

Knowledge Management Development Challenges of Transition Economy Organisations Representing Different Value Creation Models

Tiit Elenurm

Estonian Business School, Tallinn, Estonia

tiit.elenurm@ebs.ee

Abstract: This paper addresses knowledge management assumptions and development visions in the following types of organisations: organic product-focused and organic service-focused organisations, mechanistic bureaucratic and mechanistic product-focused organisations that represent different models of value creation. These types of organisations are identified and examined in relation to the changing knowledge management context of the transition economy in Estonia. Knowledge management priorities assessed by representatives of 95 organisations are then discussed in the qualitative research and learning framework.

Keywords: knowledge management, value creation, know-how, know-why, transition economy, learning organisation,

1. Introduction

Organisational knowledge and core competences form the main foundation of competitive advantage and the basis for meeting business challenges in the 21st century (Drucker 2002, Hamel 2000). Recognising the importance of knowledge management is, however, not sufficient for choosing the appropriate knowledge management (KM) tools in order to increase the value of the organisation and its business by implementing KM initiatives. The significance of organisational capabilities as an interplay of knowledge, communication and technology has to be taken into consideration in the process of developing organisations (Braf and Goldkuhl 2002). The need to align knowledge management projects and strategic business goals is a key challenge for implementing knowledge management concepts in advanced market economies (Davenport and Prusak 1998, Tiwana 1999). Impact of diversified value creation frameworks and changing business opportunities should be also studied in transition economies as the bases for understanding knowledge management development priorities.

The potential of KM can be utilised on a wider scale and with more substantial impact on operational and strategic business performance, if both environmental and organisational contingency factors are studied to facilitate the adaptation of KM concepts to suit different types of organisations. A typology that is relevant to organisations in a transition economy is used in the present paper for exploring KM assumptions and priorities in the context of different value creation opportunities. Essential contingency factor is the rapidly changing environment of the

Estonian transition economy. Estonia as a small open economy has experienced during recent 10 years rapid economic reforms on its way towards the advanced market economy. The challenges of different sectors in the field of international competitiveness and developing company core competencies, globalisation and European integration do not however coincide. We investigate how specific strategic challenges and problems in different types of organisations are reflected in knowledge management assumptions and development priorities.

2. Knowledge management in learning and changing organisations

Development of the KM field has led to the discourse about stages, ages or generations of knowledge management. Dave Snowden (2002a) distinguishes the first *age* in which the word *knowledge* itself was not problematic and the focus was on distributing information to decision-makers through information technology and business process re-engineering. The second *age* was initiated by the SECI model of Nonaka and Takeuchi (1995) and its focus was on the movement of knowledge between tacit and explicit states. The third *age* focuses on studying the paradoxical nature of knowledge in complex systems and understanding knowledge flows and transformations between complex, knowable, known and chaos domains (Snowden 2002a). Knowledge transformations between these domains can also be treated as organisational learning processes. In order to develop a KM strategy the management team, for instance, has to assess how the existing space of known best practices can be used for training programmes, what the role of internal

competences and external experts will be in exploring the knowable space and the probability that the chaotic space will enhance learning by doing or even reframing existing business concepts. Understanding the impact of changes in the business environment and the strategic intent of decision-makers allows KM practitioners to assess the extent to which organisations really are ready to use the theory of complex and adaptive systems. Maybe tools offered by the first and second age of KM are suitable for solving some strategic tasks and there is still a long process of organisational learning ahead before the paradigm of complexity can be transformed from the knowable domain to the known domain?

Mark McElroy (2003) distinguishes two, not three KM generations. First-generation supply-side KM is focused on capturing, codifying and sharing valuable knowledge and on getting the right information to the right people at the right time. Second-generation demand-side KM enhances the capacity of the organisation to produce new knowledge. McElroy (2003) also refers to explicit connections drawn between second-generation KM thinking and organisational learning. He sees second-generation KM as an implementation strategy for organisational learning. Peter Senge, the author of *The Fifth Discipline* (Senge 1990), has listed challenges common to knowledge management and organisational learning communities: understanding the nature of organisational knowledge, its generation and diffusion, the interface between acquiring information and generating knowledge, developing knowledge-based strategies (Karlenszig 1999).

