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**Knowledge-Sharing Challenges in Company Growth:  
A Comparative Case Study from the Software Business**



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To my nearest and dearest:

my husband Ari and our daughters Roosa and Fiina.

## ABSTRACT

**KUKKO, Marianne. 2013.** *Knowledge-Sharing Challenges in Company Growth: A Comparative Case Study from the Software Business.* Department of Business Information Management and Logistics, Tampere University of Technology, Tampere, Finland.

**Keywords:** Knowledge management, knowledge sharing, knowledge-sharing barriers, growth, organic growth, networked growth, acquisitive growth

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Knowledge management has aroused interest among many academics and practitioners for several decades now. Many of the academic studies have concentrated on development of the field's central concepts, and that work also supports application of knowledge management in practice. However, there is still much to study and develop in the field, and a need for empirical studies has been emphasized especially. Knowledge management has been addressed as, for example, one way to support company growth, something sought by many modern companies and economies alike, and knowledge sharing is argued to have a crucial role in knowledge management – it has even been seen as a basis and starting point for other knowledge-management activities. At the same time, the challenge frequently found in knowledge sharing has been acknowledged. A need for studies of knowledge-sharing challenges has been highlighted; in contrast, there has already been much research into elements enabling knowledge sharing. Hence, the present study focuses on factors posing challenges for knowledge sharing in a specific context involving company growth. Because the software business is a sector in which the roles of knowledge and innovativeness are critical for competitiveness and one where growth is typical, it was considered an interesting and potentially fruitful context for study. Through these elements, the purpose of the research was framed thus: *to increase understanding of knowledge-sharing challenges in company growth in the software business.*

The research was conducted as a multiple-case study. Through exploration of previous literature, a theoretical foundation was created for the empirical exploration of the research phenomenon. The literature on knowledge management, on company growth, and on the software business were explored. Through knowledge-management literature, barriers to knowledge sharing were identified. Company-growth literature was useful for understanding company growth through various expansion strategies. Literature on the software business was explored for creation of a picture of the context of the study. Three cases were studied empirically, each representing one of the three distinct growth strategies identified. These individual cases also provided a basis for comparative study. Thematically structured interviews provided the primary data for the study. Additional data, from material such as annual reports of the case companies, was

gathered for the background information it offered on the case companies. Qualitative data analysis was applied, including cross-case analysis.

The results of the study show that knowledge sharing is challenging in growth companies operating in the software business. Study of the case companies yielded identification of many individual barriers to knowledge sharing, mostly the same regardless of the growth strategy. The most interesting finding is that behind these individual barriers one can identify *root causes for knowledge-sharing challenges*, common to all the cases, no matter the growth strategy. These root causes were found to be *time issues, the role and activities of the management, and previously unacquainted people working together*.

The core contribution of the study is to increase understanding of knowledge-sharing challenges in the specific context of company growth. The study confirms that most of the individual barriers to knowledge sharing that were identified in previous literature can be found also in growth companies in the software business. The study also enriches the knowledge-sharing literature by identifying the root causes underlying the individual barriers to knowledge sharing. On the basis of this study, it is suggested that, instead of focusing on individual knowledge-sharing barriers, growth companies steer their efforts toward the identification and elimination of the root causes. To company-growth literature the study brings a new knowledge-management angle. Although some differences in the individual knowledge-sharing barriers were identified between case companies representing different growth strategies, the similarity in root causes across all of the cases indicates that the growth strategy chosen does not have an effect on the root causes. Hence, when it comes to knowledge-sharing challenges, company growth can be regarded as a well-bounded phenomenon.

## ABSTRACT IN FINNISH (TIIVISTELMÄ)

**KUKKO, Marianne. 2013.** *Knowledge-Sharing Challenges in Company Growth: A Comparative Case Study from the Software Business.* Tiedonhallinnan ja logistiikan laitos, Tampereen teknillinen yliopisto.

**Asiasanat:** Tietojohtaminen, tiedon jakaminen, tiedon jakamisen esteet, kasvu, orgaaninen kasvu, kasvu verkostoitumalla, kasvu yritysostoin

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Tietämyksenhallinta on kiinnostanut niin tutkijoita kuin yritysedustajia jo muutaman vuosikymmenen ajan. Monet akateemiset tutkimukset ovat keskittyneet alan keskeisen käsitteistön määrittelyyn, mikä osaltaan tukee myös tietämyksenhallinnan soveltamista käytäntöön. Kuitenkin tietämyksenhallinnan parissa on vielä paljon tutkittavaa ja kehitettävää ja etenkin empiiristen tutkimusten tarvetta on korostettu. Tietämyksenhallinta on esitetty myös yhtenä keinona tukea yritysten kasvua, asiaa mikä on niin monien yksittäisten yritysten kuin monien kansantalouksienkin kiinnostuksen kohteena. Tietämyksenhallinnassa tiedon jakamisella on esitetty olevan keskeinen rooli. Tiedon jakamisen on todettu olevan jopa perusta ja lähtökohta muille tietämyksenhallinnan toiminnoille. Kuitenkin tiedon jakamisen on todettu olevan usein haasteellista. Tiedon jakamista haastaviin tekijöihin pureutuvan tutkimusten tarvetta onkin korostettu, tiedon jakamista mahdollistaviin tekijöihin keskittyvien tutkimusten ollessa korostuneessa roolissa. Siten tämä tutkimus keskittyi tarkastelemaan tiedon jakamista haastavia seikkoja erityisessä, yrityskasvun, kontekstissa. Ohjelmistoala on ala, missä tiedolla ja innovatiivisuudella on merkittävä rooli kilpailukyvyyn saavuttamisessa ja missä kasvu on tyypillistä. Nämä seikat tekivät ohjelmistoalasta mielenkiintoisen ja hedelmällisen kontekstin tutkia yrityskasvuun liittyviä tiedon jakamisen haasteita. Näiden elementtien kautta tämän tutkimuksen tavoitteeksi muodostui: *lisätä ymmärrystä tiedon jakamisen haasteista yrityskasvussa ohjelmistoalalla.*

Tutkimus toteutettiin monitapaustutkimuksena. Aiempaan kirjallisuuteen perustuen luotiin pohja ilmiön tutkimiseksi empiirisesti. Niin tietämyksenhallinnan, yrityskasvun kuin ohjelmistoalan kirjallisuuteen perehdyttiin. Tietämyksenhallinnan kirjallisuuden pohjalta tunnistettiin tiedon jakamisen esteitä. Yrityskasvun kirjallisuutta hyödynnettiin yrityskasvun ymmärtämiseen eri kasvustrategioiden kautta. Ohjelmistoalan kirjallisuutta puolestaan käytettiin tutkimuksen kontekstin ymmärtämiseksi. Tutkimuksen aikana toteutettiin kolme empiiristä tapaustutkimusta, joista kukin edusti yhtä kolmesta tunnistetusta kasvustrategiasta. Nämä yksittäiset tapaukset loivat myös pohjan tapausten vertailulle. Tutkimuksen pääasiallisen aineiston muodostivat teemahaastattelut. Täydentävää aineistoa, kuten kohdeorganisaatioiden vuosikertomuksia, käytettiin

taustatiedon saamiseksi. Aineisto analysoitiin laadullisesti, sisältäen myös tapausten vertailevan analyysin.

Tutkimuksen tulokset osoittavat, että tiedon jakaminen on haasteellista ohjelmistoalalla toimivissa kasvuyrityksissä. Tutkimuksen kohteina olleista kasvuyrityksistä löytyi suuri määrä yksittäisiä tiedon jakamista estäviä tekijöitä, joista suuri osa oli samoja riippumatta yrityksen kasvustrategiasta. Kaikista mielenkiintoisin löydös kuitenkin oli, että näiden yksittäisten tiedon jakamisen esteiden taustalta löytyi kolme *ydinsyytä* (engl. root causes), mitkä kaikki esiintyivät tutkimuksen kolmessa eri kasvustrategiaa edustavassa tapauksessa. Näiksi ydinsyiksi tunnistettiin *aika, johdon rooli ja toiminta* sekä *toisilleen tuntemattomien henkilöiden työskentely yhdessä*.

Tutkimuksen kontribuutio oli ymmärryksen lisääminen tiedon jakamisen haasteista erityisessä, yrityskasvun, kontekstissa. Tutkimus antoi vahvistusta, että aiemmassa kirjallisuudessa tunnistetut yksittäiset tiedonjakamisen esteet ovat pitkälti löydettävissä myös kasvuyrityksissä, jotka toimivat ohjelmistoalalla. Tiedon jakamisen kirjallisuuteen tutkimus toi myös lisätietoa tunnistamalla ydinsyyt yksittäisten tiedon jakamisen esteiden taustalla. Tutkimuksen pohjalta ehdotetaan, että yksittäisiin tiedon jakamisen esteisiin keskittymisen sijaan kasvuyrityksissä voimavarat suunnattaisiin tunnistettujen tiedon jakamisen haasteiden ydinsyihin ja niiden poistamiseen. Yrityskasvun kirjallisuuteen tutkimus toi uutta tietämyksenhallinnan näkökulmaa. Vaikka joitain eroja yksittäisissä tiedon jakamisen esteissä eri kasvustrategiaa noudattavien yritysten välillä löytyi, kaikista tapauksista löydetty ydinsyyt antavat viitettä siitä, että valitulla kasvutavalla ei ole vaikutusta ydinsyihin ja siten tiedon jakamisen haasteiden suhteen yrityskasvua voidaan tarkastella yhtenä ilmiönä.



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in scientific methods. I think this is the best combination one could ask for in a thesis supervisor. I have been more than fortunate to have had a supervisor with all these qualities, and I am deeply grateful to you.

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believed in me. This has encouraged me to have faith that I would earn my doctoral degree someday.

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Marianne Kukko

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II	<b>Kukko, M.</b> 2013, Knowledge Sharing Barriers in Organic Growth: A Case Study from a Software Company, <i>International Journal of High Technology Management Research</i> , vol. 24, no. 1, pp. 18–29	
III	<b>Kukko, M.</b> 2013, Knowledge Sharing Barriers of Acquired Growth: A Case Study from a Software Company, <i>International Journal of Engineering Business Management</i> , vol. 5, no. 8, pp. 1–12	
IV	<b>Kukko, M.</b> & Helander, N. 2013, Knowledge Sharing Barriers in Networked Growth in the Software Business, <i>The International Journal of Business Competition and Growth</i> , vol. 3, no. 2, pp. 105-120	

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## **PART I: INTRODUCTORY PART**

# 1 INTRODUCTION

Supporting the birth of new companies has been an area of focus of many nations for decades; however, the focus is shifting slightly towards supporting growth of existing companies (see, for example, von Krogh & Cusumano 2001; Delmar et al. 2003; Simons et al. 2007). It has been understood that through the growth of existing companies faster economic growth can be gained (Goold 1999; Elinkeinoelämän keskusliitto 2006). However, guiding a company to the path of growth is not an easy task, and it is often fraught with many challenges (Penrose 1995; Vermeulen & Barkema 2001; Chui 2011; Junni 2011). Knowledge management and, especially, knowledge sharing can support the aim of growth of companies, but effective knowledge sharing can also be a huge challenge (Inkpen 1998; Salojärvi et al. 2005; van Burg et al. 2008; Hong et al. 2011). The underlying question is how companies can overcome challenges related to knowledge sharing so as to be able to support growth. Hence, the emphasis in this study is placed on identification of knowledge-sharing challenges in company growth, so that they can be overcome.

This first chapter of the thesis is intended to provide answers to the following questions: “What is the background of this study,” “Why is this study being done?,” and “How is the study done?” Hence, the background is opened up first, and the motivation for the work is described. After this, the purpose of the study is explained and the research questions are specified. The scope and limitations of the study are presented after this, following the description of the scientific starting point and the methodological choices for the study. Presentation of the structure of the dissertation concludes the chapter.

## 1.1 Background and motivation for the study

The study reported on here examines knowledge-sharing challenges of company growth in the specific context of the software business. Below, we examine why there is a need for research into knowledge-sharing challenges and on company growth. Also, the choice of the software business as research context is justified. With this research phenomenon and research context, new knowledge stands to be gained to both academics and those engaged in management practice.

