Analyzing and Solving Difficulties Experienced in Knowledge Management: The Case of a Knowledge Intensive Organization

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Knowledge management has become an important tool in staying ahead in the competition between companies. In this paper five different phases of the knowledge management process are distinguished. The occurrence of knowledge management problems has been studied 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: knowledge acquisition, knowledge codification and knowledge dissemination.

Key words: Knowledge Management, Knowledge Acquisition, Knowledge Codification, Knowledge Dissemination

In our time we live in a "knowledge society" in which knowledge is the most important means of production and 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 a few causes for this development (Castells, 1996; Rifkin, 1995, 2000; Zolingen, 1995). In a society based on knowledge, says Drucker, the knowledge worker is the single greatest asset. But survival and innovation of companies is nowadays not only dependent on the knowledge they have but on the creativity with which they apply knowledge upon knowledge (Weggeman, 1997, 2000). Knowledge can provide a sustainable advantage. According to Davenport & Prusak (1998): "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" (p 17). This is why knowledge management has become very important for companies. Further the growing interest in knowledge management is closely related to companies' efforts to become learning organizations, in which managers strive to create a culture and a system for creating new knowledge and for capturing knowledge and getting it to the right place at the right time (Senge, 1990; Watkins & Marsick, 1993; Marsick & Watkins, 1999). 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 & Prusak, 1998). In this paper we pay attention to questions such as: what is knowledge, who uses it, where is it, how do you create it, how do organizations store it, what is knowledge management and what problems do organizations have with knowledge management?

Theoretical Background

Data, Information, Knowledge and Knowledge Management. When one talks about knowledge, the question arises how the difference between knowledge, information and data can be interpreted. Davenport & Prusak (1998) say: "data is a set of discrete, objective facts about events" (p. 2) and Peter Drucker (in Davenport & 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 point of view information is being transmitted. Davenport & Prusak (1998) say, "data becomes information when its creator adds meaning" (p 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 own actions. Davenport & Prusak (1998) say about knowledge: "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" (p 5). Davenport & Prusak 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 hard to standardise and to share effectively with others.

Knowledge management is about knowledge creation. Marsick & Watkins (1999) say "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 (p. 82).

In this paper knowledge management is being described as: *listing the knowledge needs by examining what knowledge does an organization need and what knowledge is available among its employees. Knowledge management aims at systematically reducing the discrepancy between desired and available knowledge by acquiring, codifying, disseminating, developing and applying knowledge according to policy and plan on behalf of the strategic objectives of an organization.*

Knowledge Management as Process. Sprenger (1995), Diepstraten (1996) Van der Spek and Spijkervet (1996),Weggemans (1997) all distinguish several phases of knowledge mangement process. Van der Spek and Spijkervet for example mention four phases in the knowledge management process: 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 the collective; 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 research knowledge management is being characterised as a cyclical process consisting of five phases: Acquiring knowledge; codifying knowledge; dissemination of knowledge; developing knowledge and applying knowledge. Acquiring knowledge means incorporating new knowledge in the organization. For this only the strategic knowledge is important because it contributes to the execution of core activities and the development of the core competencies of the organization. Codifying knowledge means making knowledge explicit and making it accessible so that, if desired, other persons can acquire this knowledge at an arbitrary moment at an arbitrary place. The third phase of the knowledge management process is made up of the dissemination of knowledge to those for whom it is important for 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 organization.

Organizational Factors Influencing the Knowledge Management Process. Organization characteristics such as structure, culture, and strategy, and next to that knowledge systems, influence the progress of the knowledge management - process. There exists a diversity of opinions about the ideal organization structure for the promotion of the process of knowledge management. Nonaka, & Takeuchi (1995) take the view that the hypertext organization has the ideal structure to promote knowledge creation. The hypertext organization is made up of three interconnected layers or contexts: the business system, the project team and the knowledge base. According to Nonaka, & Takeuchi (1995) "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 a number of 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 organizational knowledge generated in the above two layers is recategorised and recontextualised. This layer does not exist as an actual organizational entity, but is embedded in corporate vision, organizational 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. Organizational culture orients the mindset and action of every employee. While corporate vision and organizational culture provide the knowledge base to tap tacit knowledge, technology taps the explicit knowledge generated in the two other layers (p. 167). And 'The key characteristic of the hypertext organization 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 organization" (169). This ability offers the organization great flexibility. In the hypertext organization the efficiency and stability of the bureaucracy is combined with the effectiveness and dynamism of the task force.

