Utilization of Information Resources for Business Success:
The Knowledge Sharing Model

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ABSTRACT

This article works out a method on how information resources in organizations can be turned into a knowledge sharing (KS) information culture, which can further feed business success. This process is complicated, and the value chain can be broken in many places. In this study this process is viewed in the light of resource-based theory. A KS-model is developed where the hard information resources of time, people and computers are defined. When wisely used, these make communication a core competence for the company. As the soft information resources are added, that is, the intellectual capital, KS and willingness to learn, a knowledge sharing culture is developed, which feeds business success. This model is empirically discussed through a case study of 15 Finnish insurance companies. The overall KS capability of a company corresponds positively to the different dimensions applied in the model. KS is an interactive process where organizations must work on both hard information resources, the basic cornerstones of any knowledge sharing, and make constant investment into soft information resources, learning, intellectual capital and process design in order to manage their information resources effectively.

Keywords: business success; information culture; information resource management; knowledge sharing; organizational learning

INTRODUCTION

In the global world with rich information flows coming from many different sources and channels, an organization's ability to manage knowledge effectively becomes a prerequisite for success and innovativeness. This is especially important in information and technology intensive industries. In these circumstances a greater awareness and a more active debate is needed concerning the creation of internal environments and the organizational ability to support collective knowledge production and knowledge sharing. These information literacy skills are increasingly underlined in different organizational contexts (Abell, 2000). An information literate organization has the ability to seek information, but also to understand, evaluate, integrate it into the existing knowl-

edge base and critically use it (Doyle, 1995). However this is not easily done.

In this article we will try to illuminate the problematic issues surrounding knowledge sharing in information and communication intensive organizations, based on a study of information cultures in Finnish insurance businesses.

- *How is the internal environment built to support information and knowledge sharing in information intensive companies?*
- *How can information resources in organizations be turned into a knowledge-sharing information culture, which can further feed business success?*

The article develops an understanding of the internal structures important to sharing. These structures are important in any organization and particularly in information-intensive branches. The assumption is that a company with a rich and active information culture and with the different parts of the learning organization integrated also indicates a successful business.

To begin with, some central concepts are defined such as knowledge, knowledge sharing, information culture, and human and intellectual capital. Further, the context of the study is described, that is, the insurance business industry. This type of industry represents information intensive organizations. Next, the management of information resources is described from a resource-based approach point of view in order to find out how a company builds a successful knowledge-sharing environment. Based on that, a four-step knowledge-sharing model is presented, and a number of case companies are analyzed and mirrored into the model. As a part of the analysis, the business success is also compared to the existing information cultures within the case companies to see if there is an indication that an emphasis on knowledge work really is worthwhile. Finally, the empirical insights are discussed to see how they support the suggested knowledge-sharing model.

CENTRAL CONCEPTS

In the research question it is asked how the internal environment is built to support knowledge sharing. In order to answer this question, it is important to define what knowledge sharing is. Also the internal environment of an organization may include many aspects and perspectives. In the following these concepts are defined and discussed.

Knowledge and Knowledge Sharing

Knowledge is often defined as internalized information (Ingwersen, 1992) and understood as a blend of explicit and tacit elements (Nonaka, 1994; Polanyi, 1958). This means that there are many types of knowledge at different levels of the firm. Knowledge lies in human minds and exists only if there is a human mind to do the knowing. This means that knowledge management is about managing the knowledge that the individuals have. Organizational knowledge management means supporting people so that they can use what they know. Furthermore, information and knowledge for the organization is highly specific and every organization must define information and knowledge in the light of their activities and goals (Orna, 2004).

Information sharing happens in a constant mix of organizational and individual motives, and factors like purpose, timing and availability play an important role as enablers and barriers to sharing (Solomon, 2002; Sonnenwald & Pierce, 2000). In this context every individual has his/her own perception of how to make use of his/her networks and the organisational structures. However, it is important to shape a picture of sharing on the organizational level and then integrate individual profiles into the overall structures.

Internal Environment

When the information and knowledge assets are explained, the basis for understanding the information behavior in a group or organization is the organizational context where the *information culture* forms the communication climate. The actual information use in the workplace is shaped by this environment which

is built of institutional, organizational and personal elements (McDermott & O'Dell, 2001; Widén-Wulff, 2001, 2003, 2005). Information culture is difficult to change in a short period, as are other cultures. Overcoming the cultural barriers to sharing information and knowledge has more to do with how the organization designs and implements the management effort into the culture than with changing the culture (McDermott & O'Dell, 2001).

Knowledge aspects in organizations and companies are often also connected to communicative, pedagogical or facilitation skills. *Organizational learning* aspects are about making individual knowledge collective (Srikantaiah, 2000). The organizational learning is transferred through the individuals of the organization and therefore also an important aspect (Argyris, 2002). The idea with the learning organization is that an organization consists of factors that build up a system in which the individual learning, in order to become effective, is anchored in the whole organizational activity. Thus, individual visions are important, and, at the same time, these have to be incorporated into the organizational visions and aims. The learning organization is constructed from several components such as core competence, cooperation, motivation and communication. It is important that these components create the common base for the organization. This is considered the starting point for effective information and knowledge use in a business company (Heifez & Laurie, 1997; Koenig, 1998; Nonaka & Takeuchi, 1995; Senge, 1994).

Further, organizational learning is built upon *human and intellectual capital*. The human and the intellectual capital are the measures for the different parts of the learning organization. Human capital is the personnel, how it is motivated to effectiveness and creativity. The intellectual capital is about the company's specialties and knowledge creation (Stewart, 1998). Innovation, creativity, motivation and learning are processes that need support from many levels in the organization. The support by the management is especially important,

but the creation of common strategies, values and getting the personnel's interest for these processes are also underlined in the scientific discussion (Andreau & Ciborra, 1995; Choo, 2001; Nicholson, Rees, et al., 1990).

THE CONTEXT: THE INFORMATION INTENSIVE INSURANCE BUSINESSES

The amount of information and the development of information technology have been a great challenge for all business organizations, and, among others, Owens and Wilson (1997) underline the importance of information-related questions integrated in the strategic planning of a business organization.

The concept of information intensity of an industry is well known and documented (Chou, Dyson, et al., 1998; Harris & Katz, 1991; Parsons, 1983). Financial companies are examples of information intensive enterprises where both processes and products are information intense. In both external and internal intelligence complexity, insurance companies are at a very demanding end. This makes them very dependent on information management skills.