*Why another study of knowledge management, especially knowledge-sharing challenges?*

Knowledge management can still be considered a quite new research field and still in its fairly early development, although it has already received a great deal of attention among both academics and managers, especially since the 1990s, when, for example, Nonaka and Takeuchi (1995) provoked discussion about the importance of knowledge

creation and both Grant (1996) and Spender (1996) presented the idea of a knowledge-based view of the firm. Since then, knowledge-management research has grown dramatically, and knowledge management has been studied through the lens of several fields of research (see, for example, von Krogh & Roos 1995; Nonaka & Takeuchi 1995; Spender & Grant 1996; Ståhle & Grönroos 1999; Maier 2002; Lilleoere & Holme Hansen 2011; Sandhu et al. 2011). In this diverse research, knowledge management is often divided into a human or “people” track and a technological or IT track (see, for example, Maier 2002), though many studies combine the two perspectives (see, for example, Hansen et al. 1999; Chen et al. 2012).

In the early years of knowledge management, the studies tended to focus on large companies (see, for example, Nonaka & Takeuchi 1995; Maula 1999; Sarvary 1999). However, it soon became evident that questions of knowledge management do not concern only large companies; they should receive attention in small and medium-sized companies too. Hence, the practices of knowledge management in small and mid-sized companies began gaining research attention (see, for example, Kukko et al. 2003; Salojärvi et al. 2005; Valkokari & Helander 2007). The importance of knowledge management does not depend on the size of the organization. However, it cannot be said that the size of the organization or any other feature of it has no effect on knowledge-management practices. Hence, this study contributes to existing theories by adding knowledge about the elements that challenge knowledge sharing in the specific context of company growth in the software business.

Much theory-based and empirical research has been done in the field of knowledge management, with many studies concentrating on development of the core concepts in this field (see, for example, Huber 1991; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Hansen et al. 1999; Ståhle & Grönroos 1999; Alavi & Leidner 2001; Bartol & Srivastava 2002; Maier 2002; van Burg et al. 2008; Wang & Noe 2010). It can be argued that the field is not yet so well developed that there is still need for empirical studies. Empirical knowledge-management studies are needed if the concepts in the field of knowledge management are to develop so as to respond to the needs of both researchers and management practice. Empirically grounded research is required also for the development of theory-based tools and models that meet needs at the practical level but are general enough that they can be adapted to many, quite different situations and contexts. (See, for example, Bouthillier & Shearer 2000; van Burg et al. 2008; Foss et al. 2010)

It is acknowledged that knowledge management and knowledge-sharing challenges have been studied both theoretically and empirically. However, previous studies have not explored how knowledge-sharing challenges manifest themselves in the specific setting of company growth. The current study differentiates itself from previous studies by its empirical emphasis and its consideration of the effect of specific features of the context: the purpose is to create empirically grounded understanding of specific

knowledge-sharing challenges in the particular setting of company growth in the chosen context of the software business.

*Why another study of company growth?*

Different growth types constitute distinct strategic options that differ in their impact on the future of the company (Lockett et al. 2011). The various growth strategies have distinct characteristics and provide different contexts for a company's growth (see, for example, Powell 1990; Penrose 1995; Peng & Heath 1996; Vermeulen & Barkema 2001; Collins & Porras 2005; Storbacka 2005; Lockett et al. 2011). It is important to study how knowledge-sharing barriers present themselves in this specific context of company growth with different growth strategies, each with special characteristics.

Knowledge-sharing barriers can be studied in several, quite different contexts; however, examining that of company growth can be easily justified as important. Growth is something to aspire to from the perspective of many individual companies but also from nations' standpoint. It is typical for growth to generate well-being and employment at the level of the individual company but also on the level of national economies (Elinkeinoelämän keskusliitto 2006), although growth is not easy to actualize – especially sustainable growth (Penrose 1995). Management of knowledge has been presented as one potential way of supporting growth (Mouritsen 1998). It has been suggested that higher levels of maturity in knowledge management correlate positively with long-term sustainable growth. There is also some evidence that, by applying a holistic approach to knowledge management, companies might be able to shift to higher growth. (Matlay 2000; Salojärvi et al. 2005) These points show that the issues of knowledge management are worthy of study and development in the context of company growth.

Companies can choose from among several strategies in their pursuit of growth. In traditional terms, growth can happen either organically or non-organically – i.e., through acquisitions (Penrose 1995). Despite the long history of studies of these two basic growth strategies, it is well argued that a need remains for further research into the differences between organic and acquisition-based growth if one is to gain further understanding of the phenomenon of company growth (Lockett et al. 2011). Alongside these two basic growth strategies, a third growth strategy can be cited: networked growth (Peng & Heath 1996; Tyrväinen & Mazhelis 2009). In fact, this has been said to be a highly relevant growth strategy for modern organizations such as software companies (Tyrväinen & Mazhelis 2009). Hence, it is important to study all three general growth strategies. The first two – more basic – growth strategies clearly must be studied, but understanding the phenomenon of growth as a whole requires that networked growth be examined too. As we state above, this makes it possible to understand the phenomenon of growth comprehensively. However, it also provides an opportunity to study whether growth can be legitimately viewed as a single,

well-bounded phenomenon with reference to knowledge-sharing challenges in the context of growth, or whether the specific growth strategy must be taken into account.

The assumption behind Penrose's (1995) theory of firm growth is that there are no limits to companies' growth opportunities. That cannot be said to hold anymore, on account of slower economic growth and increase in international competition (Lockett et al. 2011). In view of restricted growth opportunities, effective use of the available resources can be considered even more important. Accordingly, sharing and utilization of knowledge should be deemed central operations in a firm aiming for growth. The effective flow of knowledge should be guaranteed in a growing company, and multiple knowledge-sharing challenges should be conquered. Previous studies have presented barriers that challenge knowledge sharing (see, for example, Haldin-Herrgard 2000; Cabrera & Cabrera 2003; Riege 2005), and there are also studies identifying various kinds of growth paths for companies (see, for example, Penrose 1995; Delmar et al. 2003; Tyrväinen & Mazhelis 2009). However, there is a dearth of studies bringing together these two aspects: knowledge-sharing challenges along different growth paths. A study of knowledge-sharing barriers in the context of company growth is needed for gaining better understanding of their relevance in said specific context.

*Why the software business as the empirical context of the study?*

There are many choices, of several types, that a researcher must make in the course of the research. With an empirical study, the choice of the empirical research context must be considered with care. Because this study targets understanding of knowledge management and, especially, knowledge sharing, a knowledge-intensive empirical context was seen as a good choice. In a knowledge-intensive field of business, knowledge and its utilization should hold a central position, thus providing a fruitful context for study of sharing of knowledge. The software business is characterized as a highly knowledge-intensive arena wherein the software development and production process, and the results of the process, software and programs, are knowledge-intensive and often abstract (Hoch et al. 1999). The roles of knowledge and innovation are especially critical for competitiveness (ibid). This being the case, the software business was regarded as a good choice of empirical research context for this study.

Since the central theme of the study is growth, it was also seen as highly useful to set the study in an area of business where growth is typical. The rapid growth of software companies has become a typical feature in this business sector. Also, the growth in the number of jobs has been far more rapid in the software business than in most other fields. (Hoch et al. 1999; Hecker 2005; Lacey & Wright 2009) Thus, the software business responds well to the goal of selecting an empirical context wherein growth is common.

This choice of empirical context for this study also involved consideration of the researcher's background. The aforementioned features of the software business

(knowledge-intensiveness and typicality of rapid growth) intrigue the researcher. Another reason for choosing the software business as the empirical context was that the researcher has worked in a software company, with about one year of experience there. Hence, she has some basic understanding of the business, which can be seen as a positive factor, aiding the researcher in coming to a better understanding of the context. However, that can be also seen as a downside: the researcher might be too “deep” in the context; there is a danger of not being able to see the forest for the trees. The researcher has recognized this and has tried her best to take a neutral position as a researcher.

## **1.2 Purpose of the study and the research questions**

This dissertation argues that in the context of the software business certain fundamental issues pose challenges for knowledge sharing amid company growth no matter the growth strategy. The purpose of this study is to increase understanding of knowledge-sharing challenges in company growth in the context of the software business, so the main research question (MRQ) of the study can be described as follows:

*MRQ: What issues create challenges to knowledge sharing in company growth in the software business?*

The main research question is tackled through finding of answers to the more detailed subsidiary research questions (SRQs):

*SRQ1: What knowledge-sharing barriers have been identified in previous studies?*

*SRQ2: What kinds of growth strategies exist?*

*SRQ3: What are the special characteristics of the software business?*

*SRQ4: Are the knowledge-sharing barriers that face a software company similar regardless of the growth strategy?*

The relationship between the main research question and the sub-questions is depicted in Figure 1, below.

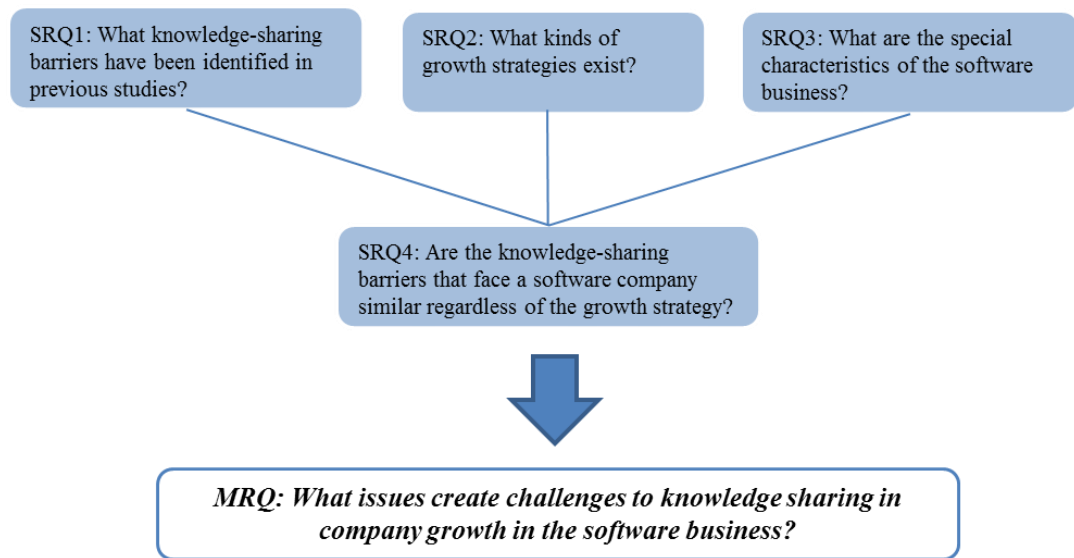


Figure 1. The relationship between the main research question and the subsidiary research questions.

The first research question is theoretical in nature, and the answer to it was sought through literature-based research. The work started with examination of what barriers to knowledge sharing the previous literature has identified. Several relevant studies were found. Review and analysis of these led to an initial conception of knowledge-sharing barriers. Since the second research question is also theoretical in nature, literature on company growth was reviewed. Because three core strategies for a company's growth – organic, acquisition-based, and networked – have been identified, the characteristics of these were studied, as groundwork for research into the knowledge sharing seen with each of these growth strategies.

Because the context of this study is the software business, it was also important to explore the special characteristics of that business. This was done through a review of existing literature on the software business. Thereby, an answer to the third research question was sought. This theoretical exploration of knowledge-sharing barriers, growth strategies, and the software business was published in the form of a publication (original publication I) forming part of this dissertation. This theoretically oriented phase created a basis for empirical analysis of knowledge-sharing barriers through the lenses of different growth strategies and the software business.

