Problems in knowledge management: a case study of a knowledge-intensive company

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Knowledge management has become an important tool in staying ahead in the competition between companies. In this article five different phases of the knowledge management process are distinguished: acquiring knowledge, codifying knowledge, disseminating knowledge, developing knowledge and applying knowledge. The occurrence of knowledge management problems is demonstrated in a case study in a knowledge-intensive company. Most of the problems in this case occur in the first three phases of the knowledge management process. It is recommended that the company monitors on a regular basis, starting from its core competencies and its strategy, what essential knowledge their employees are lacking and encourages them to acquire it. Furthermore, the company should ensure that employees have time to codify their knowledge regularly and that adequate information systems are in place and kept up-to-date. The dissemination of knowledge can be improved by working in different teams, coupling junior with senior employees, and by the exchange of new knowledge between employees on a regular basis by encouraging the development of communities of practice and by the systematic creation of learning histories.
Introduction

Nowadays we live in a ‘knowledge society’, in which knowledge is the most important means of production, not capital, raw materials or labour (Drucker, 1993). Growth of the service sector, automation, the development of new (information) technology, changes in structures and work processes of companies and globalisation and, as a consequence, growing competition are some reasons for this development (Castells, 1996; Rifkin, 1995, 2000; Zolingen, 1995). In a society based on knowledge, Drucker says, the knowledge worker is the single greatest asset. But survival and innovation of companies are nowadays not only dependent on the knowledge they have but on the ability to generate new strategically valuable knowledge (Harrison, 2000) and creativity with which they apply knowledge upon knowledge (Weggeman, 1997, 2000). Knowledge can provide a sustainable advantage. According to Davenport and Prusak:

Eventually competitors can almost always match the quality and price of a market leaders’ current product or service. By the time that happens though, the knowledge rich, knowledge-managing company will have moved on to a new level of quality, creativity, or efficiency. The knowledge advantage is sustainable because it generates increasing returns and continuing advantages. Unlike material assets, which decrease as they are used, knowledge assets increase with use: ideas breed new ideas and shared knowledge stays with the giver while it enriches the receiver. The potential of new ideas arising from the stock of knowledge in any firm is practically limitless – particularly if the people in the firm are given opportunities to think, to learn, and to talk with another. (1998: 17)

This is why knowledge management has become very important for companies. Furthermore, the growing interest in knowledge management is closely related to companies’ efforts to become learning organisations, in which managers strive to create a culture and a system to create new knowledge and to capture knowledge and get it to the right place at the right time (Marsick and Watkins, 1999; Senge, 1990; Watkins and Marsick, 1993). Knowledge management aims to make knowledge explicit, codifies knowledge and experiences and develops knowledge that is essential for the realisation of the core competencies of a company (Davenport and Prusak, 1998). In this article we ask questions such as: what is knowledge?, who uses it?, where is it found?, how do you create it?, how do organisations store it?, what is knowledge management?, and what problems do organisations have with knowledge management?

Theoretical background

Data, information, knowledge

When one talks about knowledge, the question arises how the difference between knowledge, information and data can be interpreted. Davenport and Prusak (1998) state: ‘data is a set of discrete, objective facts about events’ (ibid: 2) and Peter Drucker (cited in Davenport and Prusak, 1998) once said that information is ‘data endowed with relevance and purpose’. Information comes into being when somebody attributes meaning to data. When that person communicates that meaning, from his or her point of view, information is being transmitted. Davenport and Prusak state: ‘data becomes information when its creator adds meaning’ (ibid: 4). One talks about knowledge when information has acquired a place in the reference framework of the user and the user connects this with his or her own actions. According to Davenport and Prusak:

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of those who know. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms. (ibid: 5)
They describe knowledge as a socially constructed reality, influenced by personal beliefs and values, forged in the rhythms of daily work, and visible in a company’s products and services. Knowledge is complex because it is personalised. This makes it difficult to standardise and to share it effectively with others. Nonaka and Takeuchi (1995) describe organisational knowledge creation as a continuous and dynamic interaction between tacit and explicit knowledge. Tacit knowledge is personal, context-specific and therefore difficult to formalise and communicate. Explicit knowledge is transmittable in formal, systematic language. Explicit knowledge may be equated with knowing about whereas tacit knowledge is equated with knowing how. Nonaka and Takeuchi distinguish four modes of knowledge conversion: (1) socialisation, from tacit to tacit knowledge; (2) externalisation, from tacit to explicit knowledge; (3) a combination of explicit bodies of knowledge; and (4) internalisation from explicit to tacit knowledge.

The process of socialisation can be found in apprenticeships in which apprentices acquire tacit knowledge by observation, imitation and practice. The primary mechanism for tacit knowledge sharing is to connect people in a dialogue – getting people talking face-to-face, or at least through videoconferencing or other interactive media. During dialogue, experiences, mental models and skills are shared, and a collective intelligence is created – people together arrive at a shared understanding of a problem and a collective solution that combines the ideas of many people (Gerard and Teurfs, 1995; Schein, 1993). Formal and informal opportunities to elicit dialogue are talk rooms, knowledge fairs, conferences, chats by the water cooler, and coffee breaks (Davenport and Prusak, 1998; Weggeman, 2000). Another approach to tacit knowledge management is to get people to share learning histories, which are designed to discover the history of how critical decisions were made and problems were solved (or not solved) so that knowledge is transferred to others (Kleiner and Roth, 1997). In organisations a learning history is a written narrative of a specific major event or project, based on the recollections and insights of everyone who participated – managers, line workers, secretaries, even customers and suppliers. Each person is quoted directly, and the reminiscences are woven into a compelling story. In addition, a team of learning consultants and organisational employees identifies recurring themes, poses questions about the story’s assumptions and implications, and raises ‘undiscussable’ items that do not come through in the narrative. The completed learning history is used as basis for discussion groups. The people who were involved re-experience the event and collectively learn its significance. Communities of practice are another opportunity to stimulate the process of socialisation. Communities of practice are made up of individuals who are informally bound to one another through exposure to a similar set of problems and the common pursuit of solutions. These people have mutual interests (Orr, 1996; Wenger, 1998). In practice, individuals socially construct knowledge. They share views, and in so doing create a common understanding which can be shared in ‘war stories’ (Orr, 1996). This may help new workers to ‘learn the ropes’ and others to share views about technical and social problems and exchange solutions or create new solutions. Wenger says: ‘They [workers] create a practice to do what needs to be done’ (1998: 6).

