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Knowledge Sharing Barriers in Organic Growth: a Case Study from a Software Company

ABSTRACT

In a high-technology field such as the software business, there are many companies striving for growth. For small software firms organic growth is a natural way to grow and often the chosen route. Effective knowledge sharing is crucial for an organically growing software company to extract maximum benefit from its existing resources. However, it can be argued that there exist many barriers to effective knowledge sharing in an organic growth context. For companies that have an intention to grow it is important to identify these possible pitfalls lining the growth path. Using an empirical case study, this paper aims to increase the understanding of the biggest potential knowledge sharing barriers that an organically growing software company may face. Management able to recognize such barriers to knowledge sharing could support growth by acting to prevent the barriers from arising and eliminating those already in place.

Keywords: High-technology firm, software company, organic growth, knowledge management, knowledge sharing, knowledge sharing barriers

1 INTRODUCTION

Many companies, including many high-technology companies such as software companies, aspire to grow (Goold, 1999; Mouritsen, 1998) and the vast majority of companies would consider growth the way to deliver success, profitability and greater competitiveness (Goold, 1999). Growth generally generates both employment and welfare (Elinkeinoelämän keskusliitto EK, 2006). Therefore, the growth of companies is also commendable from the viewpoint of the national economy.

Organic growth has been regarded as a typical and natural way to grow, especially for high-technology companies such as software companies (Hoch, Roeding, Purkert, Lindner, & Müller, 1999). However, generating organic growth is no easy task. Organic growth requires the managerial ability to steer internal resources and processes efficiently to maintain a successful growth path (Penrose, 1995).

There are studies indicating that knowledge management can support company growth (e.g., Mouritsen, 1998; Salojärvi, Furu, & Sveiby, 2005). Despite the awareness of knowledge management in many companies, relatively few have typically been able to utilize knowledge management related activities to support growth (Salojärvi et al., 2005). One reason for this may be that despite knowledge sharing being identified as a cornerstone of knowledge management, for many companies it has proved problematic and when accomplished, inadequate (Hendriks, 1999). The extant literature notes numerous pitfalls related to knowledge sharing (e.g., Bradfield & Gao, 2007; Cabrera & Cabrera, 2003; Christensen, 2007; Haldin-Herrgard, 2000; Kimble, Grenier, & Goglio-Primard, 2010; Lindsey, 2006;

Riege, 2005). For companies with an intention to grow, it would be important to identify these possible knowledge sharing barriers, so that the challenging task of growth generation might be supported as well as possible. Considering this, it is quite surprising that studies on the relationship between knowledge management and company growth are still rather scarce (e.g., Salojärvi et al., 2005). There is a particular lack of studies of knowledge sharing in the specific context of organic growth.

This study aims to fill this void and offers an empirical case study to examine the typical knowledge sharing barriers to the organic growth of a high-technology company, specifically a software company. Armed with the ability to recognize common knowledge sharing barriers operating during organic growth, management could efficiently steer their actions and company resources towards preventing such barriers from arising and eliminating barriers already in place. If they could do so, managers could create a context in which knowledge sharing is stimulated and facilitated to support growth (van den Hooff & Huysman, 2009). This study also contributes to the literature on knowledge management by contemplating knowledge sharing barriers in the specific context of organic growth. In addition, the study contributes to the broader growth literature by adding knowledge management, and especially knowledge sharing, aspects to the discussion of the challenges and obstacles to growth.

This paper is structured as follows: the theoretical background starts with an introduction to the research context – the software business and organic growth. As is typical of a case study, the borders between the phenomenon and its context are difficult to define (Morgan, 1997; Vroom & Yetton, 1973). Accordingly, here the study uses the order of the paper to highlight its context-bound nature. The theoretical background section continues with a review of

knowledge sharing barriers in the context of the organic growth of a software company. This is followed by a presentation of the research methods and the case organization of the study. The paper ends with a presentation of the results, and there follows a discussion and concluding thoughts.

2 THEORETICAL BACKGROUND

2.1 The Software Business and Organic Growth

The software business is a rather young industry where continuous and rapid change is common. It is a high-technology industry and highly knowledge-intensive, as the software development and production process and also the results of the process, software and programs, are knowledge-intensive and often abstract (Hoch et al., 1999). In software companies independent, competent and creative people with a high level of professional knowledge (Miles, 2005; Bettencourt, Ostrom, Brown, & Roundtree, 2002; Løwendahl, 2005) shape the business. The roles of knowledge and innovativeness are especially critical to staying competitive (Hoch et al., 1999) and creating the potential to grow (Dayasindhu, 2002). Software companies are also typically small or medium-sized (Fayad, Laitinen, & Ward, 2000).

Software businesses play an important part in the modern economy and largely drive and support the modern economy. The growth rate of the field is one factor that reflects the significance of the business to the present day economy. (Hoch et al., 1999) The software industry is still one of the fastest growing industry branches and many software companies

demonstrate a continuous aspiration for growth. For many years, rapid job growth has also been a typical feature of the software business. Job growth in the software business has clearly exceeded the average growth rate of jobs in other business areas. (Lacey & Wright, 2009)

Nevertheless, many small software firms never find the path of growth, but instead exist and in some cases even fold as small firms (Miettinen, Mazhelis, & Luoma, 2010; Storey, 1994). However, organic growth is a natural and conscious choice of method for many companies (e.g. Hirvikorpi & Swanljung, 2008) including for software companies.