After the theoretical work, the research moved on to its empirical component, to find an answer to Research Question 4. The empirical part of the study used multiple cases in a comparative case study design. The knowledge-sharing barriers in company growth were studied in three separate cases: one of organic growth, a case of acquisitive growth, and a case of networked growth. These cases afforded an empirical view of the knowledge-sharing barriers attendant to all three basic growth strategies possible for

modern organizations. Exploring the barriers in each of the three distinct growth contexts enabled cross-case analysis of the cases and comparison of the barriers to knowledge sharing under each individual growth strategy. Through this comparison, an answer was sought to the fourth research question; that is, analysis of the similarities and differences among knowledge-sharing barriers of different growth strategies was performed, and thus the researcher examined whether the type of growth should always be taken into consideration or, instead, one can speak of knowledge-sharing challenges for company growth in general. As is stated above, the empirical analysis of the barriers with different growth strategies was done firstly through individual cases. The results of the associated analyses were reported in the form of empirical research publications (original publications II, III, and IV). After the individual-case stage of analysis, cross-case analysis was conducted, to provide a picture of the similarities and differences of the knowledge-sharing challenges of the growth strategies.

The aforementioned theoretical and empirical steps allowed analysis of the knowledge-sharing barriers facing the various growth strategies in the software-business context. The barriers of the individual growth strategies thus identified and analysis of the similarities and differences between them in the software-business context allowed description of *the challenges facing knowledge sharing in company growth in the software business*.

### **1.3 Scope of the study**

In the present research, the phenomenon under study is knowledge-sharing challenges in company growth. Hence, the theoretical basis lies in knowledge-management literature, especially in knowledge-sharing literature, and in the literature addressing the various growth strategies of a company. The empirical context of the study is the software business.

Getting existing companies to grow can be seen to be important for the individual companies but also for the growth of economies (Elinkeinoelämän keskusliitto 2006). Hence, it is important to find ways to support company growth. There is evidence that knowledge-management functions could support growth, but it has also been said that knowledge management is not an easy task in growing companies (Mouritsen 1998; Matlay 2000; Salojärvi et al. 2005). Also, elimination of elements that slow down growth is a way to support company growth, and knowledge-sharing barriers can be viewed as among these elements. Regardless of these conclusions, it has been stated that there is not enough understanding here, especially of the challenges of knowledge sharing, though the positive factors related to knowledge sharing are quite widely known (Peng & Heath 1996; de Man 2008; de Man et al. 2008; van Burg et al. 2008; Meriläinen & Halinen 2009). Hence, the present study includes in its focus supporting companies' growth by increasing understanding of knowledge-sharing challenges.



The most commonplace and well-known growth strategies are organic and acquisitive growth (see, for example, Penrose 1995; Lockett et al. 2011). However, networked growth has been revealed to be a relevant and good growth strategy for many modern companies (see, for example, Peng & Heath 1996; Tyrväinen & Mazhelis 2009). Studies of company growth are heterogeneous in nature, and there are many indicators for status as a growth company (Delmar et al. 2003). Growth metrics applied have included increase in earnings per share, shareholder value, assets, employment, sales, profits, physical output, market share, and others (see, for example, Delmar 1997 and Ardishvili et al. 1998 as cited by Delmar et al. 2003; Ala-Mutka 2007). Reason can be found for using any of these as an indicator for growth; however, if all three growth strategies – organic, acquisitive, and networked – are to be examined properly, increase in sales can be regarded as a good indicator of growth. Firstly, the literature opines that if only one measure of growth is to be chosen, sales would be the preferred one (Hoy et al. 1992 and Ardishvili et al. 1998 as cited by Delmar et al. 2003). It will also tell something of the delta of networked growth, which, for example, change in number of personnel would not: networked growth may be accompanied by high growth in the sales without the number of personnel at the company changing. Hence, increase in sales as an indicator of growth does not differentiate networked companies, for which “personnel” might be hard to define. (Ala-Mutka 2007) Increase in sales can be further justified as an indicator of growth in that it is one of the basic measurement instruments of business, since there is always an exchange of money involved (Delmar et al. 2003; Ala-Mutka 2007). Hence, using increase in sales as the indicator for growth in this study is reasonable, and this indicator was applied in a criterion in the selection of the case companies for this study.

Knowledge can be considered a major source of competitive advantage for modern organizations, and management of knowledge should be given focus by all companies. It has even been said that knowledge-management procedures could aid in company growth (see, for example, Salojärvi et al. 2005). In knowledge management, the role of knowledge sharing can be viewed as crucial: it can be seen as a foundation for all knowledge-management activities (see, for example, Hendriks 1999; Christensen 2007). Sharing knowledge that could benefit the employees of the company is important. Through this, one guarantees that knowledge will develop and be renewed (Ainamo 2001; Hytönen & Kolehmainen 2003). For this reason, from among various knowledge-management activities<sup>1</sup>, knowledge sharing has been chosen as the focus of this study. Since there is still need for empirical knowledge-management studies, the current study aids in responding to this need by focusing the research on a specific empirical context.

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<sup>1</sup> The basic activities of knowledge management can be considered to be knowledge creation, knowledge storage/retrieval, knowledge transfer (including knowledge sharing), and knowledge application (see, for example, Teece 1998; Alavi & Leidner 2001).

A summary of the scope of the study addressed here can be defined as follows. As noted above, knowledge-sharing challenges and company growth have been chosen as the main issues under study. Because growth often is indicative of the welfare of both individual companies and nations, growth context has been considered important to study. Since there are still many issues in the field of knowledge management that should be explored in greater depth, the scope of this study covers knowledge sharing because it can be seen as a fundamental activity in knowledge management (Teece 1998; Hendriks 1999; Alavi & Leidner 2001). It can be seen as creating a basis for other knowledge-management activities (Hendriks 1999; Christensen 2007; Paulin & Suneson 2012). However, the factors enabling knowledge sharing have been excluded from this study, since these have already been studied quite well, unlike elements hindering or preventing knowledge sharing, which, especially in a broad range of contexts, have remained less studied (see, for example, van Burg et al. 2008). Hence, the latter have been part of the focus of the study. Because this study is a multi-case one, it was seen as useful to choose empirical cases that all are from the same industry, so that the effects of differences between industries could be eliminated. The software industry was chosen as the empirical context for knowledge-intensiveness and intensity of growth. These created fruitful ground for studying issues related to knowledge in a growth context.

#### *The key concepts*

It is vital to define the key concepts of a study well, because their definition frames the research and lays the foundation for understanding the phenomenon under study. Hence, we next look at how the key concepts in the study are understood and utilized in this dissertation. The conception must be as clear and simple as possible (Haaparanta & Niiniluoto 1995). The task of definition is that of articulating the essence of the item or object being defined. Traditionally, several requirements have been set forth for definitions. Firstly, a definition has to represent the essence of the item or object under definition. Secondly, it may not be circular. Thirdly, it should not be expressed in negative terms (i.e., stating what something is not). Fourthly, it cannot employ unclear or figurative language. According to the modern theory of definition, a definition can also be conditional, acknowledging the context in which the concept appears. Accordingly, conditions in which the definition is valid may be expressed. (Haaparanta & Niiniluoto 1995) An attempt has been made to follow these guidelines in definition of the study's key concepts. The key concepts in this dissertation are knowledge management, knowledge sharing, organic growth, acquisitive growth, networked growth, and the software business.

Knowledge management: Several research disciplines have contributed to the development of knowledge management. For example, management science, information science, organization science, sociology, and psychology have taken an interest in knowledge management and have contributed to its development (see, for

example, Maier 2002). This has led to a situation wherein knowledge management can be viewed from different angles and associated disputes have arisen. However, this multidisciplinary approach to knowledge management has also led to circumstances in which knowledge management can be seen as a quite comprehensive and many-sided phenomenon. Hence, knowledge management includes conscious actions to maximize the organization's performance (Marchand & Davenport 2000). *Knowledge management can be seen as completeness with what knowledge can be established, shared, created, and utilized within an organization* (Nonaka & Takeuchi 1995; Anttila & Vakkuri 1998; Davenport & Marchand 2000). It is also important that the right knowledge be available in the right place at the right time for the right persons (Harryson 2000). Overall, it can be stated that knowledge management is all about wise and skillful care-taking, administration, and targeted management of knowledge, skills, and communication (Suurla 2001). The aim is to transform knowledge and experience stemming from routines, habits, and traditions from the routine and obvious into something novel and precious – in other words, to prevent “reinventing the wheel” (Wah 2000; Ainamo 2001).

Knowledge sharing: Knowledge sharing can be seen from many, quite different angles. One related, often even confusing, concept is knowledge transfer. In some sources, its definition overlaps or is even the same as that of knowledge sharing. The difference between these two concepts is typically described as lying in whether the term encompasses the knowledge received and applied or just that “sent out” – that is, whether the receiver of knowledge, and in some conceptions also utilization of shared knowledge, is taken into consideration or not. (See, for example, Majchrzak & Cooper 2004; King 2006; Wang & Noe 2010; Paulin & Suneson 2012.) In the present study, *knowledge sharing can be seen as a process of identifying existing and accessible knowledge and disseminating it within the organization*. The aim is to complete specific tasks better, faster, and at lower cost than would be possible without knowledge sharing (Christensen 2007). Hendriks (1999) states that knowledge sharing links the individual and the organizational level. Therefore, knowledge sharing is a vital process in an organization, since the level where knowledge resides (individual level) and that where knowledge gains its economic and competitive value (organizational-level) are connected (Hendriks 1999).

Organic growth: Organic growth can be seen as one of the two basic growth strategies, alongside acquisitive growth (Penrose 1995). Storbacka (2005) defines organic growth as growth that is achieved without buying of existing business outside the company. *Organic growth is generated inside the company as unused productive services, resources, and special knowledge of the company are brought into use* (Penrose 1995).

Acquisitive growth: As is indicated above, acquisitive growth is the other of the two basic strategies for a company's growth, alongside organic growth (Penrose 1995). *Acquisitive growth is about buying existing business outside the company to generate*

*growth*. That is, growth is achieved here through acquiring of external resources. Through an acquisition, a company obtains new personnel, new products and services, new processes, etc. all at the same time. (Penrose 1995; Vermeulen & Barkema 2001)

Networked growth: *Networked growth can be defined as an aim of increasing sales through utilization of the resources of the network partners without internalization of the partners' operations* (Peng & Heath 1996). Networked growth is seen as a transitional form between organic and acquisitive growth; while no acquisitions are involved, the relationships in the networks can be so close that the partners form such a large part of the business process that they can be seen as important structural elements of the whole production process (Powell 1990). Networking generates possibilities for sales growth by making more resources available without the company bringing the operations of other organizations inside it (Doz & Hamel 1998). Although the operations are not handled in-house, business processes are planned jointly (Johannisson 2000), for reduction of uncertainty, fast access to knowledge, reliability, and responsiveness (Powell 1990).

The software business: *The software business can be considered a quite young industry that is characterized as knowledge-intensive and rapidly growing* (Hoch et al. 1999; Lee et al. 2006; Lacey & Wright 2009). Characteristic of the software business also is that the software development and production processes and also the results of the process – software and programs – are knowledge-intensive and typically abstract (Hoch et al. 1999). This also creates some requirements for the personnel. Creativity and a high standard of professional knowledge are required of the employees (Bettencourt et al. 2002; Løwendahl 2005; Miles 2005). Continuous and rapid changes are also typical in this industry (Hoch et al. 1999). Additional issues connected to the software business are turbulence and competitiveness (Hoch et al. 1999; Suomalainen et al. 2011).

## **1.4 Research strategy**

There exist many research traditions and scientific approaches that might influence a study. The aim of this section of the chapter is to position the study among them. The research strategy characterizes the thread of the study. The selection of the research strategy depends on the chosen research scheme and research questions, and on the purpose of the study (Hirsjärvi et al. 2000). It indicates the underlying assumptions affecting the whole study and paints a coherent picture of the study, of why and how the study has been done. The sections below present the choice of research paradigm, research approach, and research methods for data collection and analysis.

#### *1.4.1 The research paradigm and research approach*

When a researcher chooses any given approach to his or her research, the research as a whole is different from what it would have been with another approach (Hirsjärvi et al. 2000). Accordingly, the researcher has to understand that his or her background and choices have an inherent effect on the research. The researcher has to understand and live with this fact. He or she needs to recognize that this has its effect also on the results and thus that the results can be generalized not to all circumstances but only to the circumstances chosen for inspection. It does not mean that the research would have been better or worse if another approach had been chosen (Hirsjärvi et al. 2000). The researcher just has to live with the fact that he or she must make choices, some of which are conscious and some of which are unconscious. All of these frame the research.