The goal to increase the capability of an organisation to learn by systematically processing new information about a changing environment and by critically reflecting upon past experience is especially relevant to business organisations in transition economies. These organisations have to deal with the challenge of radical and partly unpredictable changes in their immediate competitive environment and monitor changes in the larger socio-economic environment. It is however not self-evident if organisations that need the qualities of learning organisation in order to face radical changes have always time and resources to apply five disciplines of personal mastery, shared vision, mental models, team learning through reflection and inquiry and systems thinking in the coherent way. In the period of rapid societal and economic change an important factor

influencing the KM agenda is the dilemma of exploiting the "windows of opportunity" for rapid business gains versus developing an organisation that is directed by a vision for sustainable competitiveness. Long-lived international corporations that were "built to last" are found to be sensitive to their environment, cohesive, with a strong sense of identity based on the ability to build a knowledge sharing community, tolerant of non-core activities on their periphery and conservative with their money (De Geus 1997). A company that is directed by owners following short-term profit horizon is less interested in investing into mutually beneficial knowledge sharing with clients and other stakeholders and into organisational memory.

Sustaining momentum in a learning organisation is a challenge that has to be dealt with in the context of the life cycle of organisational change initiatives taking into consideration the interplay between reinforcing growth processes and limiting processes (Senge *et al.* 2001, p7). Opportunities and needs for introducing KM practices also depend on the life cycle of the total organisation and its market (Nonaka and Reinmoeller 1998). A small new greenfield venture at the non-saturated market may be in the situation, where applying the rule "first act, then sense and respond" is the best way to take advantage of the empty market. A growing enterprise at a more mature market has to devote more time and energy to sense changing customer needs and to monitor behaviour of competitors. That will influence how the potential of knowledge management is perceived. Rob Cross and Laurence Prusak (2002) describe how in informal networks interactions between central connectors, boundary spanners, information brokers and peripheral specialists make organisations *go or stop*. In a small venture a capable entrepreneur carries several of these roles and can directly communicate with persons carrying other roles. Systematic KM solutions that will take into consideration the potential of social networks are needed if an organisation grows. From the point of view of a KM expert introducing relevant knowledge "just-in-time", right when you need it (Snowden 2002b), is a sound principle. Aligning organisational learning and change processes with KM development means avoiding premature and formal use of KM tools plus developing a sense of urgency, clear priorities and assumptions for implementing appropriate KM solutions if and when these support the strategy of the organisation.

Knowledge management can be seen as a tool for putting the vision of a learning organisation into practice, but it is also important to understand the impact of organisational learning processes on KM practices and development priorities. What essential qualities of the learning organisation have to be created before investments to knowledge management applications become efficient? What types of organisational learning processes transform knowledge management ideas to the real agenda of managerial decision-making or change? To what extent the readiness to apply knowledge management and development priorities in this field are shaped by changing relations with clients and other stakeholders and what is the impact of developing new products and technological know-how? We use typology of organisations that relates different positioning of organisations in the Estonian business and institutional environments to organisational change capabilities for searching answers to these research questions

3. Typology of organisations for studying knowledge management priorities

3.1 Mechanistic and organic organisations as knowledge management environments

The comparison of mechanistic and organic organisations was already introduced some 40 years ago. The mechanistic organisation as more suitable for stable conditions was characterised (Burns and Stalker 1961, pp119-122) by a specialised differentiation of functions; the use of a formal hierarchy for coordination, control and communication; the precise definition of rights and obligations; the centralised location of knowledge of actualities at the top of the hierarchy; insistence on obedience to superiors and vertical interactions; and greater importance and prestige attached to internal (local) rather than general (cosmopolitan) knowledge.

Many structural and process-oriented approaches to organisational behaviour and organisational development techniques have for several decades explicitly or implicitly followed the vision of moving towards the organic organisation that was featured by Burns and Stalker. Organic organisation links special knowledge to common tasks, sets the realistic nature of the individual task according to the total situation of the organisation and

enables adjustment and redefinition of individual tasks through interaction with others. It is based on an informal network of control, authority and communication, locating technical and commercial knowledge anywhere in the network; lateral consultation-type communication; commitment to the task and the importance and prestige attached to the affiliations and expertise valid in the industrial, technical and commercial environments outside the firm.

Checklists characterising the mechanistic and organic organisation include features that are directly related to the knowledge management discourse. One could claim that the features of the organic organisation could be interpreted as good ground for introducing contemporary KM solutions. Mechanistic organisations are however, not *a priori* alien to some KM tools, especially if the focus is on the appropriate structuring and flow of information to decision-makers.