Organic growth can be defined as growth that is achieved without buying any existing business beyond the company (Storbacka, 2005). It involves the natural growth of sales and personnel occasioned by the increase of sales of services or products (Hirvikorpi & Swanljung, 2008). Organic growth is generated inside the company by utilizing unused productive services, resources, and special knowledge in the company (Penrose, 1995). There is always some resource slack in companies, which offers an opportunity to grow organically by exploiting new market opportunities (Lockett, Wiklund, Davidsson, & Girma, 2011). A firm growing organically will typically also recruit new personnel (Järvenpää & Länsiluoto, 2008) either to expand its knowledge base or to obtain more human resources to do the work.

Growing organically is often considered a wise way to grow, because it will most probably generate a smoother growth pattern over time than is available to firms that have grown mainly through acquisitions (Penrose, 1995). While organic growth is often considered the most controlled way to grow, it is also usually the slowest (Collins & Porras, 2005). Organic

growth is often a recommended growth strategy for smaller and newer firms (Delmar, Davidsson, & Gartner, 2003; McKelvie, Wiklund, & Davidsson, 2006; Penrose, 1995), which generally includes software companies (Fayad et al., 2000). Smaller companies are often marked by relatively non-hierarchical and uncomplicated structures (Lin, 1998; Simon, 1996). As the growth is typically smooth and controlled, there is no need for the sudden and dramatic changes often observed when growth comes about through acquisitions (Collins & Porras, 2005; Penrose, 1995). However, if growth is rapid there may be a need to redesign and accommodate existing structures (Lin, 1998).

Naturally, there are both positive and negative sides to organic growth. One positive issue is that existing knowledge is typically widely and deeply understood inside the organization (Karim & Mitchell, 2004), making it available to be utilized during growth. As a firm grows organically it will also probably increase its headcount (Järvenpää & Länsiluoto, 2008) and in that way also accumulate more knowledge resources, which in principle increases potential new knowledge combinations. However, those new combinations have to fit the requirements of the business before they can generate growth. Organic growth generally leads to the recruitment of staff with similar competences to existing personnel, that is what is often required. {{415 Lockett,Andy 2011}} However, this may not be the best possible course of action in terms of creating new opportunities. The development of too similar resources may hinder the development of new unique resources (Lockett et al., 2011; Penrose, 1995). Thus, a company wanting to continue its growth will need to seek complementary and new resources not merely similar ones, even though finding growth opportunities from new directions is likely to be difficult and costly (Lockett et al., 2011).

Organic growth also depends strongly on the ability of managers to see the potential for growth. In any period of growth, managers will be required to spot such potential while focusing on operational tasks and employing recruitment and delegation tactics to deal with some other management tasks (Penrose, 1995). The characteristics typical of a software business and organic growth are summarized in Table 1 below.

Table 1. Typical characteristics of software business and organic growth

	Software business	Organic growth
Typical characteristics	Continuous and rapid changes	Internal managerial abilities are crucial
	Fast growing industry branch with rapid job growth	Recruitment of new employees; typically with similar competencies
	Many small or medium-sized companies	Reasonable growth strategy especially to smaller and newer firms; simple hierarchy and low complexity and no dramatic changes to existing structures
	Abstract development and production process and results of the process; software and programs	Smooth, but rather slow way to grow
	High knowledge-intensivity	Use of internal, unused productive services, resources and special knowledge of the company to generate growth
	Independent, competent and creative employees, with high level of professional knowledge	Existing knowledge is widely and deeply understood inside the company

The purpose of this study is to determine the typical knowledge sharing barriers in the special context of software businesses growing organically. The section below considers how the typical characteristics of the software business and organic growth affect various knowledge sharing barriers on a theoretical level.

2.2 Knowledge Sharing Barriers in the Context of the Organic Growth of a Software Company

Several studies have identified various barriers to knowledge sharing (e.g., Bradfield & Gao, 2007; Cabrera & Cabrera, 2003; Christensen, 2007; Haldin-Herrgard, 2000; Lindsey, 2006; Riege, 2005). These barriers can be categorized to three levels: individual, organizational, and

technology (Riege, 2005). This is a useful division of the barriers, as it encompasses all three integral elements of knowledge management: the level where knowledge resides (the individual level), the level where knowledge attains its economic and competitive value (the organizational level) (Hendriks, 1999), and the level that provides integral tools for knowledge sharing (the technological level) (Maier, 2002). This kind of categorization also makes it easier to understand the whole. However, despite this categorization, many of the barriers are interlinked.

2.2.1 Individual level knowledge sharing barriers

Given the nature of organic growth and the software business, I have assumed that the individual knowledge sharing barriers with the biggest potential effect during organic growth are lack of time, and language problems. As organic growth is generated mainly by utilizing a firm's existing resources (Penrose, 1995), lack of time may arise as a knowledge sharing barrier, because as a company's sales grow (and rapid growth is common in the software business) it can be assumed that the amount of work also increases. If employees become overloaded with tasks generated through growth (e.g., Cohen & Levinthal, 1990) they may not have enough time to share or seek new knowledge or to internalize new knowledge (Haldin-Herrgard, 2000). However, workload may be reduced through recruitment, which is typical of both organic growth and the software business. Nevertheless, recruitment of competent people may be a challenging task in the software business due to the rapid growth, which may lead to tough competition for good software developers (Lacey & Wright, 2009). This may lead to insufficient numbers of competent people being available, which may have the effect of increasing the workload and lack of time resources for existing employees.

Language problems tend to arise when there is a need to hire many new employees and also when novices are hired. This is often the case in the software field, where growth is so fast that it necessitates recruiting novices owing to a lack of available experts. This may lead to knowledge sharing problems, as novices and experts may not yet share a common language (Haldin-Herrgard, 2000) and might lack the shared experiences that would help them to understand each other better (Nonaka & Takeuchi, 1995). However, this same problem may also occur if different occupational (Haldin-Herrgard, 2000) or specialist groups (Christensen, 2007) are combined.