The big challenge for insurance companies is to share information between different insurance lines. Typically, and in many countries demanded by law, insurance lines related to life, pension and indemnity insurance have been kept separate. A full-service insurance company might have up to some 120 different insurance lines. The current trend of customer orientation however demands that customers must be seen as whole entities. This puts high pressures on the organizational intelligence of insurance companies.

Insurance businesses do not sell concrete products, which means that they are even more affected by qualitative decisions by the personnel who need relevant information. This means that the information is a critical success factor and the cooperation between service, selling, marketing and administration become increasingly important (Codington & Wilson, 1994).

THE RESOURCE-BASED APPROACH TO ORGANIZATIONS

One approach to the management of information resources is the resource-based theory, which is one of the current theories enjoying wide acceptance by the scientific community. After a long period of market-oriented theories (e.g., Porter, 1980, 1990; Porter & Millar, 1985), attention has turned to the internal issues of any organization, the assets and resources, which are of permanent character for the organization – on the contrary to the ever changing external world and market. Internal resources are something with which one must live for a long period and of which one must take advantage. "For managers the challenge is to identify, develop and deploy resources and capabilities in a way that profits the firm with a sustainable competitive advantage and, thereby, a superior return on capital" (Amit & Schoemaker, 1993).

Clearly we can define labor and information as key resources for any organization. The resource-based theory should give us insights into how to master and foster this resource. One of the weaknesses of the resource-based theory is the complexity of the used concepts. The concepts of capabilities, resources and competences are far from settled (see, for example, Andreau & Ciborra, 1995). However, the conceptual richness of the theory is its main strength and important and interesting concepts can be summarized as follows (Barney, 1991):

- **Resource mobility and heterogeneity:** organizations command over resources of different kinds and qualities. Resources can be very immobile.
- **Social complexity:** resources may imperfectly be imitable because they are a complex social phenomena, beyond the ability of firms to systematically manage and influence.
- **Causal ambiguity**: causal ambiguity exists when the link between the resources controlled by a firm and a firm's sustained competitive advantage is not understood or understood only very imperfectly.

Interesting too is the discussion on the strategic potential of resources. A capability has strategic potential if (Barney, 1991):

- it is valuable,
- it takes advantage of opportunities in the environment and neutralizes risks,
- demand is bigger than supply,
- it is difficult to imitate,
- it is difficult to get, and
- it does not have strategically comparable substitutes.

The resource-based theory is very reality oriented. It takes up many concepts of great importance for daily organizational life. The concepts of social complexity and causal ambiguity are particularly relevant in the studies of managing information resources and knowledge sharing in organizations. In this article, we will discuss how a company builds a successful business relying on intensive knowledge sharing based on basic (hard) and soft information culture resources.

THE KNOWLEDGE SHARING MODEL

Companies are often aware of the fact that information is an important resource, but only a few concrete measures on how to use this resource effectively exist. Usually the focus of management on information resources is fragmented (e.g.., information needs analysis, environmental scanning, systems planning and information resource management). However, a holistic viewpoint is important and knowledge management activities cannot be isolated processes (Hansen, Nohria, et al., 1999). Information and knowledge management should consider both human and system factors (Choi & Lee, 2003) to develop individual knowledge into a collective organizational resource.

In this study this challenge is met in the theoretical contribution, which is an extended version of the Knowledge Sharing Model (Figure 1) (Widén-Wulff & Suomi, 2003). In this extended version we strengthen the basis of the model by building connections to

Figure 1. An extended Knowledge Sharing Model (Widén-Wulff & Suomi, 2003)
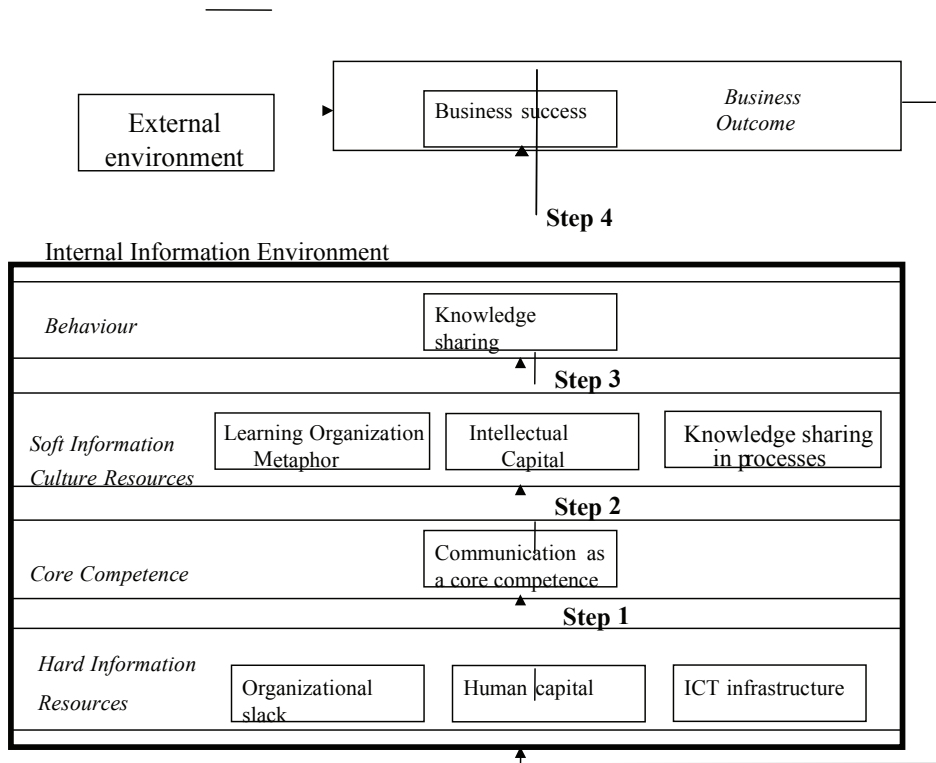
the resource-based approach. In addition, the relationship between knowledge sharing and business success is more focused.

The model starts with basic resources, which we call hard information resources.

- Workforce, people (human capital)
- Time (organizational slack) and
- Information and communications technology (ICT) infrastructure.

