher the share of newly recruited employees is, the more knowledge exchange is taking place outside traditional work environments	not supported	13.2.2, p. 520ff
H-11: A high share of employees leaving the organization negatively affects willingness to share knowledge between groups and teams	not supported	13.2.2, p. 520ff

TABLE C-55. Summary of hypotheses tested

hypotheses	support	section
H-12: In organizations with systematic knowledge management, willingness to share knowledge is improved	supported	13.2.1, p. 512ff
H-13: Organizations with systematic knowledge management target different contents than organizations without such an initiative	supported	14.2.1, p. 532ff
H-14: If an organization allows private contents as part of their knowledge management systems, willingness to share knowledge is higher	not supported	14.2.1, p. 532ff
H-15: Organizations with systematic KM handle a larger knowledge base than organizations without such an initiative	not supported	14.2.2, p. 540ff
H-16: Organizations with systematic KM handle a higher share of multimedia elements, contributions to newsgroups and data base elements in their KMS than organizations without such an initiative	supported	14.2.2, p. 540ff
H-17: There are more organizations which apply a network structure to their knowledge areas than organizations with a hierarchical structure of knowledge areas	not supported	14.2.3, p. 544ff
H-18: Organizations with KMS have a larger number of KMS functions than organizations without KMS	supported	14.3.4, p. 558ff
H-19: KMS functions in organizations with KMS bought on the market are more integrated than KMS functions in organizations without KMS	not supported	14.1.2, p. 526ff
H-20: The majority of organizations apply organization-specific KMS developments or a combination of organization-specific developments and KMS tools rather than just KMS available on the market	supported	14.1.2, p. 526ff
H-21: Organizations with KMS have a higher rate of KM activity than organizations without KMS	supported for KMS bought on the market	13.1.1, p. 482ff
H-22: The more employees have access to Groupware and/or KMS, the more they are willing to share knowledge	supported for Groupware, not supported for KMS	13.2.1, p. 512ff
H-23: The more rigorously knowledge management is established in an organization, the more business goals are achieved in that organization	supported	15.2.4, p. 575ff

In the following, the state of practice of KMS supported KM initiatives that has been studied in this empirical study will be summarized in the form of theses that

together describe the current activities concerning KMS in German organizations. The theses are based

- on the theoretical investigation presented in part B,
- on the results obtained in the broad questionnaire which were compared to the results of related empirical studies and—last, but not least—
- on the qualitative findings that were collected in the in-depth interviews with knowledge managers in organizations who had dealt with KM for a long time.

The theses are once again organized into the four blocks strategy, organization, KMS and economics.

Strategy.

1. **KM and KMS are increasingly implemented and fairly new for most organizations.**

   About a third of the organizations have a KM initiative in place. This is a significant increase over previous empirical studies. Most of these organizations have started their KM initiatives within the last two years. As related studies have shown, there are also many organizations that plan to implement KM within the next years. So far, organizations are most successful in achieving rather basic KM goals in both, the codification and personalization side of KM, such as an improved access to existing knowledge or an improved communication and location of experts. More ambitious KM goals, such as turning implicit into explicit knowledge, or changing culture have been achieved to a much lower degree. Thus, it seems that organizations still have some way to go until they achieve the more advanced potentials that KM promises. Also, there is a strong increase in the interest, the state of implementation and the usage of KM-related ICT systems over previous studies. Most organizations have installed an advanced Intranet infrastructure during the last years which they try to extend so that KMS functions are supported. Mostly large, knowledge-intensive organizations have invested in KM. Professional services companies and a number of pioneers in a variety of industries have been leading the way. As recent related empirical studies have shown, more and more small and particularly medium-sized organizations have started to evaluate the potentials of KM.

2. **There is common agreement about the strategic relevance of KM, but the coordination between KM and business strategy is weak.**

   Most organizations agree on the potentials of KM. The initiative quickly gains high visibility. Most KM initiatives report to the two highest levels of the organizational hierarchy. In many organizations, the executive board pushes the approach[155]. Organizations have high expectations towards knowledge management and believe that the approach potentially causes high positive returns when

155. E.g., von Pierer, CEO of Siemens, has made official statements on the importance of knowledge management in general and the relevance of the Internet and the worldwide corporate Intranet for effective management of company knowledge on several occasions, see e.g., Pierer 2000.

integrated with business strategy. There is broad agreement over all empirical studies that KM is a relevant and important topic as the share of knowledge workers and knowledge-intensive business processes is constantly rising. The interviewees were also convinced about the positive effects of their KM initiative on business goals. They based their convictions on positive feedback gathered in surveys of employees and success stories, but cannot provide quantitative results. As much as organizations are convinced that the potential benefits of KM are high, as much difficulties they have in establishing clear, well-documented and measurable knowledge or KM goals. The lack of a well-defined and (empirically) proven set of KM strategies is obvious as most organizations aim at a large number of different KM goals at the same time. Many interviewees see this missing link and the measurement of the impact of KM or KMS on knowledge and business goals as the most important challenge ahead of them.