According to Nonaka and Takeuchi (1995), the process of externalisation holds the key to knowledge creation because it creates new, explicit concepts from tacit knowledge by using metaphors and analogy in a dialogue or collective reflection between experts. ‘Metaphors create novel interpretation of experience by asking the listener to see one thing in terms of something else’ and create ‘new ways of experiencing reality’ (ibid: 67) and this makes them an important tool in creating a network of new concepts.

The process of combining different bodies of explicit knowledge can lead to new knowledge. Information technology such as the Internet, EDI, the Intranet, MID, DSS, ERP and mechanisms such as data warehousing, data mining, knowledge mapping, electronic libraries can be useful in combining and exchanging explicit knowledge (Sprague and Watson, 1996).

The process of internalisation embodies explicit knowledge into tacit knowledge. It
is closely related to ‘learning by doing’. For explicit knowledge to become tacit it helps if the knowledge is verbalised or diagrammed into documents, manuals or oral stories. Documentation helps individuals internalise what they experienced, thus enriching their tacit knowledge, according to Nonaka and Takeuchi (1995: 69).

Knowledge management as process

Knowledge management is about knowledge creation. Marsick and Watkins state: ‘Its focus is releasing creativity and invention in people, who in turn can use what they know to develop the capacity of people, improve practices and processes, and develop better products to serve the customer’ (1999: 82).

Sprenger (1995) talks about a ‘knowledge stream’ as process in an organisation. The knowledge stream is made up of four phases. First, the absorption ability, that is the assimilation of new knowledge in the organisation. This concerns the strategic knowledge contributing to the execution of core activities and the development of the core competencies. The second phase of the knowledge stream is the diffusion capacity. This is about the exchange of knowledge with the surroundings of the organisation. The third phase is generating knowledge, developing new knowledge by means of existing knowledge. By combining elements from existing knowledge, new insights are formed and problems are being solved. According to Sprenger, the knowledge stream ends with the exploitation phase in which knowledge is being applied on behalf of the organisation.

Weggeman (1997) visualised the process of knowledge management in the so-called knowledge value chain. The knowledge value chain comprises the following phases: determining the knowledge in accordance with the strategy of the organisation, listing the available knowledge in the organisation, developing knowledge, applying knowledge and evaluating knowledge. The knowledge management process is continuous and cyclical in nature. The mission, the vision, the goals and the strategy of the organisation are the driving forces of the knowledge value chain.

Diepstraten (1996) distinguishes seven phases of knowledge management: the exploitation of knowledge by added value by clients, the development of new knowledge, dissemination of knowledge, combining knowledge, but also recording knowledge for availability, deploying and using knowledge and acquiring knowledge from suppliers.

Van der Spek and Spijkervet (1995) indicate that organising processes are the core of knowledge management in which (1) new knowledge is being developed; (2) knowledge is being distributed to those who need this knowledge in order to be able to execute their tasks well; (3) knowledge is being made accessible for future use, also for collective use; and (4) knowledge fields are being combined.

From the foregoing it appears that various possibilities exist to describe the phases within the knowledge management process. In this study knowledge management is characterised as a cyclical process consisting of five phases: acquiring knowledge; establishing knowledge; disseminating knowledge; developing knowledge; and applying knowledge. Acquiring knowledge means incorporating new knowledge in the organisation. For this only strategic knowledge is important because it contributes to the execution of core activities and the development of the core competencies of the organisation. Establishing knowledge means making knowledge explicit and accessible so that, if desired, other persons can acquire this knowledge any time anywhere. The third phase of the knowledge management process is made up of the dissemination of knowledge to those who need it in the execution of their tasks. In the fourth phase, knowledge is being developed by means of existing knowledge. By combining elements of existing knowledge, new insights can be formed and thus new knowledge can be developed. The fifth phase of the knowledge management process is the application of (newly developed) knowledge. This means that knowledge is being used on behalf of the organisation.
Organisational factors influencing the knowledge management process

Organisation characteristics such as structure, culture, and strategy, as well as knowledge systems, influence the progress of the knowledge management process. A range of opinions does exist about the ideal organisation structure for the promotion of knowledge management process. Nonaka and Takeuchi (1995) take the view that the hypertext organisation has the ideal structure to promote knowledge creation. The hypertext organisation is made up of three interconnected layers or contexts: the business system, the project team and the knowledge base. According to Nonaka and Takeuchi:

The central layer is the business-system layer in which normal, routine operations are carried out. Since a bureaucratic structure is suitable for conducting routine work efficiently, this layer is shaped like a hierarchical pyramid. The top layer is the project-team layer where multiple project-teams engage in knowledge creating activities such as new product development. The team members are brought together from different units across the business system, and are assigned exclusively to a project team until the project is completed. At the bottom is the knowledge-base layer where organisational knowledge generated in the upper two layers is recategorised and recontextualised. This layer does not exist as an actual organisational entity, but is embedded in corporate vision, organisational culture, or technology. Corporate vision provides the direction in which the company should develop technology or products, and clarifies the ‘field’ in which it wants to play. Organisational culture orients the mindset and action of every employee. While corporate vision and organisational culture provide the knowledge base to tap tacit knowledge, technology taps the explicit knowledge generated in the two other layers. (ibid: 167)

And ‘the key characteristic of the hypertext organisation is the ability of its members to shift contexts. They can move among three contexts in order to accommodate the changing requirements of situations both inside and outside the organisation’ (ibid: 169). This ability offers the organisation great flexibility. In the hypertext organisation the efficiency and stability of the bureaucracy are combined with the effectiveness and dynamism of the task force.