Other barriers to knowledge sharing can be a lack of trust, low awareness of the value of possessed knowledge, and lack of social networks during organic growth. During organic growth, these can be seen as two-sided issues; they can appear very different if contemplating the knowledge sharing between new and old employees and knowledge sharing between old employees. The recruitment of new employees, typical of both organic growth and the software business, may lead to a lack of trust in sharing knowledge, as trust is needed for knowledge sharing to happen, but creating trust takes time (Hite, 2005; Lorenzoni & Lipparini, 1999). Thus, management cannot assume that there will immediately be sufficient trust between old and new employees, and it is likely that valuable knowledge will remain unshared (Christensen, 2007; Hargadon, 1998; Riege, 2005; Sutton & Hargadon, 1996). This may also lead to a low awareness of the value of the knowledge possessed by other employees. However, as there are grown software companies at hand, it can be assumed that there is not so much a problem in the awareness of the value of the employees own knowledge (Riege, 2005), as it can be argued that typically experts are highly acknowledged and self-conscious of their own knowledge. Long-standing employees of a small firm can also

be assumed to have high levels of trust in each other that encourages a high degree of knowledge sharing. Within the company, more established employees probably know full well which of their colleagues possess what valuable knowledge.

As stated above, a lack of social networks could become a relevant knowledge sharing barrier in a company that has grown organically. Small software companies that are growing organically can be assumed to feature strong ties and internal social networks between long-standing staff. In such a situation, new employees can find it difficult to create social networks with old employees as they may be viewed as outsiders. In a period of organic growth generated with existing resources, there is also a danger that employees hang on to old routines (Cohen & Levinthal, 1990; Miller, 1994; Vermeulen & Barkema, 2001). Those routines often lead them to deploy resources in the same way they always have, seeking support from their existing social networks, and not recognizing that there could be a lot of valuable knowledge available from new employees.

Companies that have grown organically are often rather small (Penrose, 1995), have relatively simple hierarchies, and are staffed by people who know each other well. It is a combination that would suggest that knowledge sharing issues caused by personal power relationships should not exist. However, in a company growing strongly, power relations may play a role, especially what it comes to the relationships between new and old employees. Personal characteristics can also create barriers to knowledge sharing, but that is a personnel issue that should not be affected by the *type* of growth, and so personal characteristics as knowledge sharing barriers are not examined in the current research.

2.2.2 Organizational level knowledge sharing barriers

The nature of organic growth and the software business suggests some candidates for the role of potential knowledge sharing barriers at the organizational level. These barriers include: a disconnect between the purpose of knowledge sharing and the organizational goals; neglecting of managerial communication of the benefits of knowledge sharing; lack of knowledge sharing space and an infrastructure to share knowledge; lack or exiguity of network connections. As mentioned before, organic growth requires the effective use of internal resources (Penrose, 1995). During growth, internal managerial abilities are critical (e.g. Penrose, 1995). However, in many cases of organic growth, managers are busy supporting the growth, for example by driving sales. This is potential case especially in software business, where growth is often fast. It is then difficult for them to prioritize integrating knowledge sharing with the organizational goals and communicating its importance to the workforce (Riege, 2005).

During organic growth, a lack of proper space in which to share knowledge can become an issue (Gold, Malhotra, & Segars, 2001). The rapid growth of jobs and therefore headcount, that is typical to software business, can lead to weakening or absence of what the Japanese call "ba"— a space for knowledge sharing (Nonaka & Konno, 1998; Nonaka, Konno, & Toyama, 2001). Another threat to the basic infrastructure for knowledge sharing may arise if a firm tries to generate growth purely through its existing internal resources and procedures (Gold et al., 2001; Penrose, 1995). As mentioned above, organic growth does not necessarily bring any sudden changes to existing structures and processes of the firm. This may support the likelihood of staff holding on to established ways of doing things including knowledge sharing (e.g., Cohen & Levinthal, 1990; Vermeulen & Barkema, 2001) which can also

manifest itself in the firm not recognizing the need for infrastructure changes during this internal growth. Not only is failing to recognize the need an issue for a small software company, but the firm might just not be able free up resources to match its growth with improvements in its infrastructure.

The other knowledge sharing barrier with potential to cause disruption at an organizational level of a small company growing organically is a lack or an exiguity of network connections (Riege, 2005). In a small company, it can difficult to forge links between old and new employees, but that should be offset by a positive knowledge-sharing culture and support for the emergence of 'an attitude of wisdom'. In other words, people have a high level of willingness to seek knowledge from others and share their own knowledge (Hargadon, 1998; Sutton & Hargadon, 1996), as often in small companies people know each other and they have trust between each other, which has noted to be a prerequisite for knowledge sharing (Riege, 2005).

Another issue with the potential to affect knowledge sharing cited is that of competitiveness between different units (Riege, 2005). This issue should be mitigated in small companies that have grown organically by the tight connections between employees. However, in the course of organic growth, competitiveness between different teams and units can increase if there are new teams or units staffed only by new employees, giving no opportunity to tap into the existing connections between staff. The lack of complexity in small companies should also lessen inter-unit rivalries that would cause knowledge sharing problems. However, if the growth is very fast, as is often the case in software companies, there can be a risk of

increasing complexity inside the organization, which may present challenges to knowledge sharing.

Prior research has connected distance and the potential for knowledge sharing problems (Haldin-Herrgard, 2000; Riege, 2005). Knowledge sharing occurs in small companies, when people meet casually, which they do more often when distance is not an issue. This should be the case in the majority of companies that have grown steadily and organically. However, if the growth has been very rapid, as it might well have been for a software company, there might be a need for bigger business sites or even for multiple sites that increase distances between colleagues and cause knowledge sharing to deteriorate.