One essential issue affecting the researcher's choices is the research paradigm. Guba and Lincoln (1994) define the research paradigm as basic beliefs or a worldview guiding the researcher. Two main research paradigms dividing the views of different researchers are the positivistic and hermeneutic paradigm (see, for example, Olkkonen 1994). Positivism sees research as having to be based only on verified facts, and it argues that objective depictions of the world can be given. It is confined to researching facts. From this standpoint, nothing should be based on ideas generated on the basis of reflection. (Denzin & Lincoln 1994; Olkkonen 1994) Hermeneutic research, in contrast, emphasizes interpretations, meanings, and understanding (Olkkonen 1994). These are shaped by the prior understanding and prejudices of both the researcher and the subjects of the research (Denzin & Lincoln 1994). The differences between positivism and hermeneutic research can be viewed in terms of the repeatability of the research. According to positivism, research must be independent of the researcher and reproducible: with the same material and same methods, another researcher should end up with the same results. Hermeneutic research instead is characterized as research through understanding, and it cannot be guaranteed that other researchers will understand the issues similarly. This problem also affects verifiability between these two paradigms. (Olkkonen 1994)

Typical of positivistic research is a large body of empirical material, which often entails issues of superficiality and lack of in-depth understanding of the data. Typical topics of studies in positivistic research are easily structured subjects found across a wide group of occurrences. In hermeneutic research, the dataset is typically narrower and impossible to analyze statistically. In addition, usually representativeness is problematic. A positive side of the data in hermeneutic research is the possibility of in-depth orientation. Hence, the data can also yield surprising results. Typical subjects of hermeneutic research are new research areas, from which large corpora that could be analyzed statistically are not available. Because of the different nature of the results with these two paradigms, different possibilities are presented. The aim in positivistic research is to explain, whereas with the hermeneutic paradigm the goal is to understand

issues. Hence, a positivistic approach enables mainly descriptive results and a hermeneutic approach results that support understanding of the phenomenon. (Olkkonen 1994)

Another way to categorize research is to divide it into qualitative and quantitative research. The former is an array of interpretive practices (Denzin & Lincoln 1994). In simple terms, qualitative research means non-numeral description of the form of data and analysis (Eskola & Suoranta 1999). The core objective is to illustrate actual life itself. Inherent to this approach is the idea that reality is a manifold entity and unable to be broken into arbitrary pieces. Actions shape each other simultaneously, and there is a possibility of finding multiple, complex, and interlinked relationships. The aim, therefore, in qualitative research is to study the subject as comprehensively as possible. (Hirsjärvi et al. 2000) Denzin and Lincoln (1994) state that qualitative research applies an interpretive approach to the subject matter and that emphasis is placed on the socially constructed nature of reality. However, there is no research paradigm that can be said to be distinctive of qualitative research, though qualitative researchers often lean on hermeneutics. As does hermeneutic research, qualitative research emphasizes the close relationship between the researcher and the issue under study. Qualitative researchers emphasize the value-laden nature of the research. The aim is to seek answers to how social experience is created and given meaning. They recognize and wish to uncover the individual's bias and subjectivity, getting closer to the actors' perspectives. Their attention is directed to the specifics of particular cases. (Denzin & Lincoln 1994) Although the term "qualitative" is seen as "an umbrella term superior to the term paradigm" (Guba & Lincoln 1994), Guba and Lincoln take the position that "qualitative" should be used in description of types of methods. They justify this opinion with the statement that both quantitative and qualitative methods can be used with any research paradigm, and that, questions of methods are secondary to paradigm (Guba & Lincoln 1994).

In this study, it is recognized that researchers and sources of evidence (the data) alike are shaped by prior understanding and prejudices as to what constitutes reality, which influence the interpretations of the data and the meanings that are given. This study can be classified as hermeneutic research, because the aim is better understanding of the phenomenon of knowledge-sharing challenges in company growth through the interpretations the researcher draws from the meanings the subjects of the study have given to the research phenomenon. Reaching this aim requires qualitative data and analysis, and indeed the study is qualitative in nature. Qualitative data and analysis guarantee that the subjects' interpretations are revealed and that in-depth understanding of the complex phenomenon under study is gained. The size of the dataset of this study is not statistically significant. It is narrow but offers great depth, providing an opportunity to understand the phenomenon comprehensively. The research phenomenon also is quite new: the field of knowledge management has appeared only in recent

decades. It is still considered quite unevenly developed, and a need for empirical studies in particular is emphasized. All of these factors speak for the hermeneutic approach applied in this study.

Because there is an aim of understanding a specific phenomenon that is strongly context-bound, a case-study approach is suitable for this study. The case study is a research approach designed to ensure in-depth and holistic understanding of a research phenomenon that is strongly tied to its context (Stake 1994; Yin 1994). Because knowledge-sharing challenges in company growth in the context of the software business is a complex research subject, a qualitative case study was chosen as the research approach for this study.

With a case study, the aim is simultaneously to understand the phenomenon under study comprehensively and to develop more general theoretical arguments about the regularities of the phenomenon under study (Fidel 1992). Case studies are a typical source of hypotheses and thoughts. Case studies can also be used to test established understanding, theories, or concepts, and also to make comparisons that aid in challenging previous theories. A case study examines one or a few cases selected for a certain purpose. (Koskinen et al. 2005) Either a single-case-study design or a multiple-case-study design can be used (Yin 1994). For understanding of knowledge-sharing challenges in company growth in the software business, multiple cases were examined. Since the idea was to investigate whether the knowledge-sharing barriers vary between growth strategies, three cases, each representing one of the three growth strategies, were selected. This enabled us to explore the three growth strategies individually, but the most important element was the comparison of the growth strategies. The same questions were studied in three, quite different organizations, and conclusions were drawn from comparison between these cases (Ghauri & Grønhaug 2005). Clearly, the research reported upon here is a comparative case study (Ghauri & Grønhaug 2005). Applying this kind of approach enabled a more thorough picture of knowledge-sharing challenges in company growth generally. It is acknowledged that only one company represented each of the growth strategies, which makes generalizability challenging or even impossible. However, the choice of approach allowed the research resources to be directed to gaining of in-depth knowledge, instead of wide generalizability.

A case-study design is neither qualitative nor quantitative in itself. Case studies fit equally well into the two approaches with good results; the appropriate choice depends on the aim of the research. (Stake 1994) Since the aim of the present study is to gain understanding of a complex phenomenon that is strongly tied to its context, a qualitative case study was believed to be best for yielding in-depth understanding. As noted above, a case study is about the choice of object to be studied. However, the choice of a qualitative case study does guide the choices as to methods employed in the research. Next, these choices of methods are explained in more detail.

#### *1.4.2 Research methods for data collection and analysis*

Science can be seen as an action of systematic and rational acquisition of new knowledge. An aim of this action is to pursue and gain knowledge in a systematic and rational way. (Haaparanta & Niiniluoto 1995) A fundament of scientific research is that the reasoning of science must be based on a specific scientific technique – i.e., a research method approved by the scientific community (Haaparanta & Niiniluoto 1995; Puusa 2008). “Scientific research method” refers to a method that is objective, public, and self-reconstructive (Peirce 1877). According to Peirce, this means that, in the work, the characteristics of a research subject must remain independent of researcher opinions about them. He has also stated (Peirce 1877) that through reasoning the researcher can ascertain how things are, and that the ultimate conclusion will be the same no matter who does the research (as long as he or she has sufficient experience with the method). It is considered imperative that approved scientific methods be used in all academic research. Also, their correct and careful presentation is important. Hence, this section explains the methods of data collection and analysis, case by case. We start by presenting the cases, including justification of the choice of cases. This discussion is followed by description of the data-collection methods. The section concludes with presentation of methods for data analysis.

#### **Description of the cases**

The case companies were selected via purposeful sampling (Coyne 1997; Patton 1999; Patton 2005), since the primary objective in the selection of the case companies was to learn, not to aim for statistical generalizability (Stake 1995). The idea in purposeful sampling is to select cases that are information-rich and hence provide ground for in-depth research to illuminate the questions under study. From such cases one can learn “a great deal about issues of central importance to the purpose of the inquiry.” (Patton 2005) In the purposeful sampling of case companies, the chief aim was to meet the criterion of each of them representing a different one of the growth strategies under study. Another core criterion was the company operating in the software business. Next, each of the cases is presented in more detail.

#### *Case A – organic growth*

Case company A meets the criteria for selection for this study well. First, it operates in the software business, where it offers software systems to its organizational customers. Secondly, it represents a company that has expanded through organic growth. It has increased its sales by utilizing its internal resources. The company has constantly grown organically. Its business volume has increased well: both its sales and its personnel have grown strongly, and all of the firm’s growth has been financed with cash-flow financing. It has not made any acquisitions. Neither is it networking to support its growth.



More precisely, this case organization is a small software company operating in business-to-business markets. The services the company offers 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 work in teams. The teams are of quite consistent composition. Most team members share a similar educational background: they have or are studying for a master's degree in engineering. 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 so are close to each other in physical terms also.

#### *Case B – acquisitive growth*

For the purposes of this study, case company B is a good representative of a company that has grown through acquisitions. The company has made several acquisitions to support its growth. Through these acquisitions, it has been able to increase its sales. Naturally, also its personnel numbers have grown through the acquisitions.

The company is a large software firm operating in business-to-business trade by providing large and complex information and communication technology (ICT) systems for its organizational clients. The company has been engaged in rapid acquisitive growth for several years. The aim has been to create a “united” company from the acquiring firm and those acquired. The reality is, however, that the acquisitions have caused the company to become quite dispersed. The operations of the acquiring company have typically been based on working with separate teams/units. In addition, the company's operations are geographically dispersed across several sites. The result is a company with many, very different teams. These teams differ in the organization background, their technologies, and the products used, and they also have very different compositions. The physical distance between teams also is in many cases rather large.

Because the company had become dispersed on account of its several acquisitions, at the time of the study it was facing difficulties in flow of knowledge throughout the organization. One attempt to improve the knowledge sharing involved a company decision to move to a more productized — in fact, “componentized” — way of working. The intention with this was to improve knowledge sharing throughout the organization by improving cooperation between teams and reducing redundancy of information.

### *Case C – networked growth*

Filling the need for a representative in the category of networked growth, case company C was chosen as the third case company for the study. It too meets the criteria for inclusion as a case company in this study: It has aimed to grow through a networked way of operating. It is a medium-sized company strongly networked with three other software companies and many hardware companies so as to be able to offer a turnkey production-line solution for its customers. This turnkey solution represents innovative leveraging of the core business of the company in question and also offers a route to sales growth, and here such growth would not be possible without the partner network.

Furthermore, case company C meets the criterion of operating in the software business. The company is a software company operating in the industrial automation sector. The company acts in business-to-business markets, providing its organizational customers with a wide range of devices and larger automated production systems based on integration of software with hardware. The company represents the embedded-software business in the classic typology of software business models (Hoch et al. 1999; Cusumano 2004).

The case company had been working in collaboration with most of the partners in the network before the launch of the partner network itself. Hence, there were close dyadic relationships between the case company (or “focal company”) and the other partners. However, not all of the other partners had been working this closely together before. In consequence, there were differences in the depth of the relationships with respect to vertical vs. horizontal relationships in the network.

### **Collection of the data**

The body of data in this study is multifaceted. The core of the dataset is formed of interviews. The interviews were carried out in semi-structured form – more precisely, thematic interviews. The thematic interview is a semi-structured interview method wherein the subject matter and themes of the interviews are outlined beforehand (Eskola & Suoranta 1999; Hirsjärvi & Hurme 2004). The most fundamental element of interviews of this type is that, instead of detailed interview questions, the interview process relies on certain central themes (Hirsjärvi & Hurme 2004). The interviewer makes sure that all of the theme areas determined beforehand will be gone through with the interviewee, but the extent and order in which they are dealt with varies from interview to interview (Eskola & Suoranta 1999). This largely divorces the interview from researcher-imposed viewpoints and brings out the “voice” of the interviewees. The thematic interview acknowledges that the interpretations and the meanings they assign to subjects are central, and also that meanings are born in interaction. (Hirsjärvi & Hurme 2004) Hence, thematic interviews are typically discussion-oriented (see, for example, Ghauri & Grønhaug 2005).