3.2 Knowledge management in the context of a transition economy

Estonia has gone through the transition from the former Soviet command economy to the market economy that is in the process of integration to the European Union. During the transition process of 90-ies private business organisations as well as the public sector in Estonia have been exposed to intensive international knowledge transfer opportunities and learning challenges. Earlier studies of managers in Estonian companies have pointed out that market-driven changes in strategy, organisational culture, leadership style and the mission of the organisations can be seen as the increasing role of radical transformation factors in the 90's as part of the transition to a market economy (Alas and Sharifi 2002, pp313-331). Further studies are needed, however, in order to understand the real influence of these changes upon organisational learning capabilities and the introduction of KM practices.

New information and communication technology solutions have influenced the Estonian service sector. Estonia has been among the first countries to introduce mobile payment for parking and personal m-accounts that allow the use of mobile phones instead of a bankcards. Since December 2002 permanent wireless Internet connections through combined WLAN and GPRS solutions have been available practically all over the territory of Estonia. The study of innovation in Estonian enterprises 1998-2000 based on the

sample of 3 490 enterprises with more than 10 employees and 777 enterprises with 2-9 employees indicated relatively advanced innovation patterns in the Estonian service sector in general and more developed cooperation strategies in service companies compared to industrial enterprises (Kurik *et al.* 2002, pp32-33). At present the readiness among service companies combining product and process innovations to develop and exploit advanced KM solutions in cooperation with their clients could be better than the same readiness among product-focused know-how organisations engaged in new product development efforts. Only 2% of Estonian enterprises use over 4% from their turnover for research and development activities (Kurik *et al.* 2002, p39). If R&D activities, including

intramural R&D, become more important as a part of the business strategy, the special KM needs of know-how organisations will deserve more attention in the Estonian innovation policy.

It is important to understand the influence on KM assumptions of market-driven changes, innovations driven by technology and new product development within organisations. In order to reflect these factors a matrix that combines the dimension of mechanistic versus organic organisations with the dimension of product-focused versus service-focused organisations (Nurmi 2000, p67) was selected as the sense-making model for our research. The meaning of the four spaces derived from these dimensions is explained in table 1.

Table 1: Typology of organisations for studying KM assumptions and priorities

	Product-focused	Service-focused
Mechanistic	Industrial organisation - Value creation based on internal efficiency of relatively stable production processes	Bureaucratic organisation - Value creation through following institutionally pre-determined routines in a reliable and rational way
Organic	Know-how organisation - Value creation based on know-how generated through new product and technology development	Know-why organisation - Value creation driven by monitoring and anticipating client needs and compiling complex solutions to suit clients' problems

We added our interpretations of value creation to Raimo Nurmi's matrix in order to clarify the meaning of the matrix in the context of knowledge management. Different ways of value creation influence prospects of long-term competitiveness in the framework of integration to the European Union and globalisation.

Bureaucratic organisation in this typology does not have negative connotation. This term is used in the Max Weber (1947) ideal bureaucracy sense. Bureaucracy in this context can be efficient if it serves needs of stakeholders by following routines in reliable and transparent way. Service-focus of such organisation is however limited to avoiding mistakes and minimizing turbulent influence of the environment on relatively stable procedures. If a public organisation has to anticipate new client needs and even re-define its client segments we would position it as a know-why organisation. Bureaucratic organisations that correspond to the meaning used in the matrix can be found also in the private sector and public organisations can be positioned outside the bureaucratic space if the nature of their value creation corresponds to some other space. Industrial organisation

processes material inputs and optimises the use of different resources for producing products. Innovating products or moving to new markets is however not the main challenge of this organisation type. Core competence of the know-why organisation is related to understanding changing markets and client needs. It is different from the know-how organisation, where core competence is build around developing new products and technologies that can be commercialised either by selling the intellectual property or by implementing innovative product or technologies for enhancing own competitiveness of the know-how organisation. Borderlines between these four spaces of the matrix are indeed conditional. There are organisations that are engaged in producing know-how through new product development but also anticipate or even try to create new client needs or re-define client segments. An industrial organisation may have research and development unit that follows to the value creation path of a know-how organisation. In order to understand the strategic context of the knowledge management agenda it is however justified to place a decision-maker into the

strategic choice situation by asking: "Which of these spaces reflects the position of your organisation at present and how it could change during next five years if your strategic vision is turned into reality?"

4. The learning community in the action research process

The possibilities and limitations of approaches to quantitative and qualitative research change if we move between phases of scientific cognition: from explorative to descriptive and explanatory research.