Several authors (Bertrams (1999; Marsick & Watkins, 1999; Ostroff, 1999; Watkins & Marsick, 1993) take the view that in order to create good conditions for the process of knowledge management it is best for an organization 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 organization as follows: "A network organization 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" (p. 126,127). According to Bertrams (1999), within the structure of an organization communication along short communication lines, employing language comprehensible for everybody in the organization, good communication between the various departments because there is no competition and correct and easily accessible information about professionals and departments are essential requirements for the good progress of the process of knowledge management. Watkins & 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"(p. 166). Davenport & Prusak (1998) say that these policies underline the value attached to sharing knowledge in the organization and that this motivates employees to share knowledge. The trust employees have in their organization is also essential for knowledge sharing (Watkins & Marsick, 1993). Davenport & 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 organization 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 organization with my behaviour) and autonomy (do I get enough freedom to learn). Next to that it is important that an organization rewards the correct behaviour. Not the amount of the knowledge a professional gives feedback upon must be a criterion, but the extent to which his feedback knowledge is being used.

Bertrams (1999) distinguishes two types of organizational cultures that can facilitate knowledge management: the enterprising culture and the group culture. Bertram says "An enterprising culture characterises organizations taking a great extent of risk, dealing with a dynamic and complex environment, highly valueing 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 organization with the described terms and will ask for professionals meeting those characteristics: enterprising, creative and full of initiative. Professionals in this organization want to score quickly and to climb at a high speed, their goal is to be able to start leading quickly, to get responsibility and finally to join the top of the organization. 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 organization 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 organization but strongly depends on the standards in the organization. Because on the whole they are more aiming at the inside than at the outside not much external knowledge is brought inside" (Bertrams, p. 142). Bertrams (1999) takes the view that knowledge management stands the best chance in a mixture of an enterprising culture and a group culture.

Next to a certain structure and culture a strategy aimed at knowledge with a clear and detailed knowledge policy (Bertrams, 1999) aimed at innovation and learning (Watkins & Marsick, 1993) is essential for organization for their survival. Customer-orientation, product leadership or cost leadership, all three require a well running knowledge management process. Versatile and actual knowledge about the customer and his needs, good service and training when the products have been delivered and lasting contacts with the customer require that an organization must become a part of its environment. That environment must be mainly seen as the customers and suppliers of the organization. Knowledge coming from the environment must be easily picked up within the organization to be incorporated in the products and the services. Bertrams (1999) terms this a transition from internal to external orientation of organizations. Furthermore, the accessibility, the content and the feedback possibilities of the (electronic) knowledge systems of an organization influence the process of knowledge management (Stewart, 1997).

Research Question

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

Methodology

Selection Case/Respondents/Functions. We have chosen to perform the research in knowledge intensive organizations employing professionals, because the acquiring, codifying, dissemination, development and application of knowledge is especially for these organizations of vital importance. For these organizations handling knowledge management well is essentially important for 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 organizations from a list of customers of a commercial consultancy for organization changes and management development were approached. All three organizations participated in the research project. The three participating organizations can be typified as customer oriented knowledge intensive organizations, also labeled as 'heavy knowledge intensive organizations'. With these organizations the dominant influence on the functioning of the organizations 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 paper only the research results of the organization with a prominent position in the field of automation are included because this organization is in a stable phase and has reasonable experience in the field of knowledge management. At the second company the process of knowledge management was being disturbed 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 applied in this 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 a (female) employee of the communication department. This organization will be referred to in this paper as ICT Ltd.