As we look at Barney's (1991) definition, none of these resources are strategic as such. ICT resources are most often not rare when it comes to the hardware but some complex software can be difficult to imitate. Time or lack of time is a similar problem to every organization. The workforce can be difficult to imitate in some

cases, but usually organizations can hire even persons with deep professionalism from the labor market. One important add-on to human capital is social capital that people can build on in long-term cooperation with each other. Social capital is the collective goal orientation and shared trust, which create value by facilitating successful collective action (Leana & Van Buren, 1999). Social capital is also built within an organization and can take time to emerge. All these basic resources are needed if knowledge sharing is a goal (Widén-Wulff & Ginman, 2004). With these resources in place, communication can be a core competence for a company. The first step in our KS-model, competence building, represents a process where the hard information resources are present and these resources make it possible to transform

Table 1. The differences between hard and soft information resources in our model

	Hard resources	Soft resources
Acquistion	Can be readily purchased	Mature slowly over time
Cost and value	Have clear financial cost and value	Hard to quantify in financial terms
Manageability	Average	Low
Potential strategic advantage	Marginal	High
Operative complexity	Average	High

communication into a core competence. The operational basis for performing effective communication is established.

The next step is to add the soft information resources. The components in the second phase, adding the soft dimension, are:

- utilization of the learning organization metaphor
- intellectual capital
- knowledge sharing in processes

In Table 1, we define some basic differences between the "hard" and "soft" information resources. Of our hard concepts time is of most difficult character. Calendar time as such cannot, of course, be purchased, but through adding staff personnel months, also working time, can be increased. Yet the conventional wisdom anyway tells that adding manpower to a group process does not yield a linear benefit (Brooks, 1975).

With this set of resources in place, strategic capabilities begin to emerge. The organization starts to utilize the learning organization metaphor, which means that learning is a basic business practice, and where mechanisms to facilitate double loop learning are in order. Further, intellectual capital is the knowledge and knowing capability of a social collectivity, such as an organization, intellectual community or professional practice (Nahapiet & Ghoshal, 1998). Several researchers have shown that intellectual capital grows from social capital

(Nahapiet & Ghoshal, 1998; Reich & Kaast-Brown, 2003). Knowledge sharing happens in processes that have integration, often through computer systems and joint databases. The resources become increasingly rare and more difficult to imitate.

The organization is able to take the third step, called "utilizing resources." Here, the company uses the available hard and soft information resources to share knowledge. The total sum of knowledge sharing capabilities and resources of the organization is called the "internal information environment," or "information culture," in our model. It is a kind of aggregate parameter indicating the quality of the knowledge sharing capabilities and resources. Finally, there is a last crucial step, where knowledge sharing turns into business success. This step is called "competitiveness building." Even the company best in sharing knowledge efficiently may not however encounter business success if the external environment is too difficult or hostile. However, an internal environment that is communication intensive will help in attaining business success (Barney, 1991).

In the model, there is also a feedback loop. Strong competitive position – as well as knowledge sharing – allows companies to build their hard information resources, also organizational slack (time), human capital and ICT infrastructure. Most likely, business success will directly feed core competence building, soft information resources and knowledge sharing behavior too. In resource-based

Table 2. The interview topics with the insurance company managers

Individuality	Information and communication technology (ICT)
Company aims	Knowledge creation
Motivation	Innovation
Communication	Information resources management

theory the mobility, social complexity and the strategic potential and competitive advantage of resources are focused. In our KS-model we try to picture critical resources (both hard and soft resources) with the aim to point out that communicative potential is based on hard resources (ICT, human capital, organizational slack). These resources provide tools for communication upon which the soft resources are built (learning, intellectual capital, knowledge sharing in processes). The social complexity is present in the next stage where knowledge sharing is actualized. These different dimensions of resources are important when knowledge sharing is turned into business success.

The following summarize the steps in the model:

Step 1   **Competence building** — Turning hard information resources into a core competence

Step 2   **Adding the soft dimension** — Building information culture resources

Step 3   **Utilizing the resources** — Actualizing knowledge sharing

Step 4   **Competitiveness building** — Turning knowledge sharing into business success

In the next section the empirical material is presented and the four steps in our KS-model are described based on the data from the studied insurance companies. Our theoretical model is explained through the actual management of information resources and knowledge sharing that took place in our case companies.

THE SAMPLE AND RESEARCH METHOD

Data Collection

This study is based on a survey conducted from 1996-2000 in the Finnish insurance industry. The interviews covered aspects on internal knowledge sharing activities and support of these activities on a broad level which means that the material is stable and not affected by new trends in technology, for example. It is a qualitative study where the interview method is used in order to evolve different angles and a thorough understanding of information behavior and information cultural aspects (Miller & Glassner, 1988). The material was collected qualitatively through 40 in-depth interviews in 15 Finnish insurance companies, identified as C1-C15 in our article. The insurance companies in our sample are of different sizes and in this material there are mostly medium-sized (100-500 employees), and large (over 500 employees) companies. This sample covers almost all of the big Finnish insurance companies, with only two companies turning the study down because of lack of time.

The persons interviewed were managers responsible for strategic planning, marketing and production to give an overall picture of the knowledge sharing structures in the companies. The interviews were taped and transcribed. In addition, annual reports from each company were analyzed, especially as we examine the dimension of financial success. The interview questions covered the themes as in Table 2.

Table 3. Knowledge sharing capability of the case companies in qualitative terms and in narrative description

Poor performers	C1	1.5	The different business processes involve some key persons, but an overall communication of these processes is missing. The strategic planning is mainly a normative process and involves only the top management.
	C7	2.0	
	C14	2.0	
Average performers	C6	2.3	The middle group has similar difficulties as the poor performers when it comes to communicating business activities. Though these companies underline the role of the units and the departments in the communication and evaluation, strategic planning are the responsibilities of the top management.
	C8	2.3	
	C10	2.8	
	C2	3.3	
	C11	3.3	
	C12	3.3	
	C15	3.3	
Good performers	C13	3.8	The development of the communication of the business activities has existed already for a long period of time. When company guidelines are drawn up, several channels are used in order to involve also the individual level I the planning process. Involving all levels in planning processes is concluded to be difficult where common interest, willingness, and common language are underlined aspects.
	C4	3.9	
	C3	4.0	
	C5	4.0	
	C9	4.0	