Thematic interviews are termed semi-structured because one aspect of the interviews – that of their themes – is the same across all interviews yet the interviews are missing the precise form and order that is characteristic of a structured interview, without being totally free as an in-depth interview is. (Hirsjärvi & Hurme 2004) Semi-structured, thematic, interviews make it possible to ask the interviewees about the main themes of the research but also to add more detailed questions as required for obtaining genuine answers without “leading” the interviewee (Yin 1994). For this reason, it was quite natural to choose thematic interviews as the data-collection method, a method aimed at in-depth and comprehensive data on the research phenomenon. The interviews for this study followed broader themes outlined in advance, while the exact form and order in which they were dealt with varied from one interview to the next. Overall, the interviews were very interactive and conversational, and the discussion went “back and forth,” since the issues often were interlinked.

In every case, the interviewees were selected through purposeful sampling (Coyne 1997; Patton 1999; Patton 2005) with the aid of representatives of the case company. The aim was to guarantee interviewees possessing good knowledge of the phenomenon, providing reliable knowledge, and being interviewed voluntarily. Also, for provision of the most comprehensive and reliable picture of the phenomenon under study, personnel at different levels in the hierarchy were interviewed. The participants were interviewed individually. To strengthen the reliability of the answers, all interviewees were guaranteed anonymity. All of the interviews were recorded, and notes were taken during the interviews. The interviews were transcribed with detailed interview memos. Table 1, below, summarizes the interviews and other empirical data.

Table 1. The empirical data of the study.

Type of data	Purpose	Case A	Case B	Case C
Interviews	The core of the empirical material  To identify knowledge sharing barriers in different growth strategies as perceived by the interviewees	Management interview (2 × 1) - Interview of managing director - Thematic interview - Duration: 2 × 1 hour	Management and support (12) - Thematic interviews - Duration: 1.5–2 hours	Focal-company interviews (6) - Interviews with focal-company representatives - Thematic interviews - Duration: 1.5–2 hours
		Middle-management interviews (3) - Interview of one project manager - Interviews of two team leaders - Thematic interviews - Duration: 1–1.5 hours	Middle-management interviews (17) - Thematic interviews - Duration: 1.5–2 hours	Supplier interviews (3) - Interviews with certain of the focal company’s suppliers - Thematic interviews - Duration: 1.5–2 hours
		Operational-level interviews (3) - Interviews of three software developers - Thematic interviews - Duration: 1–1.5 hours	Operational-level interviews (13) - Thematic interviews - Duration: 1.5–2 hours	Customer interviews (5) - Interviews with customers of the network - Thematic interviews - Duration: 1.5–2 hours
		Time during which the interviews were done - 9/2001	Time during which the interviews were done - 3–5/2006 - 10–11/2006	Time during which the interviews were done - 10/2001–2/2002
Other, complementing, materials	To gain background information about the case companies	Case company annual reports, brochures, Web sites, etc.	Meetings (3) with company representatives, annual reports, etc.	Annual reports of the focal company and its suppliers and customers, various commercial and technical material, meetings (5) with the focal company’s representatives, etc.

In cases A and B, the interviewees were from the case companies. Because case C touched on networked growth in a more than passing manner, besides the

representatives of the case company, representatives of selected software suppliers and customers were interviewed, for provision of a comprehensive picture.

The interview data were complemented with written materials about the case companies. These included annual reports of the case companies, various commercial and technical materials, etc. In cases B and C, data were collected also through meetings with case-company representatives. The complementing data were used to provide background information on the cases.

### Methods of analysis

The aim of qualitative analysis of any datum is to clarify the phenomena under study and hence produce new knowledge about it. The analysis is aimed at capturing the essence of the data without losing the information they contain. The intention is to increase the value of the information by creating a clear and meaningful picture from scattered data. (Eskola & Suoranta 1999) According to Marshall and Rossman (1989), qualitative analysis is messy, ambiguous, time-consuming, creative, and fascinating as a process. It does not proceed in a linear fashion, and it is not “tidy” (Marshall & Rossman 1989). In a case study, data analysis is performed throughout the study (Fidel 1992). This study was no exception: already during the interviews, analysis took place at the researcher’s mental level. The analysis process in the three cases followed mainly the same pattern. A summary of the process is presented in Figure 2, below.

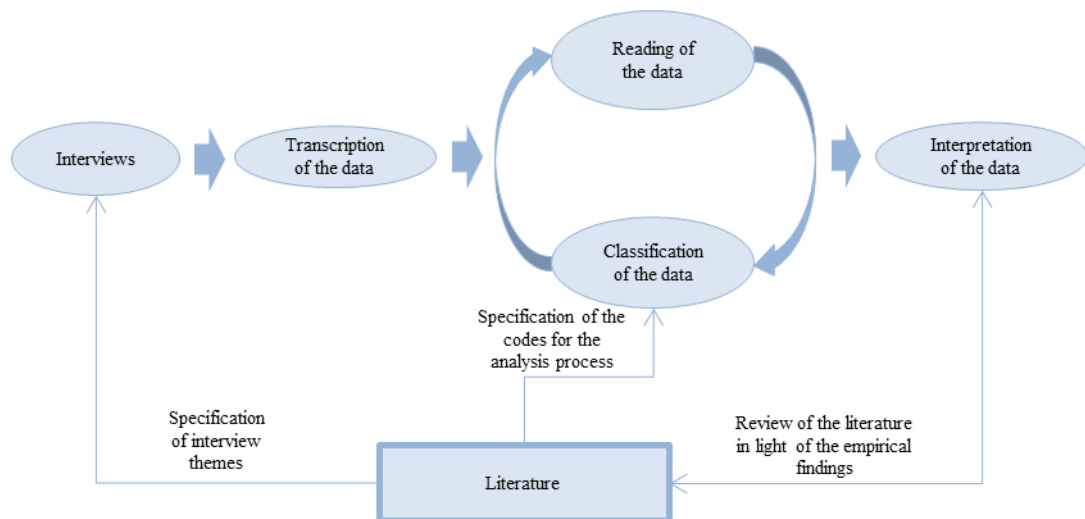


Figure 2. Summary of the analysis process.

The data were analyzed qualitatively. Cross-case analysis (Miles & Huberman 1994; Donaldson & Mohr 2000) was used in this study. For this reason, each of the cases – of organic, acquired, and networked growth – was first analyzed as its own entity (Miles & Huberman 1994; Donaldson & Mohr 2000). This stage of analysis, of individual cases, included the following main phases: reading of the data, key-word identification, thematization, and grouping (Alasuutari 1995; Eskola & Suoranta 1999). Analysis

commenced with reading through the data several times to obtain a sense of the whole and get familiar with the data. Then those sections of the dataset that are related in some sense to knowledge sharing were identified and labeled as interesting (Seidman 2006). The intention was to extract all the data that were somehow related to knowledge sharing. Only after this step was the material coded – or classified, as some scholars prefer to put it when speaking of qualitative research (see, for example, Dey 2005; Seidman 2006). One way to proceed with the analysis is to utilize existing theory for aid in classification of the data. For example the themes stemming from previous literature and used in the interviews can be utilized as a tool in classification of the data. (Eskola & Suoranta 1999) Indeed, themes rooted in previous literature were used as tools in data classification in this study. Classification categories identified in the literature were adopted, so codes such as “time,” “organizational culture,” and “technological tools” were utilized. The codes were selected to be “neutral” in tone, meaning here that they lacked a positive or negative charge assigned to an element supporting or preventing knowledge sharing. The aim was to be sensitive in addition to knowledge-sharing barriers arising from the data that were not identified in previous literature.

The ideas produced in this phase of the analysis were organized under the larger analytical categories of “individual-level barriers,” “organization-level barriers,” and “technological-level barriers.” Upon completion of this classification and categorization process, the researcher assessed whether the issues classified are related positively or negatively to knowledge sharing. That is, did the factors in question hinder knowledge sharing or promote it? After the interpretation phase, the results were compared with the typical knowledge-sharing barriers proposed in the literature. Accordingly, in essence, the analysis included winnowing and classification of the data, followed by synthesis and interpretation of the data (Hirsjärvi & Hurme 2004).

After understanding of the individual cases gained from the aforementioned analysis, the study moved on to comparative case analysis. In the latter analysis, each of the cases was compared with the others, to produce some idea of the similarities and differences in the knowledge-sharing barriers identified in the individual cases (Miles & Huberman 1994; Donaldson & Mohr 2000).

### 1.4.3 Summary

Above, in subsections 1.4.1 and 1.4.2, the research paradigm, research approach, and research methods of this study were discussed. These can be seen as basic issues that have made this study what it is. These create the research strategy for the study, which is presented in Figure 3, below.

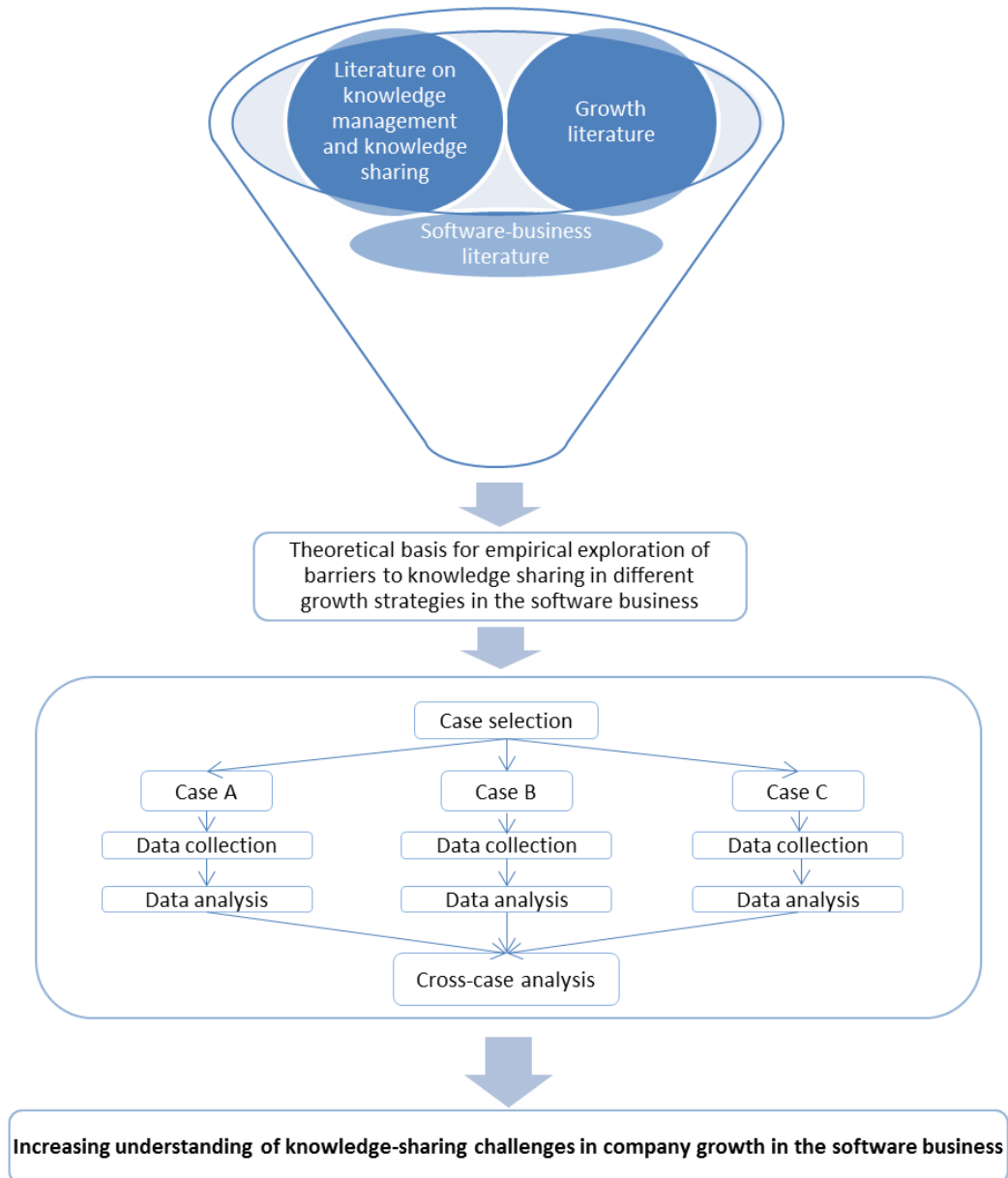


Figure 3. The research strategy of the study.