Procedure and Instruments. The data collection was being executed with a questionnaire followed by half structured interviews, going deeper into the subjects most relevant for this organization. The aim of the questionnaire was to get a quick image of that what is taking place in the organization in the field of knowledge management. Next to that the questionnaire served as preparation for the interviews. The questionnaire was filled in by four persons with diverse functions. The questionnaire contained 59 items. The literature was directive in the realization 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 scale of six points 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. Next to that questions were asked about the structure, the culture, the strategy and the knowledge systems of the organization. Next to the written questionnaire half structured interviews were being used. The aim of these interviews was to further examine the most relevant bottlenecks organizations experience in the field of knowledge management. At the same time it was examined which activities are being arranged in organizations to optimalise the process of knowledge management. The subjects in the half-structured interview had been formulated beforehand in a topic-list.

Results

A Large Automation Company. The company is a part of ICT International, one of the biggest automation companies in the Netherlands. It is a combination of ten subsidiaries with their own expertise in their own domains and markets. ICT Ltd. is one of the subsidiaries of ICT International and an information and comunication technology service provider from the very beginning. With its six hundred employees it extends service to the government. Public government is its field of activity. Its orders mostly deal with income processing, benefits, pensions, subsidies, finances, and document management. In the beginning of this year ICT Ltd. has started the project 'Knowledge management ICT Ltd.', because they realized that knowledge is the most important value in the organization.

The Knowledge Management Process at ICT Ltd. In this paragraph 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 organization influencing the process of knowledge management: structure, culture, strategy and knowledge systems.

The Different Phases of the Process of Knowledge Management

Acquiring Knowledge. All four respondents experience it as a problem that ICT Ltd. has not or hardly not established which specific knowledge and skills its employees have at their disposal. Because of this it is not clear which knowledge is available within ICT Ltd. At the moment much time is being lost with the searching of 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 organization 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 a solution for this problem in the form of Purple Pages, which are being organized at holding level. 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 'fire place sessions'. During these rather informal meetings different subjects come up, but the outcomes of these meetings are not adequeately being taken up by the organization. Within ICT ltd. BV the account managers only spend one day per week with their (possible) clients. The remaining four days they occupy themselves with internal worries. The respondents see this as a problem because account managers are contracted for the acquisition of new clients and next to that to find out about the wishes and needs of the existing clients and not to solve internal problems. ICT Ltd. offers its employees enough possibilities to learn. However, the management does not stimulate the following of trainings and seminars. Employees themselves have to indicate that 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 a training in this or that field. You really have to explain what purpose it serves for ICT Ltd."*. Thus the following of trainings and seminars takes place on one's own initiative and 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 being shared. Sometimes another service line or another subsidiary is being invited to tell about their activities.

Codifying Knowledge. All respondents except one do not know how they can get access to knowledge about activities in the past. Anyway the accessibility of information isn't taken serious, 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-tended. The focus is very strongly externally. The internal organization of ICT Ltd., consequently the Intranet also, does not get enough attention. The employee of the department covering knowledge management expresses it as follows: *"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 a 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, has been reasonably well or well recorded. However with the procedural knowledge the comment is made that maybe too much is being casted in 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 know-what 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 of the opinion 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 organization. *"When this information is being stored and opened up in a structured way, this would be a considerable headway for ICT Ltd. in easily retrieving important information"*, according to the head of the department covering knowledge management. About the stimulation of the management the respondents have different opinions. Two respondents are of the opinion that the management supports them sufficiently to record their knowledge. The other two respondents, one of them the head, say that the management ought to stimulate them more to record subject content knowledge. They are of the opinion that recording knowledge and skills must be extorted by means of a procedure or rule, because some people do not take that responsibility themselves. It is even being suggested to make the recording of knowledge and skills part of the assessment. There is no difference of opinion about the fact that colleagues hardly pay attention whether it is being set out according to which method one

works. This is in particular because of the culture of ICT Ltd. There is a very friendly atmosphere, this makes it very difficult to tell each other 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 from the organization. One of the respondents also experiences having own storage methods which are inaccessible for others and a lack of a convention about formats, as bottlenecks in the field of the recording of knowledge. There are no rules for assigning a name to a file. *"Most of the time information is being put on one's own laptop computer. There are hardly any common directories. When there are common directories these are only accessible in the office and not when you are at a client's house or at home"*, according to the employee of the department covering knowledge management.