Several authors (Bertrams, 1999; Marsick and Watkins, 1999; Ostroff, 1999; Watkins and Marsick, 1993) take the view that in order to create optimal conditions for the process of knowledge management it is best for an organisation to switch from the widespread hierarchical task-oriented structure consisting of many layers to the much flatter horizontal or network structure. This process of decentralisation can extend over a group of businesses. Bertrams characterises the network organisation as follows: ‘A network organisation is a group of businesses usually supplying the same market or specific target group, and by means of working together they try to use each other’s strong points. With this it is important that various businesses actively work together in the exchange of clients and the offering of overall solutions’ (1999: 126, 127). According to Bertrams, essential requirements for the good progress of the process of knowledge management are: (1) within the structure of an organisation communication along short lines; (2) employing language comprehensible to all members of the organisation; (3) good communication between the various departments because there is no competition; and (4) correct and easily accessible information about professionals and departments. Watkins and Marsick (1993) mention the importance of ‘a culture that is learning oriented, with beliefs, values, and policies that support learning; for example, tolerance for mistakes as opportunities for learning and problem solving; and policies that reward knowledge and the sharing of knowledge as well as rewards for performance’ (ibid: 166). Davenport and Prusak (1998) are of the opinion that these policies underline the value attached to sharing knowledge in the organisation and that this motivates employees to share knowledge. The trust employees have in their organisation is also essential for knowledge sharing (Watkins and Marsick, 1993). Davenport and Prusak (1998) say that trust must be visible (see people get credit for knowledge sharing) and trustworthiness must start at the top (if the top managers are trustworthy, trust will seep through and come to characterise the whole firm). These authors also point out the importance of providing time for learning and reflection. Factors from the culture of the organ-
isation strongly influencing the motivation for learning and giving feedback are, according to Bertrams (1999): feedback (what happens with my knowledge), the diversity of skills (do I get the chance to use that which I am learning?), the recognisability of the task (does that which I am learning supply an added value to my ambition?), the importance of the task (do I help the organisation with my behaviour?) and autonomy (do I get enough freedom to learn?). It is also important that an organisation rewards the correct behaviour. The criterion must be not the amount of knowledge a professional gives feedback on, but the extent to which the feedback knowledge is being used.

Bertrams distinguishes two types of organisational cultures that can facilitate knowledge management: the enterprising culture and the group culture:

An enterprising culture characterises organisations taking a great extent of risk, dealing with a dynamic and complex environment, highly valuing creativity. Innovation, individual initiative and independence make up the standard. This is also the culture with which many businesses will identify themselves. Recruitment ads of almost all businesses will characterise their own organisation with the described terms and will ask for professionals meeting those characteristics: enterprising, creative and full of initiative. Professionals in this organisation want to score quickly and to climb at high speed, their goal is to be able to start leading quickly, to get responsibility and finally to join the top of the organisation. A group culture is characterised by tradition, loyalty, socialisation, lots of teamwork and social control. People enter into a long-lasting association with each other and they feel socially strongly connected. Although the organisation aims at a good turnover, working together with each other in interesting fields gets priority. Communication, coordination and integration take place on the basis of shared goals. Innovation is possible in this organisation but strongly depends on the standards in the organisation. Because on the whole they are more aiming at the inside than at the outside not much external knowledge is brought inside. (1999: 142)

Bertrams takes the view that knowledge management stands the best chance in a mixture of an enterprising culture and a group culture.

After a certain organisation structure and culture, a ‘knowledge strategy’ based on a clear and detailed knowledge policy and aimed at innovation and learning (Watkins and Marsick, 1993) is essential for an organisation to survive. Customer-orientation, product leadership or cost leadership, all three require a well running knowledge management process. Versatile and actual knowledge about the customer and their needs, good service and training when the products have been delivered and lasting contacts with the customer require that an organisation must become a part of its environment. That environment consists mainly of the customers and suppliers. Bertrams (1999) terms this a transition from internal to external orientation of organisations. Furthermore, the accessibility, the content and the feedback possibilities of the (electronic) knowledge systems of an organisation influence the process of knowledge management (Stewart, 1997).

Marsick and Watkins describe the relationship between learning, the learning organisation and the knowledge management process as follows:

If a continuous learning system enables an organisation to build new competencies and capacities among its members, a knowledge management system enables the organisation to translate that learning into knowledge that adds value. Knowledge management, by focussing attention on the processes that create knowledge and which preserve it, enables organisations to grow and renew themselves. This is the essence of the learning organisation. (1999: 101)

They mention a few decisions that have to be made in creating a knowledge management system: (1) what is the vision that guides choices about what to include or exclude?; (2) once selected for inclusion, how should information be updated?; (3) who should do the selection and inputting of information?; (4) how should knowledge be organised so it is easily understood and easily found?; (5) how can the system be designed so that people can easily add or access information?; (6) how should people be rewarded for adding their knowledge to a knowledge base so that others can access it?; (7) how should people be rewarded for using the system? (ibid: 89). Bertrams (1999) mentions a number of specific factors playing a role in the quality of electronic knowledge systems: speed; simple log in and log out; user friendly navigation (surfing); good and simple search method; convenience in feedback;
linking from knowledge to professionals: pointers to competencies of employees; actual and correct content. He warns about: decrease of face-to-face contact; abundance of information instead of knowledge; loss of time because of abundance of e-mails; in some situations e-mail is unsuitable for knowledge transfer.