The purpose of the study was to increase understanding of knowledge-sharing challenges in company growth in the context of the software business. A hermeneutic perspective guided the study, and the research approach chosen for reaching this aim was a case-study approach. It was thought that such an approach should provide an in-depth view of the complex phenomenon under study.

Firstly, theoretical exploration of the research phenomenon was performed. This phase provided a theoretical basis for the empirical case study’s exploration of the challenges to knowledge sharing in company growth in the context of the software business. Existing streams of literature on knowledge management and, especially, knowledge-sharing barriers, on company growth, and on the software business were explored. This work was followed by three empirical case studies and then cross-case analysis. This thoroughly established research frame – with a theoretical foundation built first and then, after that, empirical exploration of the phenomenon in a specific context through the lens of this theoretical grounding – created an opportunity for this study to increase understanding of knowledge-sharing challenges in company growth in the software business.

The dissertation is made up of two parts, which are interrelated. The introductory part (Part I) is complemented with Part II, which consists of the original research publications produced in the course of the research. The structure of the dissertation is depicted in Figure 4, below.

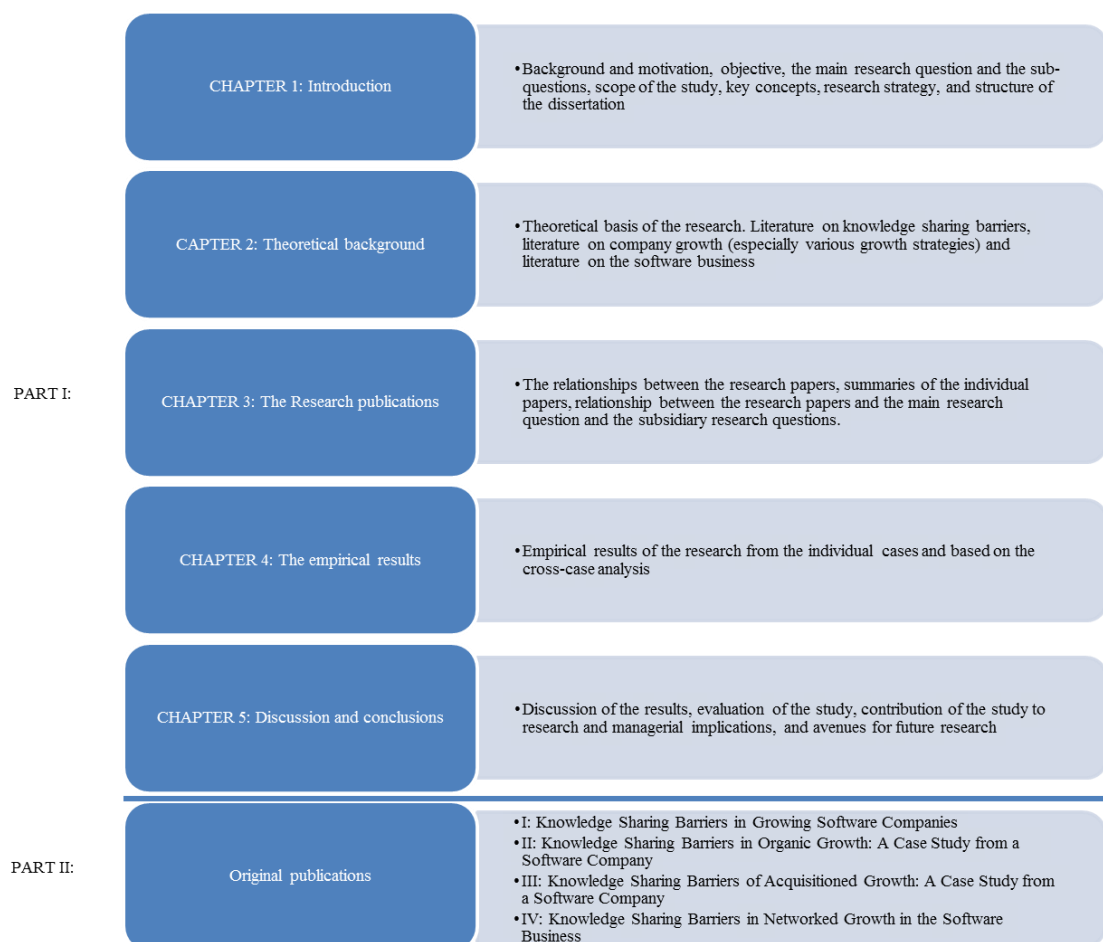


Figure 4. The structure of the dissertation.

In Part I, the present chapter has set the stage for the discussion and introduced the motivation for the study. The objective of the study has been explained and the research

questions introduced. Also, the scope and the limitations of the study have been contemplated, and the central concepts have been presented. The research strategy, including research paradigm, research approach, and methods of data collection and analysis, has been explained. Chapter 1 now concludes with this presentation of the structure of the dissertation.

In Chapter 2, the theoretical basis for the study is presented. It is grounded in literature on knowledge sharing and on barriers thereto, literature on company growth (especially various growth strategies), and literature on the software business. A summary of the original research publications forming part of the study is presented in Chapter 3. This is followed by presentation of the empirical results of the study, in Chapter 4. Finally, Part I concludes with Chapter 5, with its discussion and presentation of the conclusions from the study. Then, Part II presents the original research publications. These original publications are presented in their original form, as published.



## **2 THEORETICAL BACKGROUND**

This chapter presents the theoretical background of the study. Firstly the significance of knowledge for modern organizations is explained. Since knowledge management has been presented as a way to utilize knowledge resources in organizations, the history and the content of the concept are presented on a general level, for understanding of what it involves. After this, knowledge sharing and its role in knowledge management are addressed. Then follows a presentation of barriers to knowledge-sharing, which can be seen as the core of the study. This is followed by exploration of the other core area of this study: company growth and the different growth strategies a company might employ. To set the ground for analysis of the key knowledge-sharing barriers in each of those growth strategies, the various characteristics of these three growth strategies are contemplated. Because the aim of this research is to study the knowledge-sharing barriers of different growth strategies in the specific context of the software business, the last major section of the chapter discusses the characteristics of the software business. A summary of the theoretical background rounds out this chapter.

### **2.1 Knowledge as a source of competitive advantage**

The word “knowledge” has evoked many feelings over the centuries, at the very least since Plato, who declared that “knowledge is justified true belief,” and throughout history those people able to utilize knowledge the best have survived and succeeded (Stewart 1997). For example, in ages long past, soldiers who knew how to make weapons from iron conquered enemies armed with bronze weapons (Stewart 1997). Also, for many modern organizations, knowledge can be seen as the central resource and element for survival. Knowledge is considered to be the primary source of competitive advantage for modern companies in an environment wherein globalization is one factor that has made competition between companies fiercer (Stewart 1997; Brooking 1999; Teece 2000; Fleisher & Bensoussan 2002). There are characteristics of knowledge that distinguish it from other resources of a company. First of all, it is typical that knowledge accumulates over time and can be utilized without additional costs (Leonard-Barton 1995; Shapiro & Varian 1999). Knowledge does not deteriorate through use; instead, it evolves, and is dynamic (Prahalad & Hamel 1990; Leonard-Barton 1995; Nonaka et al. 2001). It can also be hard to grasp (von Krogh & Roos 1995). Therefore, a company with solid knowledge resources can separate itself from its competitors in a manner that is hard for competitors to copy. Hence, knowledge can be said to be an essential factor creating genuine competitive advantage for a company. (von Krogh & Roos 1996)

To get the most out of knowledge it should be designed, acquired, developed, and utilized well (Nordhaug 1994; Nonaka & Takeuchi 1995). For this, the management should be able to build physical, social, and resource-allocation structures that afford extensive utilization of knowledge (Teece 1998). However, definition, discovery, and maximal utilization of knowledge are often found to be difficult. Accordingly, many companies have a great many unused internal knowledge resources with which they could develop their competitiveness, if they only had the ability to learn and develop new combinations from these. (Ruohotie 1996; Ståhle & Grönroos 1999) Hence, a company should have the ability to maintain, develop, coordinate, and utilize its knowledge (Ruohotie 1996). Knowledge management has been presented as a way to utilize knowledge effectively throughout a company.

Although the most profound discussion about knowledge management goes back only three decades or so, the advent of knowledge management can be seen as being at least as early as at the late '60s and early '70s. In 1969, Zand (1969) discussed management of knowledge-based organizations. In 1976, Rickson (1976) used the term "knowledge management." However, Rickson approached the issue at a different level than today's knowledge management does. He took the stance that knowledge and learning developed within companies could be transferred to the level of society, so that the whole of society would develop (Rickson 1976). However, neither Zand's nor Rickson's ideas received much attention. The '80s brought a "new awakening" of knowledge management and can be seen as the beginning of the modern approach to knowledge management.

In the '80s, authors including Sveiby (see, for example, Sveiby & Risling 1987; Sveiby & Lloyd 1987), Wiig (see, for example, Wiig 1988), and Teece (see, for example, Teece 1982; Teece 1986) wrote about the importance of knowledge and its management to modern organizations. Hence, they can be seen as among the fathers of modern knowledge management. The discussion of knowledge management reached fever pitch in the mid-1990s, when a lot of attention and discussion centered on the thoughts of Grant and Spender (Grant 1996; Spender 1996); of Nonaka, Takeuchi, and Konno (see, for example, Nonaka & Takeuchi 1995; Nonaka & Konno 1998), and of von Krogh and Roos (see, for example, von Krogh & Roos 1995; von Krogh & Roos 1996), to mention a few important figures. Grant and Spender (see, for example, Grant 1996; Spender 1996) spoke about the knowledge-based view of the firm. Nonaka et al. (see, for example, Nonaka & Takeuchi 1995) focused especially on the creation of new knowledge within an organization. As for von Krogh and Roos (see, for example, von Krogh & Roos 1995; von Krogh & Roos 1996), other key works highlighted the meaning of knowledge at the level of strategic planning and also knowledge management between partners.

There has also been discussion about whether or not knowledge can even be managed. For example, Prusak (2000) was pessimistic about the possibility of managing

knowledge, because knowledge is invisible, intangible, and hard to measure. He has stated that problems also occur because we cannot fully know what is inside everybody's mind (Prusak 2000). Despite these comments, Prusak (2000) has stated that there are elements of knowledge that can be made visible and thus easier to manage. Nonaka and Takeuchi (1995) have taken a slightly different view of knowledge management, stating that any knowledge is manageable, be it visible or not. They define knowledge management as a dynamic process of knowledge transformation. (Nonaka & Takeuchi 1995) Also, according to Sarvary (1999), knowledge management is a process through which organizations create and utilize institutionalized and collective knowledge. According to him, knowledge management demands both good IT infrastructure and organizational infrastructure, which includes, among other things, organizational culture, a suitable incentive system, and organization-internal rules.

According to Marchand and Davenport (2000), knowledge management features conscious actions of sharing, increasing, and creating internal and external knowledge to maximize the performance of the organization. Harryson (2000) has emphasized the meaning of knowing "who knows." We can also recall Ainamo's (2001) statement that the aim of knowledge management is to move knowledge and experience of routines, habits, and traditions from the realm of the known to that of the novel and precious. Also, Wah (2000) has emphasized the meaning of sharing and reusing knowledge. She has stated that the main principle of knowledge management is to share knowledge and promote its reuse so that people will seek the best possible solution instead of "reinventing the wheel" (Wah 2000). It can be said in summary that effective utilization of existing knowledge is central in knowledge management, and sharing of knowledge creates a basis for it.