Analysis

The analysis of the empirical material was done by the case study method where the material was categorized and combined in relation to the theoretical framework, which considers aspects on building effective knowledge sharing (ICT, human and intellectual capital, learning and knowledge sharing). The companies were studied as different cases where the chosen aspects were interpreted within a social complexity. The Knowledge Sharing Model functions as a basis for the empirical analysis. The proposed four steps of building a knowledge-sharing information culture are presented and discussed on the theoretical basis provided by the KS-model. Earlier research gives a picture of how these aspects should be developed in a company and based on that the empirical data are assessed by the researcher on a 5-point scale. This is done in order to give us a possibility to compare the different companies and different components of the KS-model based on quantitative data on an ordinal rank. This would not have been possible based on narrative discussion only. Through these values the companies can better

be compared; that is, how well the different parts of their information work is developed. Value 1 means that the item is badly developed in the company. Value 5 means that the item is fully developed in the company. The detailed descriptions of the valuation process can be seen in Widén-Wulff (2005).

A central parameter in this context is the actual performed amount of knowledge sharing in the companies. The analysis of the business activities and their role in the communication process is the basis for this assessment. Table 3 shows how the three groups of different case companies define their communicative and knowledge sharing capability when it comes to strategic planning, marketing and production.

As knowledge sharers the companies are distributed into three groups. Those companies where knowledge sharing is just done between some key persons, and the overall communication of the processes are missing, are assessed as having 1-2 points. The average performers (2,1-3,5) have the same problem as the previous group, but the role of different business units in the communication processes is stronger. The

good performers (3,6-5) have a clear aim and genuinely work to improve knowledge sharing processes throughout the organization.

The knowledge sharing parameter is further compared to the other aspects important for building an effective knowledge sharing company, that is, aspects on ICT, human and intellectual capital and the learning organization (see Tables 4-9, 11). For this comparison the Spearman rank coefficient is used, which is suitable for this purpose where the assessment values are ordinal numbers, and the purpose is to picture the relationship between the variables, both measured by ranking scales. The coefficient tells us the correlation between the items compared.

THE FOUR STEPS BUILDING THE KNOWLEDGE-SHARING MODEL

There are companies in both ends of the performance of the different variables in the four-step model. The active performers (see Table 3) support and take advantage of their information resources and function as good examples on how to build a good knowledge sharing information culture. Therefore, the active performers are mainly described in this context and function as an example of how a good knowledge-sharing information culture can be built.

Step 1: Competence Building — Turning Hard Information Resources into a Core Competence

In this section the analysis is concerned with how the hard information resources are exploited in the studied companies. These are compared to the actual knowledge sharing to see if there is a connection between well-managed information resources and knowledge sharing. Further the aim is to explain how these resources are turned into core competencies.

As mentioned earlier, the actual knowledge sharing is measured by how well knowledge is communicated in the different business processes in the company. The evaluated processes are strategic planning, marketing and production (Table 3).

The first part of the hard information resources is to see how the ICT infrastructure can support knowledge sharing. There are great possibilities for ICT to contribute to information intensive organizations. The technology in itself does not bring added value to the organization. However, if ICT merges the different ICT functions in an organization (Huysman & de Wit, 2002) and challenges the design incorporated human and information systems (McDermott, 1999), it starts to bring positive effects. In the insurance businesses ICT is needed for their activities and ICT is a tool for minimizing the costs and making the administration more effective (Codington & Wilson, 1994). In addition, the strategic potential of information technology to the insurance business has been known already for a long time. But of course ICT also is needed for communicative tasks, to help people share knowledge. It is then important to create a functioning infrastructure in order to obtain effective use of ICT with emphasis on both organizational and social structures (Garrett & Caldwell, 2002; Kling, 1999). Here the top management has an important role (Dixon, Arnold, et al., 1994; Koenig, 1998).

The ICT infrastructure is evaluated through the following aspects:

- top management's engagement in developing information technology
- aims with ICT work as stated by management
- education given by the organization

These aspects are not directly connected to the technical ICT infrastructure, but rather measure the management's relation with and interest in ICT infrastructure. If management is emphasizing the role of ICT, we can indirectly assess that ICT infrastructure is developed in the company. Measuring ICT infrastructure quality and quantity directly in very different organizations is out of the scope of this study.

In the interviews it was shown that all the studied companies have emphasized the

Table 4. Knowledge sharing and ICT infrastructure

	Knowledge sharing	ICT infra-structure	d	d2
C1	1.5	1.7	-0.2	0.04
C7	2	1.7	0.3	0.09
C14	2	3.3	-1.3	1.69
C6	2.3	2.7	-0.4	0.16
C8	2.3	3	-0.7	0.49
C10	2.8	3.7	-0.9	0.81
C2	3.3	2.7	1	1
C11	3.3	2.3	0.6	0.36
C12	3.3	3	0.3	0.09
C15	3.3	3.3	0	0
C13	3.8	3	0.8	0.64
C4	3.9	2.7	1.2	1.44
C3	4	3.7	0.3	0.09
C5	4	4	0	0
C9	4	4	0	0
Sum d2				6.9
Spearman r = 0.99				
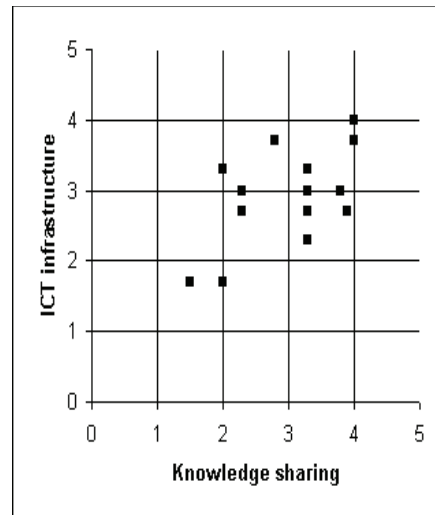
technology but they are able to manage this resource very differently. Although they have similar problems with the rapid development in the ICT field; for example, there are problems with several different system and program generations within a company, and the demand on different kinds of information skills in the ICT environment is noticed. They emphasize different solutions. Those companies with a more purposeful ICT work and active engagement do not focus solely on the technical problems. Rather they strive to motivate personnel to actively learn new technological solutions.

Table 4 shows that a well-managed ICT infrastructure correlates with active knowledge sharing. In those companies, where the ICT management does not merely occur from the technical perspective, we see more interest in knowledge sharing.