Riege (2005) also raises the notion that knowledge sharing might be more efficient when there is a reward system to promote it. While it is an interesting concept, it is one that should not be affected by the *type* of growth; so the lack of reward systems as barriers to knowledge sharing is not an aspect that we examine in the current research.

2.2.3 Technology level knowledge sharing barriers

Technology level barriers to knowledge sharing come into play when employees have unrealistic expectations of technology or are reluctant to use it. They might also arise from a lack of the necessary competence or willingness to employ technology (Riege, 2005). Logically, none of these situations should pose any serious issue in software companies, however, the willingness or reluctance to use new technology is something that is rather dependent on personality, so it cannot be said that the growth of a company has any straightforward correlation with it.

The question of whether unsuitable technology might create a barrier to knowledge sharing is a two-sided one. The first part of the question is whether the technology used is compatible with other technology in use. The other side of the question is whether the technology is suitable for use by those who are meant to use it, and whether they can adopt it for use. Presumably, the involvement of software experts in the adoption of technology in small software businesses and the connected lack of organizational complexity mean that any issues with the suitability of technologies should be avoidable (Riege, 2005).

However, we cannot assume that knowledge sharing in the midst of organic growth will be totally without issues from the technological point of view. The technology level issues with the biggest potential as knowledge sharing barriers are lack of training; failure to communicate the benefits of the chosen technologies; and lack of time. Knowledge sharing problems may occur if management neglects either training (even of its experts) or communication of the benefits of technology (Riege, 2005). Failure to communicate the benefits of new technology relates to the management communication issue discussed above in the context of organizational level barriers. There is also a danger that in many cases of organic growth, the time pressure on employees increases and that they do not have time to get acquainted with new technologies or that certain technologies are too time-consuming to use (Cabrera & Cabrera, 2003).

The potential knowledge sharing barriers most relevant to an organically growing software company suggested by the literature review above are presented in Figure 1 below. The

barriers have been categorized as individual, organizational or technology types as suggested by the literature.
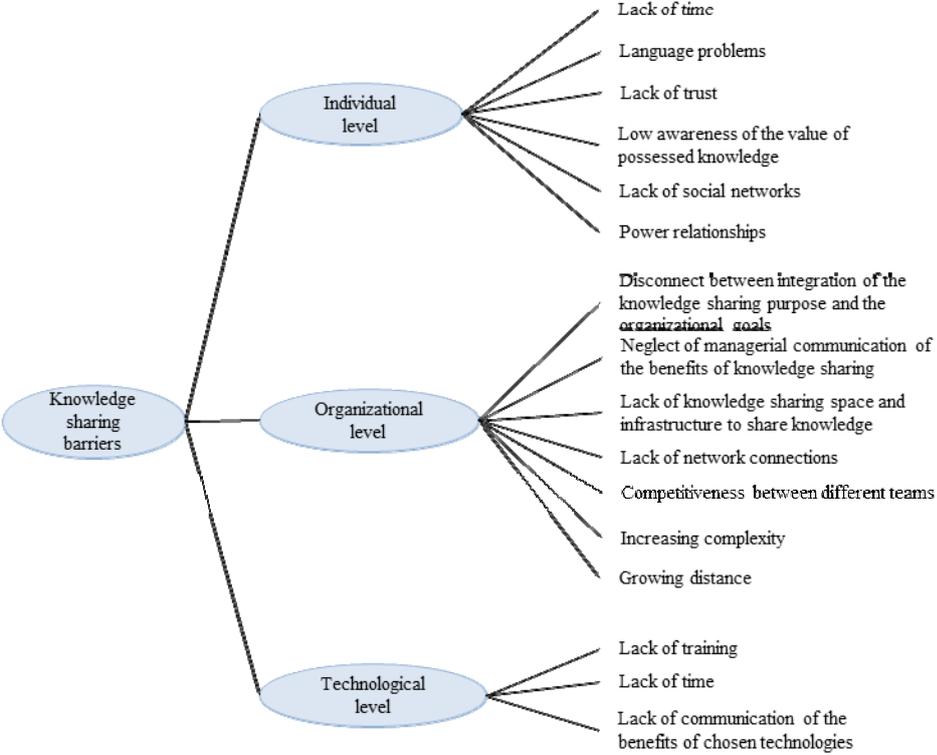

Figure 1. The potential knowledge sharing barriers facing an organically growing software company

The barriers recorded previously and summarized in Figure 1 will be used as a framework to study the issues empirically. Before presenting the case organization and the results of the empirical study, I will outline the research methods of the study.

3 RESEARCH METHODS AND THE CASE ORGANIZATION

A qualitative case study was chosen as the research method to ensure an in-depth and holistic understanding of the research phenomenon that is strongly tied to its context (Yin, 1994), in this case, a software company that has grown organically. The core of the empirical data was

gathered in seven semi-structured, themed interviews. The central subject matter (the themes) was specified beforehand on the basis of a review of knowledge-management literature (Eskola & Suoranta, 1999; Hirsjärvi & Hurme, 2004). Themed interviews ensure that the same set of themes are covered in each interview, while allowing space for the order and form of questions to be flexed and also for follow-up questions to be asked to obtain a comprehensive picture of the phenomenon (Hirsjärvi & Hurme, 2004).