3. **KM initiatives are a multidisciplinary effort.**
   KM initiatives regularly comprise a strategically relevant combination of organizational and ICT instruments. Even though organizational instruments are the main drivers for a change in the handling of knowledge, it is often ICT implementations that play the role of an enabler, a catalyst for the changes to take place as they visibly change the work environments of the participants. Consequently, multiple disciplines are required in order to implement KM successfully. In a substantial part of the organizations KM is not embedded in a single functional area, but assigned to an interdisciplinary group. Also, many KM initiatives are split into at least two separate groups within an organization with frequently a large gap between their perspectives. These are human resources and organizational design on the one hand and the information technology department on the other hand. Regularly, marketing, R&D and strategy are also major players in the KM initiative.
4. **There is a strategic shift in many organizations from codification towards personalization and especially towards bridging the gap between these two strategies.**
   There is a shift in focus of KM initiatives from explication or codification of knowledge to a more holistic, theme-oriented approach supporting the identification and handling of existing knowledge, the documentation and distribution of knowledge on the one hand and the support of knowledge workers and experts in knowledge sharing from person to person and in networks or communities on the other hand. It is a popular starting point in many KM initiatives to improve the handling of existing knowledge that is documented in electronic form. Organizations then focus the personalization and codification strategy at the same time as in most organizations, both strategies promise benefits. It seems that by now organizations have realized that KM is not an exclusively technical or infrastructural approach, but that a combination of infrastructural, organizational and person-oriented measures promises the most benefits. As almost all organizations try to change their culture with the help of a KM initiative, it seems that organizations also recognize that a positive organizational

environment fostering willingness to share knowledge is a prerequisite for an efficient and effective use of KM measures and instruments.

5. **Most KM initiatives aim at organization-internal knowledge and neglect knowledge external to the organization.**
   Most KM initiatives have their focus on knowledge flows between organizational units or groups of employees within the organization. Much less do KM initiatives aim at knowledge that crosses organizational borders. Neither do most organizations support the acquisition of external knowledge nor do they systematically make use of knowledge developed internally by selling knowledge products or services. Also, most KM initiatives only foster organization-internal work groups, teams, networks and communities whereas those collective structures that cross organizational borders are rarely systematically supported. There are a lot of issues at hand that need to be resolved, such as the relationship to the formal organization, appropriability of the knowledge generated in cross-organizational border networks, security issues for the access to organizational ICT systems by non-members of the organization, just to name a few. Organizations have just begun to establish positions for key strategic alliance management[156] that address these challenges at least for the most important liaisons to partner organizations.

Organization.

6. **In large organizations, KM is a set of independent activities, rather than a single initiative.**
   Today, large companies have a multitude of knowledge management efforts working in parallel to tackle the problem. In many cases, several core groups start KM activities independently. Companies such as DaimlerChrysler and Siemens organized conferences where KM-related projects and other activities could be exhibited and were surprised how many activities had gone unnoticed. Thus, in some cases even the various KM groups, teams and communities do not coordinate their efforts or even exchange knowledge which gives an indication of the complexity of the challenge.
7. **Most organizations have organized their KM initiative as a project.**
   The most prevalent form of structural organizational design applied to KM, however, is the project. Projects have been established in almost half of the organizations. In more than a quarter of the organizations, KM is advanced in the organization by an informal group of employees interested in KM. As the interviews showed, many of these groups attempt to convince senior management to fund a project. Only if an organization has established a separate organizational unit assuming a role similar to KM before, it is likely that KM is organized as a group or a department. Only a minority of the organizations with a systematic KM initiative have established a separate KM unit. However, several

156. In analogy to key account managers a key strategic alliance manager oversees all transactions and communication with a partner organization.

of the projects might be turned into permanent units after the project is finished successfully.