The next basic information resource discussed in the model is the human capital. The role of the individual is very important when the information as a resource is defined. Favorable circumstances for the individual level of the organization are motivating cultures, which support creativity, innovation and learning (Andreau & Ciborra, 1995; Amabile, Conti, et al., 1996; Sadler-Smith, 1998), which also constitute the measures for the human capital in this study. The aim is to analyze how the organizations identify the human capital as a part of their information culture. Again, human capital is compared to knowledge sharing ability. From Table 5 we can see that the correlation of human capital with knowledge sharing is high, although less than in the case of ICT infrastructure.

Looking at high knowledge-sharing companies (C13, C4, C3, C5, C9), it is concluded that creativity is a strong component in these organizational cultures. There are official channels for creativity, but these companies underline the creative atmosphere in the company even more.

Table 5. Knowledge sharing and human capital

	Knowledge sharing	Human capital	d	d2
C1	1.5	1.8	-0.3	0.06
C7	2	1.8	0.3	0.06
C14	2	2.5	-0.5	0.25
C6	2.3	2.8	-0.5	0.20
C8	2.3	4.0	-1.7	2.89
C10	2.8	3.3	-0.5	0.20
C2	3.3	2.5	0.8	0.64
C11	3.3	2.5	0.8	0.64
C12	3.3	3.3	0.0	0
C15	3.3	2.3	1.0	1
C13	3.8	4.3	-0.5	0.20
C4	3.9	2.0	1.9	3.61
C3	4	4.0	0.0	0
C5	4	4.5	-0.5	0.25
C9	4	4.3	-0.3	0.09
Sum d2				**10.1**
Spearman r = 0.98				
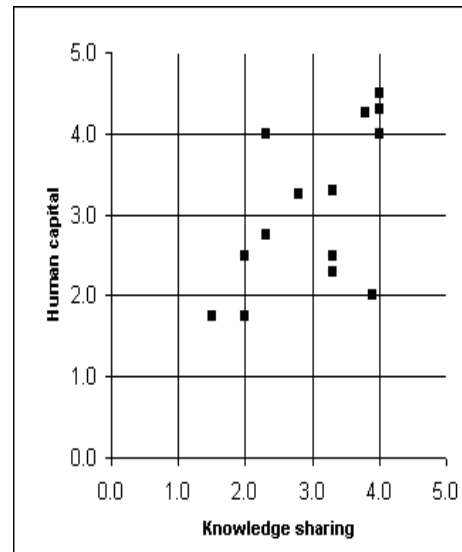
We have had creativity as a basic company value. This is a challenge while insurance business is not the most dynamic of businesses.(C9).

Interactivity and active communication support the creativity and motivation processes. This means that the personnel develop an interest in these processes, while the units and the management support the processes. With mutual support the activities are actively integrated into the corporate aims.

Both ICT infrastructure and human capital in knowledge sharing companies are accompanied by strong values of communication with the individual aspect in mind. The motivation for making these resources effectively used lies in a wider perspective of these resources. This is elaborated further in step 2.'

The relationship between organizational slack and knowledge sharing was not studied in our empirical data collection. Time was a resource that was added to our model after the data collection phase. In our original plan for data collection, we did not appreciate how an important obstacle lack of time is for knowledge sharing. This aspect came around first in the first rounds of analyzing the data.

Step 2: Adding the Soft Dimension — Building Information Culture Resources

One of the biggest problems with ICT is the fact that there are so many different programs and applications within the organization. Therefore we have established a project that should create a holistic ICT employment, where the different organizational needs are taken into consideration. This should make the whole ICT-use more fluent.(C9)

It was concluded in step 1 that the management of ICT resources is not only a technical

Table 6. Knowledge sharing and application of the learning organization metaphor

	Knowledge sharing	Application of the learning organization metaphor	d	d2
C1	1.5	1.8	-0.3	0.09
C7	2.0	2.0	0.0	0
C14	2.0	2.1	-0.1	0.01
C6	2.3	3.0	-0.7	0.49
C8	2.3	3.1	-0.8	0.64
C10	2.8	3.3	-0.5	0.25
C2	3.3	2.9	0.4	0.16
C11	3.3	3.3	0.0	0
C12	3.3	2.8	0.5	0.25
C15	3.3	3.5	-0.2	0.04
C13	3.8	3.8	0.0	0
C4	3.9	3.0	0.9	0.81
C3	4.0	4.1	-0.1	0.01
C5	4.0	4.3	-0.3	0.09
C9	4.0	3.8	0.2	0.04
Sum d2				**2.88**
Spearman r = 0.99				
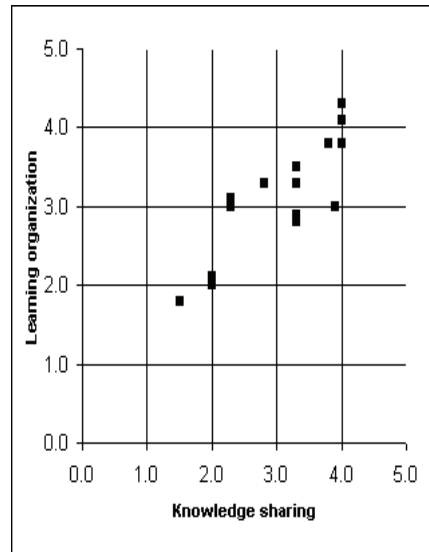
problem issue. This resource is gained by focusing on the learning processes and individual possibilities. Having taken the hard information resources into consideration, the holistic view of how these resources fit into the organizational context, the next step in the building of knowledge-sharing competence. The soft dimension means that the information culture values must be considered on a holistic level. Learning ability and knowledge base utilization are soft resources that are hard to capture. The result of knowledge use is focused on. To this end, we analyze the learning metaphor in the organization more closely, and also the ability to manage the intellectual capital.

To achieve a successful learning process, it is important to eliminate hindrances for learning (Romme & Dillen, 1997) and adopt a holistic view of activities and shape a mutual understanding of the values and aims of the company (see further step 3). This study shows that those companies with active knowledge sharing have adopted many of the disciplines involved in organizational learning (Senge, 1994). The companies invest in training, which is well planned. Training is seen as a channel for common aims, shared visions and commitment, where the individual's role at the same time is underlined. Overall, it seems that these companies define system (network) thinking strongly and have created an active environment and structure in which to develop this thinking even further. However, it is also important to remember that learning does not always result in positive effects (Holmqvist, 2003). Organizational learning aims at formalizing ideas but may generate rules and routines that create traditions not suitable for effective knowledge sharing.