Method

Research question

At present the process of knowledge management is receiving much attention, but there has been very little solid research into it. This is important because organisations, despite much good will, do not really know what they must do with knowledge management in real terms. Therefore, in this article the following research theme is being explored: Knowledge-intensive organisations experience difficulties in handling knowledge management. With which problems in the field of knowledge management are these organisations being confronted? How do these organisations handle these problems? And what recommendations can be made to prevent and solve problems in the field of knowledge management?

Selection case and respondents

It was decided to perform the study in knowledge-intensive organisations employing professionals, because the acquiring, codifying, dissemination, development and application of knowledge are of vital importance to these organisations. For these organisations handling knowledge management adequately is essential to their survival. At the same time, professionals are the ones who find it hardest to share their knowledge for they derive their value from the knowledge they ‘possess’.

Three organisations from a list of customers of a consultancy firm were approached. All three organisations participated in the research project. The three participating organisations can be typified as customer-oriented knowledge-intensive organisations, also labelled ‘heavy knowledge-intensive organisations’. Within these organisations the dominant influence on the functioning of the organisations is being exerted by the employees and the – direct – output is in the form of software, reports, drawings, formulas, programs and the like (Weggeman, 1997). In this article only the results of the organisation with a prominent position in the field of automation are included because this organisation is in a stable phase and has reasonable experience in the field of knowledge management. In the second company the process of knowledge management was upset because this company was merging with another company and the third company was still in a starting-up phase and consequently did not pay structured attention to knowledge management. In the case study four respondents were involved, with the following jobs: the executive manager, the service line manager consultant (a specialist in the field of documentation); the knowledge manager and an employee of the communication department. This organisation will be referred to in this article as ICT Ltd.

Procedure and instruments

Data collection was undertaken by a questionnaire followed by half-structured interviews, going deeper into the subjects most relevant for this organisation. The aim of the questionnaire was to get a quick scan of what was taking place in the organisation in the field of knowledge management. The questionnaire also served as preparation for the interviews. The questionnaire was filled in by four persons with various functions. The questionnaire totalled 59 items. The literature directed the selection of the research variables to be studied and the operationalisation of the items. Each item represented a bottleneck in the field of knowledge management distinguished in the literature. The items were formulated in the form of propositions and were measured.
on a 6-point scale with answer categories ranging from complete agreement to complete disagreement. The items were classified on the basis of the phases of the knowledge management process: acquiring knowledge, recording knowledge, dissemination of knowledge, development of knowledge and applying knowledge. Questions were asked about the structure, the culture, the strategy and the knowledge systems of the organisation. After the written questionnaire half-structured interviews were used. The aim of these interviews was to further examine the most relevant bottlenecks organisations experience in the field of knowledge management. At the same time the interviews attempted to examine which activities are undertaken in organisations to optimise the process of knowledge management. The subjects in the half-structured interview had been formulated beforehand in a topic list.

Results

ICT International is one of the biggest ICT companies in the Netherlands. The company has ten subsidiaries with their own expertise in their own domains and markets. ICT Ltd. is one of the subsidiaries of ICT International and was an information and communication technology service provider from the very beginning. With its 600 employees it services the field of public government. Its orders mostly deal with income processing, benefits, pensions, subsidies, finances, and document management. At the beginning of this year ICT Ltd. started the project ‘Knowledge management ICT Ltd.’, because they realised that knowledge is the most important determinant of the organisation.

The knowledge management process at ICT Ltd.

In this section the results are structured on the basis of the various phases of the process of knowledge management: acquiring knowledge, codifying knowledge, dissemination of knowledge, development of knowledge and applying knowledge, and subsequently on the basis of the factors of the organisation influencing the process of knowledge management: structure, culture, strategy and knowledge systems.

Acquiring knowledge

All four respondents experience it as a problem that ICT Ltd. has not established which specific knowledge and skills its employees have at their disposal. Because of this it is not clear what knowledge is available within ICT Ltd. At the moment much time is being lost searching for the right people with the right qualities. ‘You really have to know people to find somebody,’ according to one of the respondents. The fact that ICT Ltd. is a big organisation with different branches does not make it any easier. The head of the department covering knowledge management does not think that this is such a determining factor. He said: ‘If each department has established in its own way who has which knowledge and skills, then others can also retrieve this quickly with a phone call or an e-mail.’ All respondents see the solution to this problem in the form of Purple Pages, which are being organised at holding level. In these pages it is recorded what each employee can do, wants and has done. It contains a kind of résumé of each employee; it must also be clear who has carried out which projects and what everybody is working on at the moment. In order to be successful the Purple Pages must be kept up-to-date and must be user-friendly. Each respondent takes the view that ICT Ltd. is actively gathering knowledge about the wishes and needs of its clients. According to the managing director this is being done in the form of so-called ‘fireplace sessions’. During these rather informal meetings different subjects come up. Nothing is being done at the organisational level with the results of these meetings. For instance, based on these facts, there is no active acquisition of knowledge in order to be able to anticipate future developments. Employees themselves have to indicate whether they want to follow a certain course
or want to attend a seminar. One of the respondents says about this: ‘The management never tells you that it might be good to follow training in this or that field. You really have to explain what purpose it serves for ICT Ltd.’ Thus training and seminars take place on one’s own initiative and are usually ad hoc. One service line has been given time to assemble the whole department for one day per month. During this meeting experiences are shared. Sometimes another service line or another subsidiary is invited to talk about their activities.