8. **KMS supported KM initiatives are often organized as decentrally as possible with a central coordinating unit.**
   KM was implemented as a predominantly decentral approach leaving as much responsibility with decentral functions as possible. Responsibility for contents of KMS in most cases is shared between the author of a knowledge element and subject matter specialists. One of the most important goals of the implementation of KMS solutions is to increase participants' ability to actively handle ICT supported knowledge, e.g., to publish knowledge elements and information about their skills, project assignments and the like and to react to activities of other participants, e.g., to answer questions, contribute to discussions, comment, value, give feed-back to and recommend knowledge elements. KMS help to decentralize the corresponding KM tasks. A central unit, either a separate, permanent organizational unit or a project, frequently coordinates the decentral activities. Examples are the management of the organizational and ICT infrastructure, a regular reorganization of the knowledge structure, the administration of KMS and quality management for knowledge elements.
9. **The key role in KM initiatives is the subject matter specialist.**
   Most of the organizations surveyed assigned responsibility for the majority of their KM tasks to this role. Subject matter specialists are primarily responsible for KM tasks on the operational level. They take on responsibility for one subject area or topic in the organizational knowledge base, help knowledge providers to document, link and organize their experiences, refine and organize their subject area and help knowledge seekers to locate expertise and knowledge elements. Subject matter specialists also provide the "linking pins" for knowledge-related design and operational management tasks such as the update or reorganization of knowledge structure(s) or the integration of knowledge into the existing structure. In these cases, they share responsibility with knowledge managers. The strategically relevant identification of knowledge and the operational distribution of knowledge are in many organizations joint efforts with responsibility split between subject matter specialists, participants and knowledge managers.
10. **Many organizations do not assign responsibility for important KM tasks.**
    There are also several organizations in which responsibility for KM tasks is not assigned at all. About a third of the organizations just assigned responsibility for basic tasks related to the publication and distribution of knowledge, but did not pay equally high attention to what happens to the knowledge once it is documented and inserted into the organizations' knowledge bases. In a number of organizations, important tasks to keep a knowledge base relevant and useful are not systematically assigned. Examples are the actualization and refinement of existing knowledge, quality assurance, deletion and archival of knowledge. This might trigger a vicious circle in which participants use the KMS less frequently because they do not find what they are looking for. Thus, investments in KMS

are cut which deteriorates the quality of the knowledge in the KMS. This reduces trust in the knowledge and in turn negatively affects usage of the systems starting the circle over again (see also Probst et al. 1998, 309f).

Knowledge management systems.

11. **Most large organizations have an Intranet and/or a Groupware platform in place that offer basic KM functionality and a solid foundation for KMS.**
By now, almost all large organization have installed an Intranet and/or a Groupware solution which can be considered the basic ICT infrastructure for KM. These platforms together with a multitude of extensions and add-on tools provide good, basic KM functionality. During the past couple of years, corporate Intranet solutions have been implemented to connect employees, to support the easy sharing of electronic documents and to support access to company information. Also, organizations have installed Groupware tools in order to support teams and to master the increasing complexity of organizational structure and processes along with advanced information and communication needs.

12. **Many KMS functions are implemented, but not used intensively.**
Large organizations have already implemented many KM-specific functions as part of advanced Intranet infrastructures and Groupware platforms as well as more specific solutions, such as customer relationship management systems or systems that support individual business units. Many of the functions are not used intensively, in some cases due to technical problems, but mostly because they require substantial organizational changes. Therefore, there still seem to be considerable potentials when applying ICT to KM initiatives.

13. **Integrative KMS functions predominate, but interactive and bridging KMS functions catch up.**
Up to now, in most organizations there has been a strong emphasis on integrative KMS functions with a focus on explicit, documented knowledge. This is not surprising as in many cases large amounts of documents have already existed in electronic form. The improved handling of documents and the redesign of business processes to systematically capture lessons learned and to use the document base have provided for a visible improvement of the organization's knowledge base. Recently there is a trend towards more collaboration-oriented and bridging KMS functions. Organizations profit from integrative KMS functions and now seek for new forms of ICT support for their KM initiatives. Also, the technical requirements for a sophisticated support of media-rich electronic communication and collaboration can now be met at a reasonable cost due to the advancements in the ICT infrastructure in the organizations. Examples are videoconferencing, tele-teaching and tele-learning or application sharing that require large bandwidths and multimedia equipment for the PCs of the participating knowledge workers. Most organizations follow a general pattern of four phases in which they implement predominantly (1) basic KM-related functionality, (2) integrative KMS functions, (3) interactive KMS functions before they (4) finally aim at a combination and integration of the two. Most organizations are still in

the first two phases of this sequence whereas many organizational KM instruments need to be complemented by KMS functions of the third and fourth phase.

14. KM-related ICT systems lack integration.

In most organizations, a multitude of partial systems are developed without a common framework which could integrate them. Only recently, comprehensive and integrated KMS gain market share. They offer extensive functionality integrated within one system. Some organizations also build enterprise knowledge portals that at least integrate access to most, if not all organizational and organization-external ICT systems relevant for the KM initiative. Still, in most organizations the functionality of KM-related ICT systems is largely not integrated, e.g., messaging systems, document or content management systems, access to external systems, World Wide Web, external online data bases, data warehouses, customer relationship management systems and last but not least the organization's enterprise resource planning systems.