The soft dimension of the information resources is also connected to the knowledge base of the whole organization, the intellectual capital, which is focused on the information user from a cognitive viewpoint. The result of individual knowledge use is the key to understanding intellectual capital (Cronin &

Table 7. Knowledge sharing and intellectual capital

	Knowledge sharing	Intellectual capital	d	d2
C1	1.5	1.9	-0.4	0.16
C7	2.0	1.9	0.1	0.01
C14	2.0	2.9	-0.9	0.81
C6	2.3	2.6	-0.3	0.09
C8	2.3	3.7	-1.4	1.96
C10	2.8	3.9	-1.1	1.21
C2	3.3	2.7	0.6	0.36
C11	3.3	3.0	0.3	0.09
C12	3.3	3.6	-0.3	0.09
C15	3.3	3.7	-0.4	0.16
C13	3.8	3.4	0.4	0.16
C4	3.9	3.3	0.6	0.36
C3	4.0	4.0	0.0	0
C5	4.0	4.1	-0.1	0.01
C9	4.0	4.0	0.0	0
Sum d2				**5.47**
Spearman r=0.99				
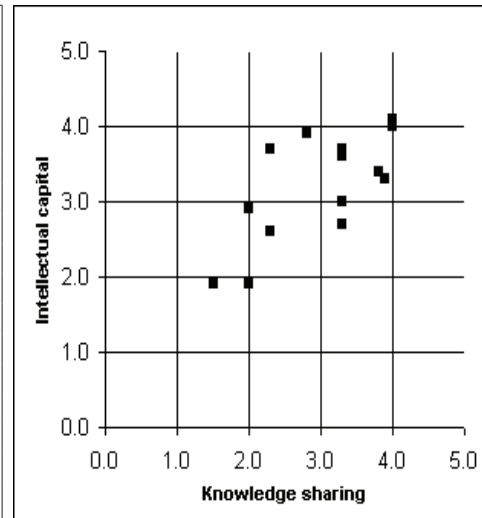
Davenport, 1993; Nonaka 1994). Especially when communication is a core competence of the organization, it is possible to make effective use of the intellectual capital. In this study, the measures for intellectual capital are assessed by asking the following:

• How is knowledge valued?
• How is the individuality of the company defined and developed?
• What are the prerequisites for knowledge use (teamwork, communicative environment)?

From Table 7 it is obvious that knowledge-sharing companies emphasize the role of intellectual capital. This means that the versatility of knowledge is underlined as well as its content and communication in the company. All the core competencies are well defined and so are the measures for evaluating and developing them. Continuity, technology and the ability to change

are the most central factors in this process. The development of the core competencies is a natural activity in those knowledge-sharing companies and does not demand separate attention or special actions. It is a self-evident, integrated part of the basic business activities. The processes in the knowledge creation consist of activities such as teamwork, interactivity by the middle management and integration of new workers. Teamwork is an established way of working, and the aim of the work is to make internal communication and the circumstances for knowledge transformation more effective. The companies have clear aims concerning knowledge creation but also with the development of the tools that are needed for knowledge creation, that is, those hard information resources such as information technology and communication networks.

The study shows that, when building an information culture, there must be a link between the hard and soft information resources, and a

Table 8. Internal information environment

	ICT infrastructure	Human capital	Application of the learning organization metaphor	Intellectual capital	Internal information environment
C1	1.7	1.8	1.8	1.9	1.8
C7	1.7	1.8	2.0	1.9	1.9
C14	3.3	2.5	2.1	2.9	2.7
C6	2.7	2.8	3.0	2.6	2.8
C8	3.0	4.0	3.1	3.7	3.5
C10	3.7	3.3	3.3	3.9	3.6
C2	2.3	2.5	2.9	2.7	2.6
C11	2.7	2.5	3.3	3.0	2.9
C12	3.0	3.3	2.8	3.6	3.2
C15	3.3	2.3	3.5	3.7	3.2
C13	3.0	4.3	3.8	3.4	3.6
C4	2.7	2.0	3.0	3.3	2.8
C3	3.7	4.0	4.1	4.0	4.0
C5	4.0	4.5	4.3	4.1	4.2
C9	4.0	4.3	3.8	4.0	4.0

consciousness to develop these resources into a functioning entity.

## Step 3: Utilizing the Resources — Using Resources to Perform Knowledge Sharing

Having established that the information resources are linked, it is also important to analyze their social complexity (Barney, 1991). How the resources are actually used is embedded in the organizational culture, which is the basis on which the organization works. The information culture is a part of the whole organizational culture and, of course, the more specific basis for all information activities. Knowledge organization demands a certain type of environment in order to function well. Earlier studies (Blackler, 1995; Correia & Wilson, 1997; Dewhirst, 1971; Hofstede, 1991; Muchinsky, 1977; Samuels & McClure, 1983) have shown that information and knowledge aspects are best seen in the open vs. closed internal environments dimension. The aim is an open environment where the importance of

information awareness is underlined. Flexibility with a focus on the competence of the personnel is important in creating an open internal environment. These are the circumstances that enable cooperation in order to create value from the information assets (Huotari, 1998). The average of the parameters measured in our empirical data, in steps 1-2 (human capital, intellectual capital, ICT infrastructure and application of the learning organization metaphor), constitutes our measure for the internal information environment, as documented in Table 8.