The interviews were conducted on a range of organizational levels to obtain an extensive picture of the phenomenon and different perspectives on it (see Table 2). The interviewees were selected by purposeful sampling (Coyne, 1997; Patton, 1999; Patton, 2005) with the help of the managers of the case company. The aim was to guarantee that the interviewees would be the most suitable available in that they would: represent the whole personnel staff; have a good knowledge of the phenomenon; provide reliable knowledge and be interviewed voluntarily. The interview sample represented the company well both in terms of size as a proportion of the whole staff) and in terms of age, sex and education demographics. Both long-standing employees with more than a year in service (referred to here as 'old employees') and newer employees with less than a year in service were interviewed. I conducted eight (two interviews with managing director; 1 interviews with other interviewees) interviews with seven people (of a staff of 48) over a two-week period, and all the interviews were recorded and later transcribed. At the time, the firm had been in business for six years and had grown constantly since its establishment. In addition to the interview data, company specific written material such as annual reports was also incorporated (see Table 2) and provided background information on the company.

Table 2. The empirical data.

Type of data	Purpose	Description
Interviews	The core of the empirical material Purpose - to determine the status of knowledge management and challenges to it from the perspective of different organizational levels.	Management interview (2x1) Interview of managing director Semi-structured interview Duration: 2x1 hour
		Middle management interviews (3) Interview of one (1) project manager Interview of two (2) team leaders Semi-structured interviews Duration: 1-1.5 hours
		Operational level interviews (3) Interviews of three (3) software developers Semi-structured interviews Duration: 1-1.5 hours
Company specific written material	To gain background information about the company	Case company annual reports , brochures and website

The summary of the analysis process is presented in Figure 2 below. The data were analyzed qualitatively, and the analysis commenced with a reading of the data to identify and label those parts that somehow related to knowledge sharing (Seidman, 2006). The point was not to miss any parts of the data that might relate to knowledge sharing and possible barriers to it. Only after this step, was the data coded (or classified as some scholars prefer to term it when speaking of qualitative research (e.g., Dey, 2005; Seidman, 2006)). I adopted classification categories identified in previous literature, and so obtained codes such as "time", "organizational culture", "technological tools", etc. I also tried to be sensitive to knowledge sharing barriers arising from the data that not identified in the prior literature. The ideas I derived from this analysis phase I structured under the larger analytical categories of "individual level barriers", "organizational level barriers", and "technological barriers". Following this classification and categorization process, I assessed whether the classified issues related positively or negatively to knowledge sharing. That is to say, did the issues hinder knowledge sharing or promote it. Following the interpretation phase, I compared the results with the typical knowledge sharing barriers faced by an organically growing company proposed in the extant literature. Thus, in essence, the analysis included reduction and

classification/coding of the data, followed by combination and interpretation of the data (Hirsjärvi & Hurme, 2004).
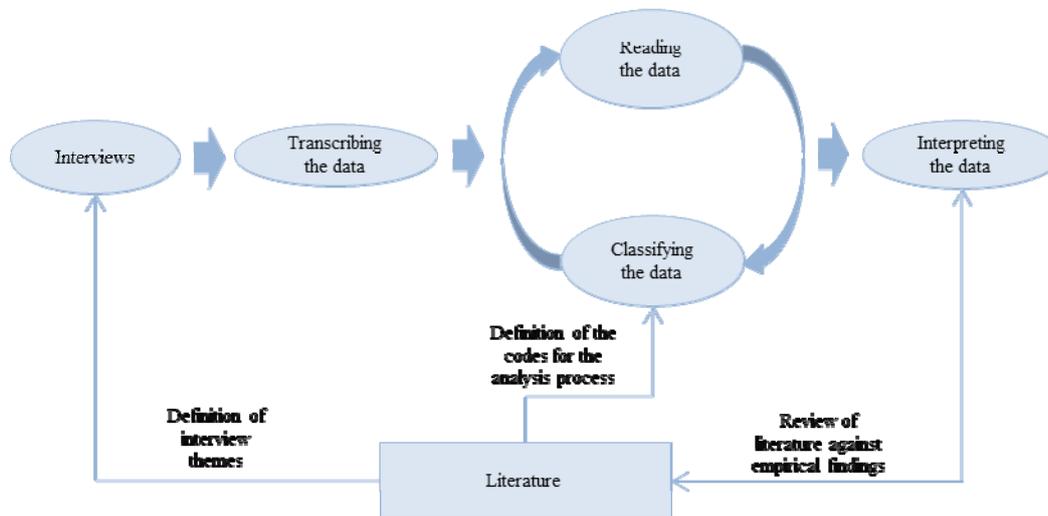

Figure 2. The summary of the analysis process

The case organization is a high-technology company, a software company to be precise, operating in the business-to-business market. The services offered by the company include software architecture consultation and various software projects. The company has also been active in implementing software development tools and software environments. It undertakes software projects by aiming for continuous development of methods and competence. The software development and production of the case company are based on teams. The teams share a quite similar composition. Most team members have or are studying for a master's degree in engineering, so share a similar educational background. The spirit of the teams also seems to be quite similar: they aim to do their work well, but seem to value having fun while working. The teams all work on the same premises and so are physically located quite close to each other. The company has grown organically throughout its period of operation. Its business volume has grown satisfactorily: both its sales and its personnel have grown strongly, and all of the growth of the firm has been financed with cash-flow financing. In the

first five years, the sales and personnel at least doubled each year. In the best years, the sales and personnel even tripled.

4 EMPIRICAL FINDINGS

The empirical findings derived from the analysis of the case company are presented in this section. The results will be discussed in the light of the aforementioned classification of knowledge barriers into individual, organizational and technology levels. Despite this categorization, many of the barriers are interlinked.