**Codifying knowledge**

All the respondents except one do not know how they can access knowledge about activities in the past. The accessibility of information is very bad, not only the accessibility of knowledge from the past, but also the accessibility of current knowledge. The infrastructure of the Intranet is hampered by the dialectics of progress; it was very modern in the past, now it is outdated and not at all well maintained. The focus is very strong externally. The internal organisation of ICT Ltd., consequently the Intranet also, do not receive enough attention. The employee of the department covering knowledge management says: ‘It’s the same as the house of the painter that is badly in need of paint.’ The Intranet is a possible solution but also informal contacts – acquaintance management – are very important. Employees do not get enough time for this. There is too much striving for maximum declarations. All respondents are of the opinion that the know-how knowledge, in other words the procedural knowledge, and the know-what knowledge, also called factual knowledge, have been reasonably well recorded. However, with procedural knowledge the comment is made that maybe too much is following procedures. ‘The advantage of it is that everybody talks the same language, but the disadvantage is that suddenly everything has to be done in procedures. People handle this rather rigidly while the procedures are meant to be flexible,’ according to a respondent. Which knowledge is being recorded differs per service line. Some service lines lay down explicit knowledge about clients and markets, other service lines mainly record knowledge concerning content of projects. This knowledge is only accessible for the employees of the service line in question. The respondents are all under the impression that within ICT Ltd. much information is already laid down in the form of e-mails, letters, faxes, documents and the like. But this information is left lying around the whole organisation. ‘If this information were stored and opened up in a structured way, this would offer a considerable headway for ICT Ltd. in easily retrieving important information,’ according to the head of the department covering knowledge management. Respondents have different opinions about encouragement by the management. Two respondents are of the opinion that management supports them sufficiently to record their knowledge. The other two respondents, one of them the head, say that the management ought to encourage them more to record subject-content knowledge. They are of the opinion that recording knowledge and skills must be enforced by means of a procedure or rule, because some people do not take that responsibility themselves. It is even suggested making the recording of knowledge and skills part of the assessment. All agree that colleagues pay hardly any attention whatever method one uses. This is particularly because of the culture of ICT Ltd. There is a very friendly atmosphere, this makes it very difficult to tell colleagues what could have been done better. The respondents regret this because at the moment ICT Ltd. has a high staff turnover and as a result much knowledge disappears.

**Disseminating knowledge**

With regards to the dissemination of knowledge, the respondents experience only few bottlenecks. A great deal of knowledge is spread by means of the informal circuit. This is experienced as pleasant, but the corridors also cause much ‘noise on the line’. The employee of the department covering knowledge management said about this: ‘If there is no communication, people will fill in the dots themselves. If they no longer
know the truth, they start pointing and usually the general manager is the fall guy.’ The head calls the informal circuit ‘the place where you can do business quickly’. ‘It’s like “I am working on this, do you know someone who knows more about it?”’.

According to the respondents the informal circuit has advantages over the formal circuit. It is accessible, ‘safe’, easy and quick. A disadvantage is that it is more difficult to supervise, to control and to survey than the formal circuit. One respondent is of the opinion that maybe the informal circuit has become so big because of the lack of a good formal circuit. When it is being recorded in a user-friendly accessible system who works on what and who has which knowledge and skills, the informal circuit becomes less vital.

Nearly all respondents admit the problem that within ICT Ltd. much knowledge is inside the heads of the employees. One respondent does not consider it to be a problem that much knowledge is inside the heads of the employees, but the fact that this knowledge is not recorded is a problem. The head of the department covering knowledge management is of the opinion that ‘This implicit knowledge is worth a fortune, but it would be worth something if ICT Ltd. were a little less dependent on the physical presence and effort of employees with a lot of implicit knowledge.’ Much personal knowledge is lost when an employee leaves the organisation. It is also difficult to lay down this implicit knowledge in systems. There are different ways to solve this bottleneck. Good facilitation of knowledge management increases the chance that good employees will stay. Because of this, the search for relevant information takes less time and projects work more efficiently. A good knowledge management system also increase the pleasure in one’s work. In any case it gets rid of a number of frustrations. A second solution is to link a senior with a junior. But within ICT Ltd. they do not have the nerve to give a senior a day off each week for this. With the issues of the day the external clients take precedence. Too much attention is being paid to the short-term results. The fact that ICT Ltd. is quoted on the stock exchange is being used as an excuse for this. According to the director, the implicit knowledge and the experience of the employee who leaves the organisation are also being reflected in advice reports and products. According to him there is in this ‘an implicit knowledge transfer in the way in which the work has been done. Others can learn from this.’

Three of the four respondents take the view that sharing knowledge with colleagues strengthens their position in the organisation. ‘For when you share your own knowledge, you are more likely to get knowledge back from others.’ Respondent number four states that many employees of ICT Ltd. find the sharing of knowledge with colleagues threatening. He says about this: ‘People are afraid of losing prestige when they yield up their knowledge.’

The fact that employees never change jobs is considered a bottleneck in the field of the dissemination of knowledge. The respondents agree that job changes do not or hardly ever occur within the company. Job changes are also rather difficult because the roles and tasks of the different employees diverge too much. According to the director: ‘It is hardly possible for a programmer to carry out the tasks of an advisor for a month and vice versa.’ However, there are many different projects demanding various skills of the employees. Apart from the exchanges in the projects, within ICT Ltd. one works almost always in interdisciplinary teams. The respondents find this very worthwhile, because in this way much knowledge is disseminated and new knowledge is being developed since you learn from each other.