In this context it is important to look more closely at how the knowledge sharing actually takes place. The interviews showed that work on communication processes is active since the companies need the processes both in the planning stage and in operational implementation. It is typical that the companies with an open environment have worked on developing the communication of their business activities for a long period of time already; the aim of this work is to improve the knowledge of these processes throughout the organization. When

Table 9. Knowledge sharing and internal information environment

	Knowledge sharing	Internal information environment	d	D2
C1	1.5	1.8	-0.3	0.09
C7	2.0	1.9	0.1	0.01
C14	2.0	2.7	-0.7	0.49
C6	2.3	2.8	-0.5	0.25
C8	2.3	3.5	-1.2	1.44
C10	2.8	3.6	-0.8	0.64
C2	3.3	2.6	0.7	0.49
C11	3.3	2.9	0.4	0.16
C12	3.3	3.2	0.1	0.01
C15	3.3	3.2	0.1	0.01
C13	3.8	3.6	0.2	0.04
C4	3.9	2.8	1.1	1.21
C9	4.0	4.0	0.0	0
C3	4.0	4.2	-0.2	0.04
C5	4.0	4.0	0.0	0
Sum d2				**4.88**
Spearman r= 0.99				
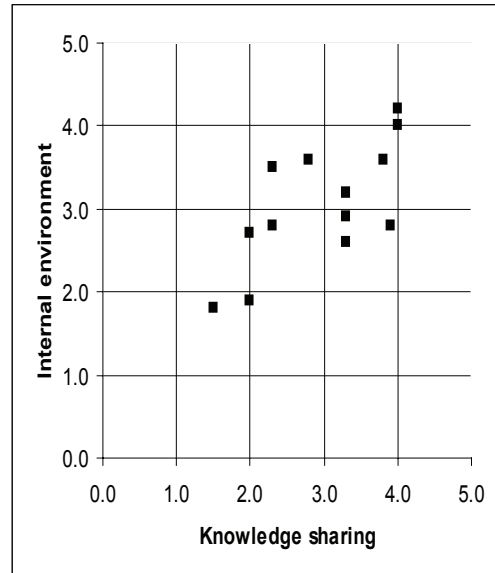
the company guidelines are drawn up, several channels are used in order to involve the individual also in this planning. The holistic grip of business processes, which means that all organizational levels should be included, is also underlined in the literature (Abell, 2000; Moon, 2000). However, the companies in this study conclude that it is very difficult to use the individual level of knowledge in the guidelines and strategic planning process.

How is the challenge of social complexity (Barney, 1991) of the information resource management solved? We have seen that knowledge-sharing companies support human capital and ICT. They have also been able to link these resources to a soft dimension of the information resource. These companies also mentioned some ideas about how they thought they could succeed in involving the individual level by considering the fact that every individual is part of a social system. They underline the interest and willingness among the personnel to communicate, which is visible especially in the case of themes of direct interest for the personnel. Further, value

discussions and evaluation of the processes are important. Finally, a common language for both management and personnel is needed. These companies have also defined this process as a learning process that is anchored in the real activities, in the overall context. The same idea goes for marketing and production, that is, the responsibility for communicating the processes throughout the organization. The processes are communicated through several channels and in several different ways. Many different tools are used. The information that is produced in these processes is important for the whole company. The open companies see themselves as expert organizations where everyone is an expert. To mention one example, product development is a part of strategic planning and is also communicated in that way.

Human capital is a key resource for any organization, but in order to the gain most added value from this resource, it should be connected to a process which also involves learning, flexibility and common values (Senge, 1994). In this study, it is clearly shown that a success-

Table 10. Key criteria for the analysis of the business success

1. Market share	The share of the total market for insurance products
2. Solvency	An insurance company should have a solvency position that is sufficient to fulfill its obligations to policyholders and other parties. Regulations to promote solvency include minimum capital and surplus requirements, statutory accounting conventions, limits to insurance company investment and corporate activities, financial ratio tests and financial data disclosure.
3. Expense ratio	The percentage of each premium Euro that goes to insurers' expenses including overheads, marketing and commissions.
4. Net investment income	Income generated by the investment of assets.
5. Difference between current and book values on investment activities	

ful utilization of the information resources is connected to an information behavior that is supported by a suitable internal environment, a rich information culture.

Step 4: Competitiveness Building —Turning Knowledge Sharing into Business Success

We define the total capabilities of the organization to master knowledge sharing the "internal information environment." This has some connections to the concept of information culture. The information culture is a form of the entire organizational culture, which is a complex subject with a large amount of definitions. In short, its function is to be a source of identity, making it possible to understand and be devoted to the organizational aims. Its function is also to keep the balance in the social system and create meaning and contents (Alvesson, 2003). The information culture focuses more specifically on cooperation, communication and information behavior in general in the organization. In this study, the internal information environment is described as the context in which needed information is communicated so that the company has the largest possible use of the information inside (and also outside) the company. The

internal information environment, or information culture, of a company is developed using the four steps shown in the KS-model (hard information resources, soft dimension, utilizing resources, building success). It is important to underline how these factors together create the context in which information is communicated (Curry & Moore, 2003).

The market feasibility of the Finnish insurance business is generally good, which means that there are not such great differences in the business success of the companies, and thus the critical success factors are not so visible. The measurement of business success is based on the study of companies' annual reports from 1996-1998. It is difficult to compare the financial figures between the 15 different insurance companies exactly because they are quite different in size and insurance trades. We have therefore used five different key criteria for the analysis of the business success as in Table 10.

Again, the key figures are assessed on a 5-point scale. Value 1 means that the criterion company has not been successful in this aspect, whereas value 5 means that the company has been successful in this aspect. In Table 11 the internal information environment is compared to the measures of business success in order to see if there is an indication that emphasis

Table 11. Internal information environment and business success

	Internal information environment	Business success	d	d2
C1	1.8	3	-1.2	1.44
C7	1.9	4	-2.1	4.41
C14	2.7	1	1.7	2.89
C6	2.8	2	0.8	0.64
C8	3.5	3	0.5	0.25
C10	3.6	4	-0.4	0.16
C2	2.6	2	0.6	0.36
C11	2.9	3	-0.1	0.01
C12	3.2	2	1.2	1.44
C15	3.2	4	-0.8	0.64
C13	3.6	4	-0.4	0.16
C4	2.8	2	0.8	0.64
C3	4.0	4	0.0	0
C5	4.2	4	0.2	0.04
C9	4.0	4	0.0	0
Sum d2				13.08
Spearman r= 0.98				
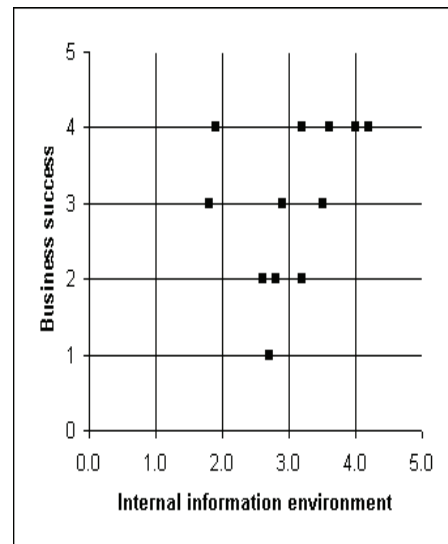
on information and knowledge management is worthwhile.