Quantitative questionnaire-based surveys are suitable for measuring such attributes of phenomena, which are understood in the same frame of reference by respondents. Knowledge management is, however, a relatively new concept. The researcher has to capture the *pre-understanding* and *sense-making* patterns of managers. Qualitative methods have strengths in descriptive and explorative research or where the context and the respondent's frame of reference are important (Marshall and Rossman 1995). Qualitative research enables one to get close to the object of the study, to identify important variables, patterns and meaning structures for participants in order to investigate little understood phenomena (Remenyi *et al.* 1998, pp107-113).

Evert Gummesson (2000, p35) treats *action research* as the most advanced step in qualitative research compared to interviews and observations. The full potential of *action research*, however, can only be used if the researcher manages to act as the change agent during the whole cycle of diagnosing the management problem, generating, assessing, selecting and implementing new solutions, checking outcomes and introducing corrective actions. The present study process does not cover the process of actual implementation of KM development strategies. The process of action research is limited to the following steps:

1. Introducing basic knowledge-management concepts through interactive learning supported by the WebCT e-learning environment. Each participant had to search for knowledge-management and organisational learning publications or Internet sources and send an executive summary of his source to the virtual forum referring to the practical implications of the ideas reviewed.
2. Introducing and discussing the checklist of KM preconditions (appendix 1) as a tool for assessing KM assumptions and

priorities. The checklist was a reflection of some consulting experience related to KM initiatives.

3. Assessing KM assumptions in organisations that were represented by managers or specialists participating in the action research process. Participants had to give their assessment by specifying and ranking 10 high priority preconditions for efficient KM in their organisations. They also explained to what extent these preconditions for efficient KM had already been created. In the assessment process, organisations were positioned to one or more of the spaces in table 1. Participants were encouraged to re-define KM assumptions presented in the checklist or to add new ones. A short written report was presented.
4. Creating subgroups following the typology of organisations. Members of each subgroup were asked to reflect on the results preceding from step 3 and to find common ground among KM priorities and tools in their group.
5. Each participant finally documented, in an essay, the strategic vision of KM development in his/her organisation and specified the main tools for putting the vision into practice. The main ideas of these essays were then presented orally to the other participants.

In 2001 MBA students working as managers or specialists in 31 Estonian companies or public agencies participated in a limited format of this cycle. On this occasion however, the typology of organisations was not introduced and subgroups based on organic-mechanistic and product-focused versus service-focused types were not applied. The full research and learning cycle applying the typology was subsequently conducted in autumn 2002. Participants were also asked to present their vision and rationale for a possible re-positioning of their organisation from one field of the matrix to another. It was possible to prove that their organisation combined features related to different fields of the matrix. In this cycle 52 organisations were analysed. In spring 2003 a smaller group of 14 MBA students analysed 12 organisations. We treated these groups as learning communities sharing their experience-based knowledge and their new knowledge acquired in the learning and research cycle.

5. Research results

The comparison of the highest average importance rankings of assumptions of

knowledge management in table 2, from experts in 2001, 2002 and 2003, indicates that assumptions related to trust, the free circulation of information, the promotion of information sharing and integration between databases have consistently been among the top five. Although, trust was treated as a

broader concept and received the highest rank in the 2002-2003 study. In 2001, the subsidiaries of trans-national companies were analysed separately. It was found that they have a relatively good technological foundation for developing KM practices.

Table 2: Assumptions of efficient knowledge management that received the highest priority rankings

Assumptions of efficient knowledge management	Priority rank (importance)		
	for 31 organisations in 2001	for 52 organisations in 2002	for 12 organisations in 2003
Trust between employees as a basis for knowledge sharing	V	I (broader interpretations than in 2001)	I (broader interpretations than in 2001)
Free circulation of information. Product and client information easily accessible.	I	II	II
Promoting information sharing between colleagues, linked to bonus schemes	II	III	III
Integration between the databases of headquarters, suppliers and business partners	IV (II – in subsidiaries of foreign companies)	V	IV
Virtual databases and colleagues are more valuable sources of information than paper documents	III	IV	VII
The information search and retrieval system is efficiently used	VII-VIII	VII	V

The integration of local knowledge sharing tools in Estonian subsidiaries with data and knowledge bases from their international headquarters, suppliers and customers is, however, in many cases low. This is perceived by the local Estonian staff of these companies as a high-priority challenge in the area of KM development.