4.1 Individual Level Knowledge Sharing Barriers in Organically Grown Software Company

In the case organization there was a common understanding that efficient knowledge sharing was important for everyone to get the job done in the best possible way. However, there was a common perception that the growth of the firm had led to the employees' workload growing to such an extent that most of their time was being spent on routine tasks, that were performed with only the existing knowledge of individual employees, or at best with the knowledge contained inside a particular team. Employees felt that there was not enough time to seek out knowledge from the whole organization to learn new things or to share their own knowledge more widely.

When the staff were questioned about whether language problems impacted on knowledge sharing they reported that the jargon used in the software field is so common and well taught since school that language problems were non-existent or at least, minimal. The use of drawings was also well-established in the firm—staff had always been in the habit of making drawings on flipcharts to explain concepts that were not understood. The use of drawings thus provided a route to overcoming any language problems in the specific company context, and new employees were familiarized with this practice from day one. Interviewees did not identify any changes in this area resulting from the organic growth of the company.

The case company is a knowledge-intensive organization and its employees are highly educated and very familiar with their own specialist areas. They were also conscious that their knowledge could probably be useful elsewhere in the organization. Hence, the employees did not feel that there were issues around the awareness of their own knowledge. At the same time, they admitted that there was not enough time to share their knowledge, nor to identify if they had colleagues beyond their close circle with knowledge that would be beneficial to them. Thus, they were not fully aware of the knowledge of all their colleagues or of the value of their colleagues' knowledge. This was the case especially between the teams and between old and new employees.

There were evident differences in the level of trust reported. Trust was affected by the parties involved, whether members of the same team, members of different teams or indeed if old and new employees were involved. Respondents reported a high level of trust within their own team and especially between the old (long-standing) team members. In that case, they felt that

shared knowledge would be of good quality and be used appropriately. However, in interactions between teams and between new and old employees the level of trust seemed to diminish during growth, a result of employees being less familiar with their colleagues than they had been previously. However, there was a firm foundation for the formation of social networks, as new teams were usually formed of whichever employees were available. Of course, whenever possible, management did take the competencies of potential team members into account when forming teams. Hence, these factors added to the mixing of teams and contributed to the possibility of the birth of new social networks. The counteracting factor was the policy of not changing a team that had proven a particular aptitude for something. Overall, respondents reported internal social networks to have an important role in knowledge sharing, but at the same time relatively few new networks were born during the growth, employees instead continuing to utilize their existing networks. It seemed that especially during growth marked by the recruitment of new employees, the company was not able to create strong social networks between different teams and between old and new employees. This led to a deterioration of knowledge sharing, especially between those groups of employees.

The employees believed that it would have been useful to share knowledge across the whole organization. They felt that in general, knowledge sharing would strengthen the expertise of all the employees and that would improve common job security. The positive attitude meant that there was no evidence of power games regarding knowledge sharing, not even between new and old employees, but instead there seemed to be an understanding of the need for knowledge sharing to work for the common good including during growth, despite promoting knowledge sharing becoming more challenging.

4.2 Organizational Level Knowledge Sharing Barriers in Organically Grown Software Company

The respondents reported that there was evidence of a disconnect between the purpose of knowledge sharing and the company's goals, as the two aspects were not integrated as well as they might have been. This disconnect provides our first example of a barrier to knowledge sharing at the organizational level. Although staff throughout the organization understood that knowledge sharing was an important contributor to everyone doing their jobs well, practical knowledge sharing was still not a well-formed process. How knowledge sharing related to the company's overall goals was not clearly understood, despite management reinforcing its belief that knowledge sharing was an essential prerequisite to the functioning of the company. Employees also said that the management had not explicitly communicated the meaning and benefits of knowledge sharing. As the relation of knowledge sharing to the company's overall goals was not emphasized to the employees, they saw knowledge sharing as important only in terms of helping them to perform their own daily tasks better.

The managers spent most of their time on marketing and sales during the growth, and so they had become detached from the everyday work of the software developers. In the past, the management was quite aware of the work of the software developers. Managers acknowledged good development work, which motivated the software developers to share knowledge, as they saw that the management felt that it was important to do so. During the growth, recognition of knowledge sharing by the management diminished and the sharing of knowledge suffered when the software developers felt that their work was less appreciated than it once had been.

Earlier the company's development had been marked by the management calling regular company meetings to share all kinds of business-related knowledge such as ongoing projects and the sales and financial situation of the company. However, during the growth the management stopped holding these meetings. The personnel felt that this was a mistake and that it weakened the overall knowledge sharing climate and culture. However, the managers interviewed reported that there was a plan in place to resurrect the weekly meetings.

There were no major infrastructure issues in the case company reported in the interviews conducted. All the employees were working on the same premises, and could therefore see each other daily. There was even a common 'hobby room' with a pool table, which was intended to be an informal space for knowledge sharing. Employees used this room frequently and it helped them become more acquainted with each other. Even though the company was still rather small (with 48 staff), the growing number of employees seemed to make the company a more complex entity and was also increasing the distances between different teams, making searching for and finding knowledge harder. As the company grew, knowledge was shared within teams as the members of each team worked in close proximity to each other, but the distance between teams increased, leading to interviewees reporting that they no longer had the time to go and meet the members of other teams.

The rising number of employees made it harder for long-standing employees to get to know new entrants, both personally and in terms of what competences they possessed and where their knowledge could be supplemented. There were also signs than there was an 'attitude of

wisdom' between the old employees working in the same team, but between old and new employees, the attitude of wisdom was weaker or even invisible. Despite this, employees reported no competitiveness between different teams. Respondents felt that it would have been easy to ask questions of other employees whichever team they belonged to – if only the employees had known what knowledge their colleagues possessed. However, the interviewees also said that during growth an attitude of "think who you can trust to share your knowledge with" had appeared to some extent, and the atmosphere seemed less conducive to knowledge sharing than it once had. There was some evidence of the new workforce being somewhat excluded, and so unable to create strong social networks inside the company.