Only the director takes the view that the employees of ICT Ltd. provide each other with too little information about their work experiences, courses they have taken and/or projects. Good methods within a project are not explicitly registered and disseminated. Sometimes this knowledge is being disseminated in an informal way, for instance in the corridors. One is reasonably open about problems and mistakes. The employee of the department covering knowledge management refutes this. There is more talk about others than with others. More is said about this under the heading ‘Culture of the organisation’.

Developing knowledge

The head of the department covering knowledge management and also an employee of that department take the view that within the company the same knowledge is being developed in two different places in the organisation. They say that this is caused by lack of information about the activities of colleagues. Both respondents experience this as a problem. It costs time and therefore money. The director of the organisation also indicates that indeed it does happen once in a while that the same knowledge is being developed at two different places in the organisation but he does not consider this to be a problem. About this he says: ‘It’s better that the same knowledge is being developed in two places in the organisation than that this knowledge is not being developed at all. Indeed it’s a pity about the time, but in any case the employees have learned.’

ICT Ltd. has reasonably good contacts with research institutions. Students frequently do an internship at ICT Ltd. Both parties profit from this, in this way both the student and ICT Ltd. acquire and develop knowledge.

The respondents all take the view that ICT Ltd. offers them enough room to experiment with, for instance, new working methods. The development of new knowledge is even one of the items of the evaluation. The employee of the department covering knowledge management is of the opinion that within the company the work is primarily done by routine. But according to him this working by routine does not hinder the knowledge management process. ‘Certain activities have to be executed by means of certain fixed steps.’

Applying knowledge

According to the respondents, new knowledge and/or methods are well applied. Knowledge is applied with the work for clients, writing of articles and internal consultation. In the execution of assignments knowledge acquired earlier is always used to arrive at new understandings. The respondents do not experience any difficulty with the application of the knowledge of colleagues. There is no fear that the knowledge of colleagues is of insufficient quality. Everybody takes the view that the application of new knowledge is important. The director says about this: ‘There is no culture “I have always done it this way, it always worked, so why should I change?”.’ Furthermore, according to the respondents, the employees for whom new developed methods are intended are sufficiently involved in this development.

Organisational factors influencing the knowledge management process

Structure of the organisation

The opinions about the length of the communication lines of ICT Ltd. differ. Only the head of the department covering knowledge management says that the communication lines are short. ‘A culture of calling very quickly and walking into each other’s room when you have a question is prevalent,’ according to this respondent. The communication lines to the management and the board could be shorter. The other three respondents share this view and experience it as a problem. Because of this the knowledge feedback is slower. In general, employees find it difficult to walk into the office of the director. The director doesn’t agree. He says about this: ‘If I get an e-mail message or a phone call from an employee, I answer it the same day. Sometimes I do not succeed in answering it the same day, but then I always inform the person in question about this.’ The director also gives the following example that aptly expresses the situation with regards to this: ‘I heard from a colleague that person X wanted to ask me a question about a certain subject. He did not dare to call me, so my colleague advised him to send me an e-mail. It took a week before
he had summoned up his courage to send me a mail message. I replied the same day, and he was so amazed that he went to my colleague to tell him this remarkable news.

The same respondent who takes the view that the communication lines of ICT Ltd. are short, also is of the opinion that the staff turnover within the company is relatively small, anyway when you compare it with the holding. The other three respondents take an opposite view. All three experience the big staff turnover as a problem. It happens regularly that employees with unique knowledge and experience, which in most cases have not been recorded, leave the company. According to the employee of the department covering knowledge management, the most important reason for this is the fact that employees are being hindered in executing their work properly. Too many internal matters have to be solved by the employees themselves.

Progress reports are regular agenda items according to the respondents. The employee of the department covering knowledge management takes the view that during meetings too much time is being spent discussing progress. He says: ‘Let’s stop that nattering and get to work!’

Within ICT Ltd. one works in a thematic way. With a new assignment it is determined who is best qualified to execute it. The deployment manager is responsible for this but it remains a problem because it is not clear who has which knowledge and skills. During busy times one often looks first at the availability of employees and only after that at his or her qualities.

Culture of the organisation

According to the respondents the emphasis is mainly on the short-term results. This is so because ICT Ltd. is an organisation quoted on the stock exchange. ‘Now and then you have to show quick wins, because otherwise you will not get any room to go on,’ according to a respondent. This short-term thinking adversely interferes with the process of knowledge management. Because of this one handles knowledge pragmatically. The result of knowledge management only becomes visible in the long term, because of this it is difficult to indicate how much benefit one derives from an investment, for instance, a database.

Three respondents take the view that within ICT Ltd. one can openly talk about mistakes and insecurities. Only the employee of the department covering knowledge management disagrees. ‘They look at the mistakes you are making when you are being squared up. In the case of a mistake it is “what a failure” instead of “I learned something from that.”’ One of the reasons for this can be the fact that the company long ago was founded on a government culture. The respondent is of the opinion that this bottleneck enormously obstructs the knowledge management process. ‘When there is no willingness to learn from one’s own mistakes, possible other points of improvement are also not being passed on to others. Within ICT Ltd. knowledge is still often considered to be power, because of this employees are often not willing to openly share knowledge at the tactical and strategical level.’