Matzler and colleagues (2005) have explored which management concepts will be of significant importance in the future. Behind strategic planning, ranked as number one, knowledge management was deemed important. They also stated that, while the importance of knowledge management is rarely denied, it seems to encounter significant difficulties in its implementation. (Matzler et al. 2005) Hence, it would be important to cultivate it so that it can become a usable method and also practitioners could get the most from it. In 2005, when the results of the study were published, Matzler et al. (2005) predicted that knowledge management is not going to survive the next five years if it is not supplemented with practical guidance. However, whatever its dependencies, knowledge management is still a relevant management concept. Despite the fact that knowledge management has been developing apace, there is much still to do. For example, it has been stated that there is not enough understanding of the challenges of knowledge sharing in particular (Peng & Heath 1996; de Man 2008; de Man et al. 2008; van Burg et al. 2008; Meriläinen & Halinen 2009). This is true, although the role of knowledge sharing has been regarded as a critical one in knowledge management (see, for example, Cross et al. 2000; Hislop 2005). For instance, Wang and Noe (2010) have

stated that “[t]he success of knowledge management initiatives depends on knowledge sharing.” Also, Paulin and Suneson (2012) have said that “[a] fundamental part in knowledge management is to spread and make knowledge accessible and usable within or between chosen organizations.” In addition, a holistic definition of knowledge management refers to the following four main activities: creating, sharing, protecting, and discarding knowledge (Ichijo & Nonaka 2007). Therefore, the importance of knowledge sharing in knowledge management is evident. Although there is multidisciplinary research into knowledge sharing and more is coming all the time, much remains to be studied in the field of knowledge sharing (Wang & Noe 2010). For example, failure to share knowledge efficiently is commonplace in many organizations (Babcock 2004; Wang & Noe 2010). Hence, the present study focuses on identification of key challenges of knowledge sharing in the specific context of company growth. We now examine knowledge sharing in greater depth, to create a foundation for more detailed contemplation of knowledge-sharing barriers.

## **2.2 Knowledge sharing**

Knowledge sharing is not an unambiguous or straightforward concept. Even the essential term in discussion of knowledge sharing, “knowledge,” has gained many, very different definitions. However, the terms “knowledge” and “information” are often used interchangeably in knowledge-sharing research, with some stating that there is not much practical benefit to distinguishing between these two terms in knowledge-sharing research (see, for example, Huber 1991; Bartol & Srivastava 2002; Wang & Noe 2010). This study takes that approach to the term “knowledge” – no distinction is drawn between knowledge and information – these are regarded more as interchangeable terms. “Knowledge” can also be seen as a kind of umbrella term covering knowledge and information, so it has been chosen as the term for use in this study. Knowledge is seen as information that is processed by individuals, and it includes ideas, facts, expertise, and judgments (see, for example, Alavi & Leidner 2001; Bartol & Srivastava 2002).

There are also different views, or definitions, of the term “knowledge sharing” itself. The term “knowledge transfer” is often applied in relation to it, and these two terms are sometimes used synonymously, with several sources considering them to have overlapping content (see, for example, King 2006; Paulin & Suneson 2012). However, often the difference between these two terms is linked to the issue of whether the application of communicated knowledge is taken into consideration in addition. Knowledge transfer is typically seen as a process of focused and objective-targeted communication of knowledge between individuals, so application of the communicated knowledge is regarded to be another part of knowledge transfer (King 2006; Wang & Noe 2010; Paulin & Suneson 2012). Knowledge sharing has typically been defined as exchange of knowledge, which may be focused or unfocused, and the application of

exchanged knowledge is not regarded to be a part of knowledge sharing (Majchrzak & Cooper 2004; King 2006; Wang & Noe 2010). Hence, knowledge transfer can be seen as a wider concept and knowledge sharing can be viewed as one part of knowledge transfer (Majchrzak & Cooper 2004; Wang & Noe 2010). This study too considers knowledge sharing to be a part of knowledge transfer. Knowledge sharing can be seen as a starting point for knowledge transfer – first knowledge has to be shared, and only after that is it possible for others to apply it. The focus of this study is on disseminating and exchanging knowledge, not on application of knowledge; after all, a choice was made to concentrate on this first step.

The aim of knowledge sharing is to complete tasks better, more quickly, and at less expense than in the absence of knowledge sharing (Christensen 2007; Hong et al. 2011). Hendriks (1999) has stated that knowledge sharing links the individual and organizational level: the level at which knowledge resides (individual level) and the one where knowledge attains its economic and competitive value (organizational level) are connected. Van den Hooff and Huysman (2009) have stated that knowledge sharing results from a natural motivation to share knowledge since the person sharing knowledge is socially embedded. However, it has to be taken into account that individuals need to be willing to seek and share knowledge. Sutton and Hargadon (1996) and Hargadon (1998) refer this as “an attitude of wisdom.” Although the management can support knowledge sharing by fostering and creating suitable conditions and environments in a cultural, structural, and technological sense (van den Hooff & Huysman 2009); physical, social, and resource-allocation structures should be created so that knowledge can be utilized extensively throughout the organization (Teece 1998). To avoid stagnation, also growing companies should accumulate and apply knowledge in the best possible way, thus making the knowledge sharing effective (von Krogh & Cusumano 2001). Since there are opportunities to increase the effectiveness of knowledge sharing through various supportive actions, it is important also to study the factors that typically inhibit knowledge sharing (Peng & Heath 1996; de Man 2008; de Man et al. 2008; van Burg et al. 2008; Meriläinen & Halinen 2009). By recognizing barriers to knowledge sharing, the management can steer its actions towards the elimination and prevention of these barriers. Hence, knowledge-sharing barriers are discussed in more detail below.

### **2.3 Knowledge-sharing barriers**

Challenges to knowledge sharing have been identified from many angles in previous research (see Table 2, below). For example, Haldin-Herrgard (2000) has studied which knowledge-sharing challenges stem from the tacit nature of knowledge. Cabrera and Cabrera (2003) have conducted a study of social dilemmas related to knowledge sharing. Riege (2005) has taken into consideration senior managers’ perspective on knowledge-sharing challenges. Lindsey (2006) has studied these challenges especially

from the communication standpoint, and Bradfield and Gao (2007) have studied knowledge-sharing challenges in the context of the new product development process in a multinational company. Christensen (2007) has explored knowledge-sharing challenges from the perspective of the need for identifying what type of knowledge is to be shared. Kimble, Grenier, and Goglio-Primard (2010) have studied the challenges of knowledge sharing between groups of professionals.

Table 2. Different angles and contexts for approaching knowledge-sharing challenges.

<i>Author(s)</i>	<i>Knowledge-sharing challenges' angle or context</i>
<i>Haldin-Herrgard (2000)</i>	The tacit nature of knowledge
<i>Cabrera and Cabrera (2003)</i>	Social dilemmas
<i>Riege (2005)</i>	The perspective of senior managers
<i>Lindsey (2006)</i>	The communication perspective
<i>Bradfield and Gao (2007)</i>	The context of the new product development process in a multinational company
<i>Christensen (2007)</i>	The type of knowledge
<i>Kimble, Greiner, and Goglio-Primard (2010)</i>	The context of groups of professionals

So, many angles can be explored when one studies knowledge-sharing challenges. Common to studies of this nature is that each has identified a different set of barriers to knowledge sharing. Riege (2005) has grouped knowledge-sharing barriers by level: the individual, organizational, and technological level. This categorization is typically used also for consideration of knowledge management as a whole (Maier 2002; Awad & Ghaziri 2004), and indeed this can be considered a useful typology for comprehension of knowledge-sharing barriers, because it encompasses all three integral elements of knowledge management: the level at which knowledge resides (the individual level), the level where knowledge obtains 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). Hence, this categorization has been chosen as a tool for analysis of knowledge-sharing barriers in this study. Next, the barriers are discussed in light of this categorization of knowledge-sharing barriers into individual-, organizational-, and technological-level barriers. Grouped under the individual level are issues of challenges to knowledge sharing that stem from individuals' actions or attitudes. Positioned at the organizational level are factors hindering or preventing knowledge sharing related to structures and operations that involve several individuals. In categorization of barriers as technological-level ones, the angle of approach was the use of technologies, not the technical details of individual technologies. First, we discuss knowledge-sharing barriers at the individual level, because this can be seen as a starting point for knowledge management and knowledge sharing since it is the level at which knowledge resides (Hendriks 1999).

### 2.3.1 Individual level

At the individual level, *lack of time* and *lack of trust* have often been presented as hindrances to knowledge sharing (see, for example, Haldin-Herrgard 2000; Awad & Ghaziri 2004; Hite 2005; Riege 2005; Christensen 2007; Hong et al. 2011). Time is needed for seeking and sharing knowledge. Additionally, internalization of knowledge typically requires a lot of time (Haldin-Herrgard 2000; Awad & Ghaziri 2004). Time and effort are also needed for building trust within the organization, which can be seen as a prerequisite for knowledge sharing (Lorenzoni & Lipparini 1999; Hite 2005). *Low awareness of the knowledge possessed and of its value* is another recognized knowledge-sharing barrier (Haldin-Herrgard 2000; Riege 2005; Christensen 2007; Hong et al. 2011; Lilleoere & Holme Hansen 2011; Vuori & Okkonen 2012). It is difficult to share knowledge if people are not aware of the knowledge available or are unaware of the full extent of their knowledge, let alone the value of that knowledge, as is often the case (Polanyi 1966; Haldin-Herrgard 2000; Riege 2005; Christensen 2007).

*Power* too is identified as a barrier to knowledge sharing at individual level (Galbraith 1977; Pfeffer & Salancik 1978; Riege 2005; Lilleoere & Holme Hansen 2011; Vuori & Okkonen 2012). It has been presented that, in particular, people with critical knowledge tend to become bottlenecks as they try to obtain power through sharing and (especially) withholding of knowledge (Thompson 1967). This can be seen as an issue quite closely tied to personal characteristics; for example, Cabrera and Cabrera (2003) have pointed out that whether maximal payoff from knowledge sharing is pursued depends on individuals, and it has also been said that if individuals do not see any personal benefits, any personal motivation, in knowledge sharing, they are typically reluctant to share knowledge (Cabrera & Cabrera 2003; Christensen 2007). Besides the motivation to share knowledge, there needs to exist a relationship between the sender and receiver of the knowledge (Christensen 2007). Accordingly, also *lack of social networks* has been presented as a knowledge-sharing barrier (Riege 2005; Lilleoere & Holme Hansen 2011; Sandhu et al. 2011).

Lastly, but not of least importance, *language problems* have been presented as a possible knowledge-sharing barrier (Haldin-Herrgard 2000; Christensen 2007; Hong et al. 2011). Language as a knowledge-sharing barrier may have two sides: can the person holding knowledge express him- or herself in words, and is there a common language between knowledge sender and receiver (Haldin-Herrgard 2000; Dalkir 2005; Christensen 2007)? Many people find it hard to put into words something that seems natural and obvious to them (Haldin-Herrgard 2000). It is also possible that if both novices and experts, or members of different occupational or specialist groups are put to work together, they might not understand each other, since they may lack a common language, on account of lack of shared experiences (Nonaka & Takeuchi 1995; Haldin-Herrgard 2000; Awad & Ghaziri 2004; Christensen 2007).

The individual-level knowledge-sharing barriers discussed above are presented in the Figure 5, below.

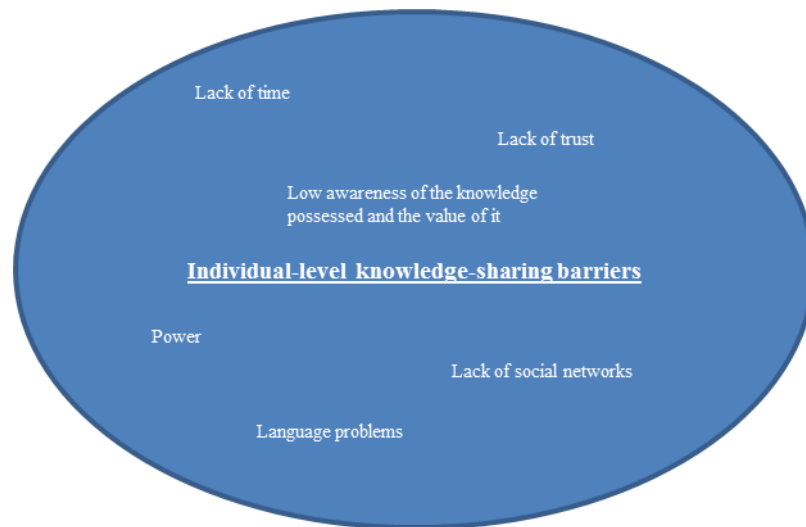


Figure 5. Individual-level knowledge-sharing barriers.