The case company had two people who had a good overall picture of the competences of the software developers employed there. They acted as internal knowledge brokers (Hargadon, 1998) who were contacted when someone needed some information, but did not know who would have it. The knowledge brokers were almost always able to connect the person in need of knowledge with the person holding that knowledge. Hence, they were like internal 'network weavers' creating internal network connections. However, as the company was growing the knowledge brokers felt it was increasingly difficult to be aware of all the competencies of the growing personnel, and to match the most suitable source of knowledge with the demand for knowledge.

4.3 Technology Level Knowledge Sharing Barriers in Organically Grown Software Company

The interviewees did not identify infrastructure or technology problems that would pose a threat to knowledge sharing. The company used an intranet efficiently in sharing common knowledge. For task-specific knowledge, there was also a documentation system in use: software developers both entered and searched for information there. However, the documentation system had insufficient search functions. During growth, the amount of information in the system had increased so much that it had become laborious and time-consuming to retrieve appropriate information from the system. Despite noting the problem, employees were accustomed to the existing documentation system and were not calling for more efficient systems.

Technology level barriers seemed to be a minor issue in the company. There were no signs of employees having unrealistic expectations about the possibilities of technology, nor was there any reluctance to use IT systems. The respondents also reported the systems to be suitable for their needs and that they were willing to use the systems, despite some reservations about the inefficient search function of the documentation system. There were no demands for new systems to make knowledge sharing better, although management did have plans in place for some new system elements. The planned changes were intended to make it easier to find required information and more efficient to recycle knowledge. There were also plans to improve the company intranet as a knowledge sharing channel and develop information systems for example to track the competences and knowledge of the employees. While the staff had high expectations of these new systems, they were not in use at the time the interviews were conducted, so issues around their introduction and use are beyond the scope of the current research.

As there had been no novel systems introduced during growth, there was no issue around finding time for training on new systems. However, employees felt that using the existing systems had become quite laborious as the amount of knowledge had increased. There was no special communication about the benefits of the chosen technologies, but that omission did not seem to cause knowledge sharing issues. Even the new employees seemed to take the existing systems for granted and quickly got used to using them.

5 DISCUSSION

This empirical study suggests that there may be a risk of knowledge sharing deteriorating during organic growth. Most of knowledge sharing barriers with the biggest potential to affect an organically growing software company presented on the basis of the literature were also apparent in the empirical study, but some were not. These issues are illustrated in Figure 3 below.
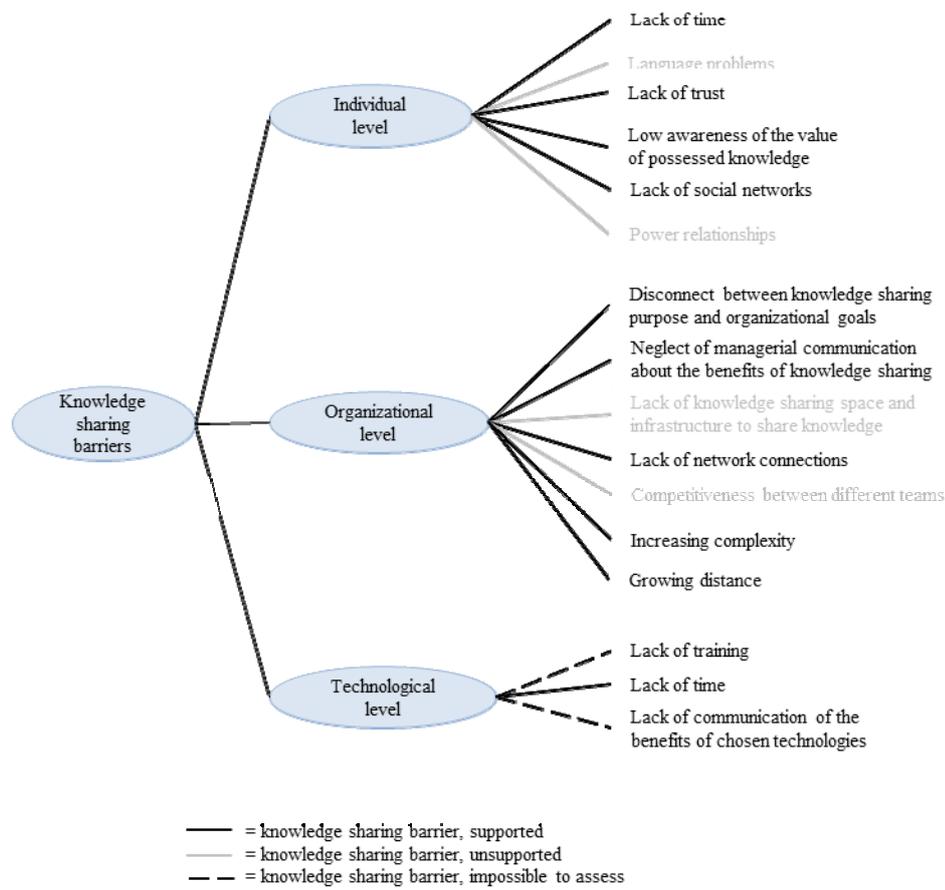
Figure 3. The knowledge sharing barriers potentially affecting an organically growing software company

As suggested in the literature, the biggest potential knowledge sharing barrier at the individual level is lack of time. It is quite natural that an atmosphere of haste arises during growth, and affects time available for knowledge sharing. In terms of relationships between old and new employees, lack of trust, low awareness of the value of knowledge possessed and lack of social networks are potentially knowledge sharing barriers. It seems that many of the individual level knowledge sharing barriers stem from the question of trust between old and new employees. When there is trust there are stronger relationships, which lead to knowledge sharing and better awareness of the value of knowledge possessed by others. When there is no

trust the situation is the opposite, and this is the case between old and new employees as trust takes time to develop.