On the question whether the management of ICT Ltd. gives a good example with regards to knowledge management, opinions are divided. The director and the head of the department covering knowledge management take the view that the management not only promotes knowledge management but that it also applies knowledge management reasonably well. The other two respondents are of the opinion that more support by the management is necessary. Knowledge management does take priority but the company does not make time for it. The degree of stimulation by the management also differs per service line. Knowledge management is everybody’s responsibility is the motto of three of the four respondents. The head of the department covering knowledge management disagrees with this proposition. He takes the view that management bears the responsibility for knowledge management. They have to make time to lay down knowledge and to disseminate it; they must encourage and direct the employees. Employees do not document developed methods, checklists etc. of their own accord. The respondent says: ‘When employees get a free
rein to only do the things they are good at, it is logical that employees do not lay down things of their own accord.’

ICT Ltd. is concerned about the personal ambitions and preferences of its employees. However, the director is of the opinion that this still can be improved.

**Strategy of the organisation**

All respondents agree, to a greater or lesser degree, that knowledge management is a part of the strategic policy of the company. The respondents experience this as being important. In this way employees get the feeling that knowledge management takes priority. This can also be realised by incorporating knowledge management in the objectives of ICT Ltd. Because of this, employees are more inclined to acquire knowledge, to record, to disseminate, to develop and to apply it. Having a knowledge policy, describing how the phases of the management process can be interpreted, is considered to be less important.

The employee of the department covering knowledge management indicates that strategy is something very nice but it has to be converted into decisiveness. It not infrequently happens that ICT Ltd. is lacking in decisiveness. There is much talk, much is written down, all kinds of plans are made, but subsequently nothing is done. Employees themselves no longer expect that the plans will be put into action. The decision-making is very slow as a result of the reigning hierarchy. Almost all decisions are being made by the general manager. As project manager you hardly have any elbow room.

**Knowledge systems of the organisation**

Different service lines have their own knowledge system, mainly in the form of an Intranet, but their cohesion and integral accessibility leave much to be desired. In most cases only employees of the different service lines have access to the knowledge system of their own service line. ICT Ltd. has an Intranet exceeding the organisation. Two of the four respondents, one of them the employee of the department covering knowledge management, take the view that this Intranet is not up-to-date and access is difficult. Feedback of information takes a lot of time, because of this it often does not take place. One of the respondents describes the state of the Intranet as follows: ‘Nothing at all happens on that Intranet, nobody looks at it, and if you do take the trouble to have a look at it you find dead links and references to people who no longer work for us, and in a few cases to someone who has already died.’ An outdated version of Microsoft Office is being used. This makes the exchange of data difficult: not only with customers but also with sister companies, because the sister companies do not use the same standards.

Too often one thinks that a knowledge system is the solution to many problems. So for each problem a new system is bought. One often forgets that knowledge management is more than an Intranet. The human factor, for example in the form of a knowledge broker is often forgotten. The head of the department covering knowledge management says: ‘When I have a problem in the issues of the day, my first thought is “who can help me with this” and then I make one or two phone calls. Only when I do not succeed I’ll start looking in systems.’

Within ICT Ltd. e-mail facilities are being used a lot. Thus, the Internet certainly is valuable.

**Conclusion and discussion**

**Phases of knowledge management**

Concerning the phase of knowledge acquisition three employees are of the opinion that they do not have enough time for knowledge acquisition and sharing. The
management team of ICT Ltd. does not make time for the evaluation of projects, for knowledge exchange meetings, to write short reports or give short presentations about a course attended. Yet the director takes the view that he does encourage his employees with regard to these points. It seems advisable to create more time for the above-mentioned activities.

There is no good insight into where knowledge is located in ICT Ltd. Nothing has been recorded about which specific knowledge and skills the different professionals have at their disposal. Because of this, it takes a lot of time to find the right employee with the right qualities. Both Bertrams (1999) and Davenport and Prusak (1998) mention this problem. According to Davenport and Prusak (1998) knowledge mapping can improve the matching of knowledge (documents and/or people résumés) with people. The respondents mention this solution themselves. They consider Purple Pages to be a solution for this. In these it is being recorded which competencies each employee has at their disposal, in which projects he or she has participated and on which projects he or she is working now. ICT Ltd. does register what the market asks.

All the time and in different ways (formally and informally) knowledge about the needs of the clients is actively being gathered. It is remarkable that the respondents take the view that no active knowledge policy based on these data is being pursued.

Respondents are of the opinion that the management does not provide enough support to attend courses or a seminar. They remark that during projects much is being learned. It seems that these professionals do not know what they must learn. This problem is mentioned by Bertrams (1999) and he takes the view that there is a danger that because of this, the motivation to learn decreases. Bertrams offers a solution: goal-oriented career planning and learning based on a good picture of the knowledge an employee ought to have at his disposal according to ICT Ltd. in order to be able to achieve the desired position and an intended competence level.

There is dissatisfaction about the phase of codification. Three employees say that they have not enough time to codify knowledge. Moreover, access to knowledge and information is difficult at ICT Ltd. and to the extent knowledge is being recorded, it is not being kept up-to-date. Furthermore, employees are not being encouraged to lay down knowledge. It seems advisable that ICT Ltd. in the near future should critically revise its use of information technology systems and decide which systems such as the Internet, EDI, intranet, MID, DSS, ERP and mechanisms such as data warehousing, data mining, knowledge mapping, electronic libraries, are most useful in the exchange of knowledge in ICT Ltd. and who will be responsible for keeping them up-to-date and running (Sprague and Watson, 1996).