While the efficient use of information search and retrieval systems received a higher priority in 2003 compared to 2002 and 2001, giving value to virtual databases and colleagues versus paper documents has received lower priority ranking in 2002 and especially in 2003 compared to 2001. It could be misleading, however, to interpret the differences between the priority lists in 2001, 2002 and 2003 as reflecting general trends of change. Organisations that belong to different sectors and strategic contexts were not represented equally in these three research and learning cycles. Following the logic of the qualitative research, we try to reflect differences in the patterns of KM assumptions depending on how participants positioned their organisation in regard to mechanistic versus organic and product-focused versus service-focused organisation types.

In 2002 five out of 52 organisations and in 2003 two organisations out of 12 were positioned as mechanistic and product-focused. In both years one organisation was identified as being a combination of mechanistic, product-focused and bureaucratic. In this *industrial* type of organisation trust between employees and the free circulation of information were pointed out as important KM assumptions. Moving from paper documents to virtual databases was seen as the third most important priority.

Links between KM, defining future core competences in the organisation, monitoring business processes, quality management and cost control were stressed in KM development visions. Among KM assumptions, in practice the free circulation of information showed the weakest level.

Six organisations in 2002 and five in 2003 combined features of bureaucratic and know-why organisations and two organisations in 2002 were positioned as bureaucratic organisations. Some state offices but also private enterprises, where core sales or service processes are pre-determined by foreign headquarters or are by their nature quite routine, belonged to this type. The majority of organisations in this group already

had information technology solutions that could support KM. In state offices one of the development challenges was the integration of IT-solutions used in different ministries. The problem of information overload was pointed out. The free circulation of information was considered to be the most important KM assumption in these organisations, but it was also linked to clearer procedures, the responsibility of information providers, information search tools and the analysis of existing information flows.

The group of eight companies in 2002 and three companies in 2003 that combine the features of organic product-focused and organic service-focused organisations included Estonian subsidiaries of some international IT and telecommunication companies, but also small consulting firms and organisations involved in the import of sophisticated technology products, tourism and medical services. Although levels of experience and the availability of tools for KM are quite different in these organisations, one can find a common denominator reflected in the following question: How can one broaden the expertise of employees representing different functional roles so that, for instance, the serviceman is not only limited to repairing and the salesman to selling? Members of this group stated as a result of group discussion that information technology is necessary, but not sufficient on its own for creating the essential KM assumptions. Three high-ranking KM assumptions in this group of companies included the free circulation of information, virtual databases and colleagues as more valuable sources of information than paper documents, and trust between employees as a basis for knowledge sharing. Several experts in this group pointed out that interfaces for discussing features of new products with clients and partners was a development priority and full-text search and data mining tools for integrating different databases were the missing KM assumptions in practice.

Twenty companies in 2002 and two in 2003 were positioned as organic and service-focused organisations (know-why organisations). Links between customer relationship marketing and KM were stressed in this group. A common development challenge was the collecting of practical knowledge about interactions with clients and adding this to the knowledge base. Improving possibilities for clients to use existing databases and solving related compatibility problems were seen as part of the KM

development agenda. Larger organisations pointed out the need to "link existing islands of knowledge-sharing". E-learning was also seen as a field of KM development in this group. The ranking list of KM assumptions in this type of organisation started from the readiness of employees to share their expert information with others, followed by trust between employees as a basis for knowledge sharing and free circulation of information. Attitude change among the sales staff and other employees supporting client relations was linked to such development challenges as motivated teamwork and training systems but also to improving the quality of databases, information search and filtering tools. A vision for the future role of a chief knowledge officer was presented by some organisations in this group. Access to different sources of information, including central corporate knowledge bases at international headquarters, and institutionalising knowledge-sharing practices on a daily basis were assessed as the weakest KM assumptions in some organisations belonging to this group.

Nine organisations were positioned by participants as organic product-focused know-how organisations in 2002 but there was none of this type in 2003. Their KM development agenda appeared to be quite similar to know-why organisations. It seems that organisations represented in this group were not involved in generating new products or technologies through intramural research and development. They were mainly adapting and diffusing new know-how that had been created elsewhere. Project management, risk analysis and the reflection of experience and mistakes in different process stages were pointed out as areas appropriate for applying KM methods. Knowledge management development needs were also related to improving transactions in the value chain. The readiness of employees to share their expert information with others, followed by trust between employees as a basis for knowledge sharing and recognising the knowledge of employees via bonus schemes were three high-ranking KM assumptions in this type of organisations. Access to different sources of information, the free circulation of information and virtual databases were pointed out as missing KM assumptions. There were also critical assessments of the situation in the area of full-text search and data mining tools and institutionalising knowledge sharing practices on a daily basis.