Dissemination of Knowledge. With regards to the dissemination of knowledge the respondents experience only few bottlenecks Much knowledge is being spread by means of the informal circuit. This is being 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 do no longer know it, they start pointing and usually the general manager is the fall guy"*. The head denominates 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 experience the fact that within ICT Ltd. much knowledge is inside the heads of the employees as a problem. One respondents 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 a fortune, but it would be worth something if ICT Ltd. would be a little less dependent on the physical presence and effort of employees with a lot of implicit knowledge"*. Much personal knowledge is being lost when an employee leaves the organization. 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 do stay. Because of this the search for relevant information takes less time and projects pass off more efficiently. A good knowledge management system also enlarges the pleasure in one's work. In any case it expels 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 each week a day off 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 organization is 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 the position in the organization. *"For when you share your own knowledge, you are more likely to get knowledge back from others"*, according to these respondents. 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 to lose prestige when they yield up their knowledge"*.

The fact that employees never change functions is being considered as a bottleneck in the field of the dissemination of knowledge. The respondents agree that function changes do not or hardly ever occur within the company. Function 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 during 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 with interdisciplinary team compositions. The respondents find this very worthwhile, because in this way much knowledge is being disseminated. Next to that because of this 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 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 organization'.

Development of Knowledge. The head of the department covering knowledge management and also an employee of that department take the view that it happens within the company that the same knowledge is being developed at two different places in the organization. They say that this is caused by lack of information about the ectivities of colleagues. Both respondents experience this as a problem. It costs time and therefore money. The director of the organization also indicates that indeed it happens once in a while that the same knowledge is being developed at two different places in the organization but he does not consider this to be a problem. About this he says: *"it's better that the same knowledge is being developed at two places in the organization 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 reasonable to good contacts with research institutions. Students frequently do a work placement or their subject for final project at ICT Ltd. Both parties profit from this. In this way both the student and Automatisering BV 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"*, according to this respondent.

Application of Knowledge. According to the respondents new knowledge and/or methods are well applied. Knowledge is being applied with the working for clients, the writing of articles and with internal consultation. For the execution of assignments knowledge acquired earlier is always being used to arrive at new understandings. The respondents do not experience any difficulty with the application of knowledge of colleagues. There is no fear that 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.

Organizational Factors Influencing the Knowledge Management Process

Structure of the Organization. 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 the 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 room of the director. On the other hand the director is of the opinion that: *"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 this remarkable news"*.

The same respondent who takes the view that the communication lines of ICT Ltd. are short, also says 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 has not been recorded, leave the company. According to the employee of the department covering knowledge management, the most important cause of 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.

Discussions of progress 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 on discussions of progress. He says about this: *"let's stop that nattering and get to work!"*.

Culture of the Organization. According to the respondents the emphasis is mainly on the short-term results. This is so because ICT Ltd. is an organization 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 your mistakes when you are being squared up. In case of a mistake it is like 'what a failure' instead of 'I learned something from that'. One of the causes of this can be the fact that the company from way back stems from 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. Next to that within ICT Ltd. knowledge is still often considered to be power, because of this employees are often not willing to openly share knowledge at tactical and strategical level"*, according to this respondent.

About the question whether the management of ICT Ltd. gives the good example with regards to knowledge management, the 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 stimulation from the management is necessary.

Strategy of the Organization. All respondents agree, indeed 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 realized by incorporating knowledge management in the objectives of ICT Ltd. Because of this, employees are more inclined to acquire knowledge, to record, to disseminate, develop and 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 being written down, all kinds of plans are being made, but subsequently nothing is done with it. Employees themselves do 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 Organization. Different service lines have their own knowledge system, mainly in the form of an Intranet, but the cohesion and the integral accessibility leave something to be desired. In most cases only employees of the different service lines have access to the knowledge system of their own service line. Next to that ICT Ltd. has an intranet exceeding the organization. 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. Next to that 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 for many problems. So for each problem a new system is being 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 about this: *"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. mail facilities are being used a lot. In that Internet certainly has a value.