Contrary to the findings of prior research, language problems had not caused knowledge sharing problems in the case company. The main reason was the common and specific professional jargon understood even by newcomers to the firm. It was also quite surprising that contrary to the assumption made in the literature, power relationships did not appear to cause knowledge sharing problems. This seemed to be due to a good knowledge sharing culture in place since the formation of the company.

At the organizational level, one critical issue related to knowledge sharing was the role of management. It was recognized that it is a major challenge for management to integrate the purpose of knowledge sharing with the organizational goals and to communicate the benefits of knowledge sharing to the workforce during organic growth. If management cannot perform this key communication function, it risks the whole knowledge sharing culture of the company deteriorating, leading to a diminishing of knowledge sharing throughout the company. Hence, the role of management as the creator of a knowledge sharing culture and as a role model for knowledge sharing was crucial in the organically growing software company. However, maintain such roles seem particularly challenging during organic growth.

Internal network connections between established teams were strong, as the previous literature suggested they would be. However, there were issues with the network connections in relationships between old and new employees. The empirical study supported the

assumption made in previous studies that rapid growth may increase the complexity of the organization and the distance between people, causing problems with sourcing and sharing knowledge, even in a small company. However, the current empirical study diverges from previous studies by indicating that, in a small, growing software company at least, neither the lack of an infrastructure to share knowledge nor competitiveness between different units give rise to potential knowledge sharing barriers.

At the technology level, the empirical results also support the assumptions made based on previous literature. These are that in an organically growing software company there are no unrealistic expectations of technology, no reluctance to use the chosen technologies, nor is there unsuitable technology that would function as a knowledge sharing barrier. However, as the company grew and the amount of information held increased, it had become more challenging to meet all the knowledge sharing requirements with the existing information systems. Hence, even in a software company, it seems necessary to think about the suitability and sufficiency of the existing systems, even if they do not cause major issues. Unfortunately, as no new systems had been introduced in the case company, the current research cannot address whether employees had enough time and training to become familiar with new technologies, or whether those new technologies were introduced properly.

Overall, this study identifies a few basic issues—root causes—that have the potential to create specific knowledge sharing barriers and to diminish knowledge sharing in an organically growing company. *The relationships between old and new employees*, *time challenges* (both at the individual and technological levels) and *management's role as creators and cultivators*

of the knowledge sharing culture were identified as root causes of knowledge sharing barriers. By focusing on these issues, many knowledge sharing barriers could be dismantled or even be avoided. Hence, management should pay attention to knowledge sharing; reserving enough time for knowledge sharing to occur and taking care of people. One of the most important things is to create opportunities for old and new employees to get acquainted and create trust. It is also important to ensure that existing positive knowledge sharing habits are shared with new employees during growth. This case study suggests that this does happen if there are well functioning knowledge sharing habits and a knowledge sharing culture in place before the growth, and the creation of such a culture should be a priority from a firm's inception. If ongoing knowledge sharing is desired, these knowledge sharing habits should also be nurtured during growth, regardless of any time pressures to do other things.

6 CONCLUSIONS

This paper has discussed the biggest potential knowledge sharing barriers for an organically growing high-technology company (specifically a software company) on the basis of previous research and an empirical case study. Referencing knowledge sharing barrier literature and literature on organic growth, and bearing in mind the typical features of a software company, the study suggests the knowledge sharing barriers likely to be biggest potential to an organically growing software company. The case study examines whether the assumed barriers can be supported empirically.

The study reveals a few basic issues underlying many of the knowledge sharing problems in an organically growing software company. These issues can be seen as root causes of a

deterioration in knowledge sharing, and are: *the relationship between new and old employees*; *time challenges*; *the role of management in knowledge sharing*. If these root causes of knowledge sharing barriers had been recognized in the software company when planning how to manage growth, the knowledge sharing barriers could possibly have been avoided. Thus, from a managerial perspective this study makes a valuable contribution by pointing out that knowledge management can support growth, but on the other hand if knowledge sharing is not managed well, a lack of, or diminishing of, knowledge sharing can make work more difficult. By recognizing the biggest potential knowledge sharing barriers for an organically growing software company, and especially the root causes of them, management might try to steer its efforts towards their prevention, and by so doing, better support growth.

There has been much research done on organic growth and a considerable amount on knowledge sharing barriers. Nevertheless, none has combined the two subject areas and examined them in an empirical context. From a theoretical point of view, this study's contribution lies in combining the theories of knowledge sharing barriers and organic growth. This study is a part of a larger research project aiming to study the knowledge sharing problems of companies that have grown in other ways, such as through acquisitions and networking. Hence, this study provides essential information on the comparison of the knowledge sharing barriers of different growth strategies.

However, as this study is only about a software company, it would be interesting to conduct a study in a field that is not so knowledge-intensive or as reliant on experts. In addition, as the current study has confirmed the key role of a pre-existing positive knowledge sharing culture, it would be intriguing to study a company lacking such a positive knowledge sharing culture.

It would also be important to study a company employing newly-acquired technology, so that the technological level barriers could be studied in more depth. Furthermore, to obtain more generalizable results than a single-case study can provide, it would be valuable to conduct a wider survey on knowledge sharing barriers in organically growing high-technology companies.

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