Dissatisfaction does exist about knowledge dissemination. Because explicit and tacit knowledge has not been adequately codified in a knowledge system, the informal circuit plays an important role in the dissemination of knowledge. The respondents say that the informal circuit is easily accessible, flexible, easy and quick. The importance of the informal circuit for the dissemination of knowledge is endorsed by several authors (Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995) in particular for the exchange of tacit knowledge for which face-to-face contact is essential. However, the respondents complain about poor knowledge exchange with regard to work experience. Much knowledge is inside the heads of the employees and because this is not being recorded this disappears as a result of a frequent considerable staff turnover. Nonaka and Takeuchi (1995) and Davenport and Prusak (1998) mention approaches such as apprenticeships and mentoring and a method such as videotaping as solutions to make this tacit knowledge explicit. Bertrams recommends passing on new knowledge during the development of knowledge. Other methods of learning from experiences in projects are the creation of learning histories (Kleiner and Roth, 1997) and creating a favourable culture to stimulate communities of practice in which these experiences can be exchanged in a more informal way on a day-to-day basis (Wenger, 1999).

Finally, there is dissatisfaction about knowledge development/creation. Within ICT Ltd. it happens that the same knowledge is being developed at two places. The employees particularly experience the loss of time because of this as a problem. In
the literature this problem has already been mentioned by Nonaka and Takeuchi (1995). A knowledge system with a good overview of where and with whom knowledge can be found within the organisation and what each employee is doing at this moment could offer a solution. Although all respondents take the view that there is enough room to experiment and that the development of knowledge should be a part of the assessment at ICT Ltd., the knowledge manager says that there is relatively too little attention paid to the development of new knowledge. This problem has already been mentioned by Bertrams (1999).

The employees of ICT Ltd. experience no problems with the application of new knowledge. Barriers to the use of new knowledge mentioned by Bertrams, such as aversion to risk, fear of problems with colleagues who want to go on using older knowledge and insufficient support are not mentioned by the respondents of ICT Ltd.

Organisational factors influencing the knowledge management process

Structure
According to several authors (Bertrams, 1999; Nonaka and Takeuchi, 1995) long communication lines, a high staff turnover, not having regular discussions on progress and not working in a project-based way are bottlenecks negatively influencing the knowledge management process. The first two bottlenecks are mentioned by the respondents. They experience communication lines to colleagues as short and communication lines to the management as too long. The staff turnover at ICT Ltd. is high. As already has been noted, because of this, unique personal knowledge disappears. The last two bottlenecks do not occur. There is regular discussion of progress and they do work in a project-based way in ICT Ltd. The company already has a characteristic of the hypertext organisation mentioned by Nonaka and Takeuchi (1995): the project-team layer, the working in projects for which the right persons are being deployed per project. However, ICT Ltd. lacks a knowledge-based layer where new generated organisational knowledge is recategorised and recontextualised. Newly acquired knowledge remains for a large part in the heads of employees. ICT Ltd. has the characteristics of a flatter network structure which certainly has a positive influence on knowledge dissemination within the organisation.

Culture
Of the learning-oriented culture mentioned by Watkins and Marsick (1993) with beliefs, values, and policies that support learning; for example, tolerance of mistakes as opportunities for learning and problem solving, and policies that reward knowledge and the sharing of knowledge as well as rewards for performance, only a few traces can be found at ICT Ltd. Although much is learned while working in projects, no efforts are being undertaken to systematically lay down this knowledge or to share it with others, and there is no aim to systematically gear the competencies of the individual employees to the (future) strategy of the company by means of courses or otherwise. Furthermore, the respondents have different opinions about being able to talk openly about mistakes and doubts. And ICT Ltd. does not have policies that reward knowledge and the sharing of knowledge and offer rewards for performance. The respondents also differ in opinion on the question whether the management sets a good example with regard to knowledge management. Trust is not visible in this organisation. Of the essential variables of the organisational culture mentioned by Bertrams (1999), such as: feedback (what happens with my knowledge), the variety of skills (do I get the chance to use what I am learning?), the recognisibility of the task (does what I am learning add a surplus value to my ambition?), the significance of the task (do I help the organisation with my behaviour?) and autonomy (do I get enough freedom to learn?), the respondents only mention variety and autonomy.
Furthermore, ICT Ltd. does exhibit the characteristics of an enterprising culture, in which innovative behaviour and initiative are expected from the employees. Besides, employees work in a dynamic risky environment, but are not expected to work in teams, ICT Ltd. hardly displays characteristics of a group culture.

Strategy

ICT Ltd. has included knowledge management in its strategic policy, but the strategy is insufficiently converted into decisiveness, according to a respondent. Within ICT Ltd. there is no aim to systematically gear the competencies of the individual employees to the (future) strategy of the company by means of courses or otherwise.

Knowledge systems

It is important that the knowledge systems are up-to-date, well accessible and user friendly (Bertrams, 1999; Davenport and Prusak, 1998). The knowledge systems of ICT Ltd. are not being maintained properly, are not up-to-date and the information is incomplete. It is remarkable that the director is satisfied with the current knowledge systems. The fact that its other sister companies work with different standards is considered to be a big bottleneck within ICT Ltd. The respondents take the view that the value of electronic knowledge systems must not be overrated. Especially in small organisations a knowledge system on paper can also function excellently. In larger organisations and in organisations with several branches an electronic knowledge system is indispensable, according to the respondents. In these kinds of organisations it is impossible to know who has which knowledge and skills, who has executed which projects and who is currently working on which project. Davenport and Prusak (1998) endorse this view. Yet as already mentioned, it seems advisable that ICT Ltd. in the near future critically revises its use of information technology systems and decides which systems such as the Internet, EDI, the Intranet, MID, DSS, ERP and mechanisms such as data warehousing, data mining, knowledge mapping, electronic libraries, are most useful in the exchange of knowledge in ICT Ltd. and who will be responsible for keeping them up-to-date and running.

References