15. KMS are highly complex systems.

Comprehensive KMS are highly complex ICT systems because of (1) the *technical complexity* of the "intelligent" functions that distinguish a KMS from a more traditional system and of the large volumes of data, documents and messages as well as links, contextualization and personalization data that have to be handled, (2) the *organizational complexity* of a solution that affects business and knowledge processes as well as roles and responsibilities throughout the organization and finally (3) the *human complexity* due to the substantial change in the handling of knowledge that is required from the organization's knowledge workers as KMS have to be integrated into their work environment.

16. Most organizations build their own KMS solutions.

The majority of organizations relies on organization-specific developments and combinations of tools and systems rather than on standard KMS solutions available on the market. The most important explanations for this finding might be two-fold. On the one hand, the market for KMS solutions is a confusing and dynamic one. There is no leading vendor or group of vendors yet and interoperability with other KM-related systems that the organizations have in place is often difficult to realize. On the other hand, organizations might fear that they loose strategic advantages if they exchange their home-grown organization-specific KMS solutions for standard software that might not fit their needs as well.

17. The diversity of KMS contents has increased.

Generally, more organizations handle a larger variety of knowledge contents when compared to previous studies. About half of the organizations use modern KM contents, like employee yellow pages, skills directories, idea and proposal systems and lessons learned. Recently, organizations seem to have extended the scope of their KMS to include more types of internal knowledge previously unavailable to a larger group of employees. Most organizations have organization-specific descriptive knowledge on the one hand and unapproved contribu-

tions to knowledge networks on the other hand as part of their knowledge base. Secured inventions are used by only a minority of organizations. The biggest potentials seem to lie on the one hand in experiences and expertise that bridge the gap between organization-specific descriptive knowledge and unapproved contributions in knowledge networks. On the other hand, external knowledge bridges the gap between the organization and its environment. Many organizations do not distinguish between these KM-related contents and more traditional contents of ICT systems, such as a broad view of all documents or the entire content of the corporate Intranet, data in data warehouses or transactional and communication data about customers and business partners. There is still considerable uncertainty in many organizations about what is or what should be considered a knowledge element in an organization's KMS.

Economics.

18. **A KMS implementation is a major, long-term investment, but organizations strive for short-term profits.**
KMS are highly complex and expensive systems. The implementation of KMS, no matter whether bought on the market or developed internally, represents a major investment. A KM initiative and its support with KMS are long-term investments because they require a substantial shift in employees' roles, organizational processes and in many cases a change of the organizational culture. KMS success is dependent on network effects. The more knowledge workers participate, the more useful the KMS solution will be and the more these workers will profit from the solution. However, most companies apply KM-related ICT systems and concepts that promise a "quick-win", a quick return-on-investment and are reluctant to commit themselves to a substantially higher investment and especially to changes in work processes. Some of them have just finished a fundamental shift to an ERP system, have solved the Y2K problem and/or have installed an Intranet solution. Thus, they currently might not want to implement any revolutionary changes in their ICT landscape.

19. **Success is assessed by story-telling rather than quantitative indicators.**
The benefits of KM initiatives in general and KMS in particular so far are determined by story-telling at best. In most organizations, this is the primary justification for the budgets allocated to the KM initiative along with references to similar activities performed by the competition. The reason is that it is extremely difficult to measure knowledge directly. There are several promising approaches to the quantitative assessment of knowledge-related activities, e.g., the balanced scorecard or the intellectual capital approach. They all require a fundamental shift in the organization's management systems and in many cases organizations are as reluctant to massively change their management paradigms as they are in fundamentally changing their ICT infrastructures.

20. The organizational design of the KM initiative is crucial for a successful deployment of KMS solutions.

Generally, the higher KM expenses per participant are, the higher respondents estimate the impact of a KM initiative on business goals. KM initiatives with a formal organizational design, but a decentral assignment of responsibility, a high rate of KM activity and the systematic support of communities might be more successful than KM initiatives which apply a different organizational design. The relatively obvious tendencies in the case of the organizational design compare with a more uncertain picture in the case of KMS. The implementation of KMS alone seems to have no positive impact on business goals. They have to be combined with people-oriented and organizational instruments in order to be successful.

21. KMS supported KM initiatives aim at similar goals as BPR activities.

Consistently with other KM studies, improve speed of innovation is an important business goal supported by KM. In addition to this rather KM-specific goal, organizations primarily aim at the same business goals as targeted in BPR projects: improve customer satisfaction, improve productivity and improve scheduling. Improve growth of organization was ranked lowly in all KM studies reflecting once again the internal focus of most KM initiatives. The organizations primarily try to improve the internal way of handling knowledge in order to achieve traditional business goals oriented towards value creation rather than environment-oriented goals such as improve growth, reduce risks and develop new business fields.

Part D will now present scenarios that give a more detailed look about alternatives of KMS supported KM initiatives.