In Table 11, we see some relation between the quality of the internal information environment and business success. All the best business performers but one have a well-managed internal information environment.

The manageability and especially the cooperation of the factors defined to build the internal information environment seem to be important. An active information culture seems to be an ingredient in financial stability, although it is not possible to clearly say that a developed internal information environment is a given success factor. The external environment plays an important role, and a more passive internal information environment suits a stable external environment, whereas the role of the internal information environment grows in change-intensive environments.

DISCUSSION

We feel that the KS-model relatively and effectively explains the process through which knowledge sharing in a company is established. The model is based on the widely accepted resource-based approach and further strengthens its message too. Our empirical data, which was collected prior to the final version of the KS-model, support the ideas behind the model.

We next discuss the results in the light of our original research questions:

- *How is the internal environment built to support information and knowledge sharing in information intensive companies?*
- *How can information resources in organizations be turned into a knowledge-sharing information culture, which can further feed business success?*

In order to answer the questions above we have studied information and knowledge sharing structures, capabilities and use in 15 Finnish insurance companies. The KS-model (Figure 1) constitutes the theoretical framework of this study, built on the resource-based approach. The model is showing how the structural dimension (hard resources) combined with communicative ability turn these resources into soft information resources enabling effective knowledge sharing behavior. Throughout the empirical analysis it is shown that the active performers of knowledge-sharing capabilities (Table 3) are corresponding positively to the different levels of building a supportive information culture (Tables 4-9, 11). This shows clearly how the internal environment should be built to support information and knowledge sharing in information intensive companies. The link was especially strong in the case of the learning organization metaphor by the organization, also the willingness to learn and knowledge sharing. If we look at the total summary concept of internal information sharing, the correlation between this and knowledge sharing is strong. Average correlation in our scale could be seen in the cases of ICT infrastructure and intellectual capital. Finally, the correlation between business success and the internal information environment as a whole was there to some extent. The analysis shows that the picture of organizational knowledge sharing needs to be linked by both formal and informal structures.

To answer the second question it can be concluded that the very basic message of the resource-based approach that one has to add value to the existing resources of one's organizations in order to cultivate them into capabilities and – finally – sources of competitive advantage are supported through this study. The approach is well suited to have ramifications for knowledge management studies. In general, knowledge management is a socially complex setting, where the individual level is important to integrate into the organizational level. Active management is needed, but it is difficult to know that every aspect is effectively managed. The conclusions of this study support

well those of Cross et al. (2002) who manifest that knowledge and communication networks management is a task which needs constant and intensive engagement. The concept of causal ambiguity manifests itself very clearly in the case of knowledge resources, and our research aims at lessening this state of causal ambiguity. Information and knowledge resources, on different levels of the company, turn into an active knowledge-sharing information culture, supporting business success, by implementing a holistic view to the resource-based approach.

According to the definition, hard information resources are something that can be bought from the market (see Table 1). They are similar to everyone and cannot create competitive advantage as such. A successful business can just use cash to obtain them. The hard part will be of orchestrating them to work together and here the soft information resources step in. Hard information resources need management, but especially intensive is the management task in the case of the soft information resources.

Both in our conceptual and empirical analysis the existence of organizational slack manifested itself as a critical condition for knowledge sharing. If human resources are utilized to a limit, there remains no incentive and power to share knowledge. Allowing for some extra time for the staff is a wise investment from the viewpoint of knowledge sharing. The classical message of Brooks (1975) has not yet come home to knowledge management activities in organizations: work and knowledge sharing in groups demands more time than individual work. The demands of group-work on resources are further documented in more recent literature (Verner, Overmyer, et al., 1999).

CONCLUSION

Many professionals, managers and policy makers have trouble gaining a reliable understanding of the actual roles of information management, technologies and knowledge sharing as causes, catalysts, facilitators and obstacles in workplaces. Therefore a better comprehension of these mechanisms can improve managerial understanding of the role of KM and knowledge

sharing in diverse institutional contexts (Huysman & de Wit, 2002).

The aim of this study was to show the development of knowledge sharing as a process adding value step by step. These are important insights both for knowledge workers in companies as for managers in different areas working with information and knowledge resource aspects. This study integrates both business and information science which gives a broader perspective and a deeper platform to the complex processes of information and knowledge management.

The proposed model shows the components that must exist in order to make knowledge a real resource. The process cannot be performed overnight, but demands years of concentrated work. The message is that the basic premises and resources need to be in place (the lower levels of the Knowledge Sharing Model), after that the upper level conditions can be realized. Focusing on the upper levels without having taken the basic level first into consideration results in wasted efforts.

Our recommendations for organizations to master knowledge sharing are:

1. See to it that the basic resources are there. An organization will need adequate people and time to conduct knowledge sharing. A decent ICT infrastructure is a basic requirement for that.
2. See to it that these basic resources are turned into a competence. Competence means that the organization knows how to exploit the resources efficiently. Also a lot of attention has to be paid to the learning on how to use the basic hard resources.
3. Install the metaphor of organizational learning into the organization.
4. An organization's workforce is not just a collection of expert individuals; emphasize that they must build their intellectual capital, also their skills to adapt and distribute information, in official and unofficial networks. Create an organizational atmosphere that supports and awards knowledge sharing.

5. Do business process re-engineering, and see to it that the processes share information. Technology consultants may want to design processes with minimal interfaces to other processes, but insist on processes to share information.
6. Understand that knowledge sharing is one important component in business success, but it cannot alone solve any problems. A business organization has to fulfill customer needs, which is the common aim and purpose of sharing.

We are aware of some shortcomings of our research. Our discussion uses terms that are difficult to define and to make concrete proposals. However, in the development of the terminology here too rests one of our contributions. Further, our sample covers only one industry, and in order to obtain more convincing results, other industries should also be studied. Our assessment of the companies occurs partly on a subjective basis, but in a qualitative analysis like this it is impossible to work out objective operational measures for many of our theoretical concepts. This work functions as a basis for further developments in information culture studies.

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