Conclusion and Discussion

About the phase of knowledge acquisition three employees say that they have not 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, for writing short reports or giving short presentations about an attended course. Yet the director takes the view that he does stimulate his employees with regards to these points. It seems advisable to create more time for 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 & Prusak (1998) mention this problem. According to Davenport & Prusak (1998) knowledge mapping can be helpful to improve the matching of knowledge 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 its disposal, in which projects he or she has participated and at 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 ectively being gathered. It is remarkable that the respondents take the view that no active knowledge policy based on these data is being pursued.

The respondents are of the opinion that the management does not provide enough stimulation for attending courses or a seminar. They do remark that during projects much is being learned. It seems that these professionals do not know what they must learn. This problem is being mentioned by Bertrams (1999) and he takes the view that there is a danger that because of this, the motivation to learn decreases. Bertrams (1999) comes out with 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 rise to a desired position and an intended competence level.

There is also 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 stimulated to lay down knowledge. It seems advisable that ICT Ltd. in the near future critically revises its use of information technology systems and decides which systems such as internet, EDI, intranet, MID, DSS, ERP and mechanisms such as data warehousing, data mining, knowledge mapping, electronic libraries, are most usefull for the exchange of knowledge in ICT Ltd. and which persons will be responsible for keeping them up-to-date and running (Sprague, & Watson, 1996).

There is also dissatisfaction 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 about the informal circuit that it is easily accessible, flexible, easy and quick. The importance of the informal circuit for the dissemination of knowledge is being endorsed by several authors (Nonaka & Takeuchi, 1995;Davenport, & Prusak, 1998) in particular for the exchange of tacit knowledge for which face-to-face contacts are essential. However, the respondents complain about poor knowledge exchange with regards 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 out of the organization. Nonaka & Takeuchi (1995) and Davenport & Prusak (1998) mention approaches such as apprenticeships and mentoring and a method like videotaping as solution to make this tacit knowledge explicit. Bertrams (1999) recommends passing on new knowledge already during the development of knowledge. Other methods to learn from experiences in projects are the creation of learning histories (Kleiner & Roth, 1997) and creating a favorable 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).

There is also dissatisfaction about knowledge development/creation. Within ICT Ltd. it happens that the same knowledge is being developed at two places. The employees especially experience the loss of time because of this as a problem. In the literature this problem has already been mentioned by Nonaka & Takeuchi (1995). A knowledge system with a good overview of where and with whom knowledge can be found within the organization and what each employee is doing at this moment could offer a way out. Although all respondents take the view that there is enough room to experiment and that the development of knowledge is even a part of the assessment at ICT Ltd., the knowledge manager says that there is relatively too little attention for 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 for the use of new knowledge mentioned by Bertrams, such as aversion to risk, fear for problems with colleagues who want to go on using older knowledge and insufficient support are not being mentioned by the respondents of ICT Ltd.

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

Culture. Of the culture mentioned by Watkins & Marsick (1993) 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 only a few traces can be found at ICT Ltd. Although much is being learned during the working in projects, no efforts are being undertaken to systematically lay down this knowledge or to share it

with others, and there is no aspiration 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 offers as well rewards for performance. The respondents also differ in opinion about the question whether the management sets a good example with regards to knowledge management. Trust is not visible in this organization. Of the essential variables from the organizational culture mentioned by Bertrams (1999), such as: feedback (what happens with my knowledge), the variety of skills (do I get the chance to use that which I am learning), the recognisibility of the task (does that which I am learning add a surplus value to my ambition), the significance of the task (do I help the organization 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 innovation independent work and initiative is being expected from the employees and one works in a dynamic risky environment, but with the exception of working 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 aspiration 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 and Davenport & 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 the different 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 organizations a knowledge system on paper can also function excellently. In larger organizations and in organizations with several branches an electronic knowledge system is indispensable, according to the respondents. In these kinds of organizations 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 & Prusak (1998) are endorsing 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 internet, EDI, intranet, MID, DSS, ERP and mechanisms such as data warehousing, data mining, knowledge mapping, electronic libraries, are most usefull for the exchange of knowledge in ICT Ltd. and which persons will be responsible for keeping them up-to-date and running (Sprague, & Watson, 1996).

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