Virtual project team rooms and electronic cards or *yellow pages* describing education, competences and project experience among employees were assessed as missing KM assumptions in many organisations belonging to various types. These assumptions were, however, not ranked among the five most important in any group. Many experts explained that their organisations are still too small to generate value through such tools.

The ability to use KM tools for participating in international project teams is an important challenge for managers and experts in business organisations under transformation. This will influence their chances of becoming a competence centre in a large trans-national company or of taking an active role in international knowledge-sharing networks among independent companies.

6. Lessons learned and conclusion

It is difficult to arrange research and learning cycles in a format where the composition of the groups and learning processes are similar enough to make the results of different cycles fully comparable. If the learning effect in such research and learning cycles is substantial, as we indeed hope it is, the pre-knowledge of participants will be modified in the knowledge-sharing process and in turn will influence their interpretation of KM assumptions. We have the opportunity, however, to monitor and interpret the learning process as it shapes the assessments of our sources of research information in a much better way than is possible in a classical questionnaire survey. This is especially evident when questionnaires are mailed to respondents who might have a different background, which may influence their interpretation of the terms used in such a questionnaire.

From the *interpretivist* point of view an alternative to using the checklist of assumptions is to ask participants to start their story from "a blank white sheet of paper". That however, would make knowledge sharing in sub-groups less structured and we would miss the opportunity to reuse knowledge created at earlier stages. In further research, however, we could test different checklists of enabling factors including the hierarchy of knowledge management activities (Stankeviciute 2002).

Another spin-off opportunity for further research is to continue our co-operation with some participants of the action research cycle in order to produce case studies as stories

reflecting successful or unsuccessful implementation of the KM vision presented earlier in the research cycle. A high quality case study should be a story that draws on multiple sources of evidence and their triangulation and provides meaning in context, among other characteristics explained in (Remenyi *et al.* 2002). Described learning and research cycles did not allow us to rely on sources of evidence from inside the organisations that would have been independent of the participants of the cycle; although, it did facilitate the discussion and challenging meanings and beliefs of participants in the interactive process. The documentation resulting from the cycle provides a good departure point for follow-up interviews inside the companies. We would prefer to continue within the *action research* framework, which would mean using consulting or in-house training opportunities to achieve access to management and organisation realities and development processes.

Integrating research and learning processes is one way of understanding the specific contexts of KM development efforts. The learning community can become a tool for gaining insights from *interpretivist* research and for supporting smart knowledge management strategies.

Appendix 1: Knowledge management assumptions

(based on the checklist by Tarmo Toiger, IBM Estonia)

- **Free circulation of information.** Product and client information, including information about new potential clients and related projects, is easily accessible. Regular monitoring of information about competitors.
- **Employees are able to combine different sources of information,** including the databases in their local unit, the central databases at headquarters and the integration of organisation-wide knowledge bases. Integration with the databases of suppliers and business partners.
- **Virtual databases/knowledge bases, Intranet and colleagues are more valuable sources of information than paper documents.** Relevant information in an electronic format is more actively used than paper documents.
- **The information search and retrieval system is used efficiently.** It is possible to use full-text search throughout the information system, including different databases and catalogues used in the organisation
- **Information about the competences of all members of the organisation is accessible on electronic yellow pages.** This information includes education, earlier work experience and knowledge profile. Links between employees and different projects and clients are also available.
- **Employees have recognised fields where their expert knowledge can support others.** They are ready for knowledge-sharing. Employees are aware of the information and knowledge their colleagues might be looking for and are sufficiently skilled to meet these expectations on time and in the right format.
- **Special virtual project workrooms have been created for project teams.** All project information and correspondence with internal and external clients is collected there.
- **Virtual information processing and knowledge sharing tools are used actively.** This is an essential part of normal daily behaviour. There are established rules for using the groupware, for sending and responding to e-mail messages. Everybody follows the rules to

save time and to diminish irrelevant information.

- **Promoting information sharing between colleagues.** Such behaviour is valued and encouraged. Bonus schemes are created in order to further activate knowledge flows.
- **Trust between employees as a basis for knowledge sharing.** Employees trust each other and discuss any failures and mistakes they have made in the course of doing their job with other members of the organisation in case the lessons learned may also be useful for their colleagues.

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