From the discussion above, the individual-level knowledge-sharing barriers can be summarized as lack of time, lack of trust, low awareness of the knowledge possessed and of its value, power issues, lack of social networks, and language-related problems. We next discuss the organization-level knowledge-sharing barriers, to get a picture of the barriers on the level where knowledge gains its economic and competitive value (Hendriks 1999).

### 2.3.2 Organizational level

At organizational level, *a poor organizational culture and climate for knowledge sharing* has been presented as a knowledge-sharing barrier. Poor organizational culture in this respect can be seen if a company tries to adjust its organizational culture to knowledge-sharing plans instead of fitting those plans to the organization's existing culture. (Riege 2005; Ichijo & Nonaka 2007; Lilleoere & Holme Hansen 2011; Sandhu et al. 2011) Poor organizational culture and knowledge-sharing climate extend to the general prevailing attitude towards knowledge sharing (Brooking 1999). Organizational culture and the climate for knowledge sharing can be deemed poor if there is no "attitude of wisdom" – that is, if the people involved do not have willingness to seek and share knowledge (Sutton & Hargadon 1996; Hargadon 1998). Poor organizational culture can be regarded as a critical issue related to knowledge sharing, because it can create other knowledge-sharing barriers. It can cause, for example, *lack or exiguity of network connections*. Lack of network connections has been cited as a knowledge-sharing barrier (Riege 2005). People tend to continue working as they have been working, and if there is little impetus to create new network connections, new knowledge may be unattainable (Cohen & Levinthal 1990; Hansen 1999; Hansen et al. 1999;



Haldin-Herrgard 2000; Vermeulen & Barkema 2001; Riege 2005). This has been judged to obtain regardless of the aim of “new” networks born of organizational knowledge-management initiatives; people tend to use the existing networks (Dalkir 2005). However, if there is a lack or exiguity of network connections, it is more difficult to map potential and rich knowledge inside the organization (Hansen 1999; Hansen et al. 1999). *Complexity of the organization* is one factor that can make it harder for network connections to appear. Hence, organizational complexity has been presented as a barrier to knowledge sharing (Hansen 1999; Hansen et al. 1999; Riege 2005). Because of complexities, routes to knowledge may become blurred.

Also, *distance* has been presented as a knowledge-sharing barrier (Haldin-Herrgard 2000; Riege 2005; Hong et al. 2011; Lilleoere & Holme Hansen 2011). Greater size and number of business sites have been concluded to increase distances. As for distance, it makes sharing of knowledge through the face-to-face channel harder in particular. (Haldin-Herrgard 2000; Hong et al. 2011) Infrastructures should be such that they support knowledge regardless of distances, yet *lack of infrastructure for sharing of knowledge* has been cited as a typical knowledge-sharing barrier (Chatterjee et al. 1992; Vermeulen & Barkema 2001; Riege 2005). Building a proper infrastructure is often found to be challenging and time-consuming, and it often requires a lot of effort and resources (Vermeulen & Barkema 2001; McKelvie et al. 2006; Lockett et al. 2011). Problems may occur also if a need for infrastructural changes goes unnoticed.

*Competitiveness* between or within units may also emerge as a barrier to knowledge sharing; it has been stated that a competitive internal work environment may lead to worries about personal vulnerability – people may not wish to reveal the secrets of their competitive edge by sharing knowledge (Cabrera & Cabrera 2003). Competitiveness, and through it willingness to engage in knowledge sharing, is often related to organizational culture and also to the existence of network connections (see, for example, Brooking 1999; Riege 2005). Some factors that may support an appropriate organizational culture for knowledge sharing are integration of the purpose of the knowledge-sharing with the organizational goals and good managerial communication about the benefits of knowledge sharing (Das & Teng 1997; Riege 2005; Sandhu et al. 2011). Nonetheless, it has been stated that there exist both *dis-integration of the knowledge-sharing purpose with the organizational goals* and *neglect for managerial communication about the benefits of knowledge sharing*, which cause challenges to knowledge sharing (Riege 2005; Sandhu et al. 2011). One tool managers may use to support communication about the benefits of knowledge sharing is provision of rewards for knowledge sharing. Indeed, it has been suggested that *lack of a reward system for knowledge sharing* hinders knowledge sharing (Riege 2005).

The key organizational-level knowledge-sharing barriers discussed above are depicted in Figure 6, below.



Figure 6. Organizational-level knowledge-sharing barriers.

Proceeding from the discussion above, one can summarize the organizational-level knowledge-sharing barriers as a poor organizational culture, lack or exiguity of network connections, complexity of the organization, distance, lack of proper infrastructure, competitiveness, poor integration of the purpose of knowledge sharing with the organizational goals, lack of managerial communication about the benefits of knowledge sharing, and lack of a reward or incentive system for knowledge sharing. We now discuss technological-level knowledge-sharing barriers so that also the level that provides integral tools for knowledge sharing is taken into consideration (Maier 2002).

### 2.3.3 Technological level

Although previous literature has shown that technology can support knowledge sharing (see, for example, Maier 2002; Hislop 2005; Debowski 2006), knowledge-sharing barriers can be identified also at technological level (see, for example, Maier 2002; Riege 2005; Watts Perotti et al. 2010). Some of the technological-level barriers can be seen as linked to barriers at the other levels. For example, *reluctance to use the chosen technologies or lack of aptitude for them* has been presented as one technological-level barrier (Riege 2005; Ardichvili 2008; Santos et al. 2012). However, it is also a personality-related issue, and hence linked to individual level. Dalkir (2005) has stated that much of the use of technological solutions depends on individuals' willingness, and that "however much you invest in high-tech knowledge banks, employees in search of an answer tend to make their first port of call the folks they know from the water cooler" (Dalkir 2005). Hence, people are often conditioned to do things in the ways they have become used to doing them, and they may be reluctant to use new technologies (Cohen & Levinthal 1990; Miller 1994; Vermeulen & Barkema 2001; Ardichvili 2008).

In this case, it would be extremely important to make sure that the individuals in question are trained to use the technologies, yet *lack of training* too is reported to arise as a barrier to knowledge-sharing at technological level (Riege 2005). There is also a danger that employees are *not given enough time to get acquainted with and to use the technologies*, and indeed time sometimes is a knowledge-sharing barrier at technological level. Time can be a barrier also from the perspective of the technologies being too time-consuming to use. (Cabrera & Cabrera 2003)

One means by which the barrier of reluctance to use technologies could be addressed is to guarantee that the chosen technologies are suitable and compatible. However, this has not manifested itself in the reality of many cases. Hence, also *unsuitable or incompatible technology* has been identified as a technological-level knowledge-sharing barrier (Maier 2002; Riege 2005; Sandhu et al. 2011; Santos et al. 2012). It is quite natural that an unsuitable or incompatible technology inspires no sense of utility for knowledge sharing and reluctance to use the technology increases. Accordingly, it should be ensured that the technology chosen meets the demands of the organization.

Also presented as an individual-level-related knowledge-sharing barriers at technological level are *unrealistic expectations for the technology* (Riege 2005). This can be seen as related to another knowledge-sharing barrier at technology level: *lack of communication about the benefits of the technologies* (Ardichvili 2008; Sandhu et al. 2011). If the possibilities and benefits of knowledge-sharing technologies are not communicated properly, it is quite natural that unrealistic expectations may be raised with respect to what can be done with the chosen technologies. The technological-level knowledge-sharing barriers discussed above are presented in Figure 7, below.

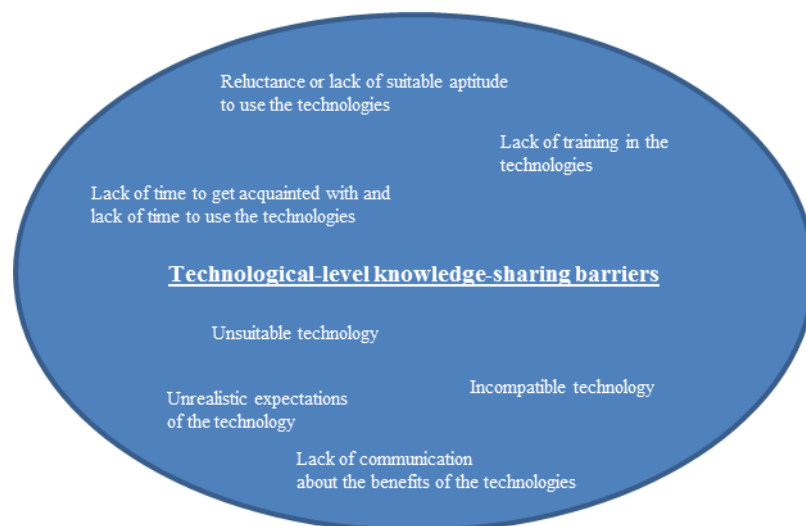


Figure 7. Technological-level knowledge-sharing barriers.

The technological-level knowledge-sharing barriers can be summarized as reluctance to use the technologies or lack of aptitude for doing so, lack of training in the technologies, lack of time to get acquainted with and actually use them, unsuitable technology,

incompatible technology, unrealistic expectations of the technology, and lack of communication about the benefits of the technologies. In the next section, company growth and the growth strategies are discussed in more detail, creating a foundation for analysis of the knowledge-sharing barriers in the specific phenomena associated with company growth.

## **2.4 Company growth**

Studies of company growth are heterogeneous in nature, and many indicators have been proposed for identification of a growth company (Delmar et al. 2003). These include the change in earnings per share, shareholder value, assets, employment, sales, profits, physical output, market share, and other factors (see, for example, Delmar 1997 and Ardishvili et al. 1998 according to Delmar et al. 2003; Ala-Mutka 2007). For each of these indicators, one can find justification but also drawbacks. However, the best of these for inspection of different growth strategies is growth of sales, a metric that can be seen a good measure of growth. It will also tell about the increase in networked growth, which, for example, growth in personnel numbers would not in the case of networked growth. During networked growth, sales may grow dramatically while the number of personnel does not change. Increase in sales as a growth indicator does not function well for networked companies, in which context the concept of personnel might be hard to define. (Ala-Mutka 2007) Another justification for increase in sales as the chosen indicator of growth is its place among the most fundamental measuring instruments of business (there is always an exchange of money involved) (Delmar et al. 2003; Ala-Mutka 2007). It has been stated also that if only one metric for growth is to be chosen, this is the one to be preferred (Hoy et al. 1992 and Ardishvili et al. 1998 according to Delmar et al. 2003). For the aforementioned reasons, it makes sense to use sales as the indicator of growth in this study.

There are multiple reasons for which growth is considered something to which to aspire. Typically, companies' growth generates both employment and well-being (Elinkeinoelämän keskusliitto 2006), so the growth of companies is commendable from the viewpoint of the individual company but also from that of the national economy. From the angle of the company, growth is desired also because some see growth as "glamorous," with growth having been regarded as both a sign of success and a requirement for remaining successful. Growth is often considered to be a way of seeking success, profitability, and greater competitiveness (Elinkeinoelämän keskusliitto 2006). It has also been stated that a growing company can offer better career opportunities, with higher personal rewards, which make a growing company more attractive also in the eyes of current and potential employees (Goold 1999).

Penrose's work is still considered the most comprehensive theory of growth to date (Lockett et al. 2011). In her work in the '60s, she studied organic and acquisitive growth

(Penrose 1995). These are still the most commonplace and well-known growth strategies (see, for example, Penrose 1995; Lockett et al. 2011). However, networked growth has shown itself to be a relevant and suitable growth strategy for many modern companies (see, for example, Peng & Heath 1996; Tyrväinen & Mazhelis 2009). Next, these three, quite different growth strategies are presented more thoroughly.

#### *2.4.1 Organic growth*

When referring to organic growth, Penrose (1995) means growth that is generated within the company through utilization of unused productive services, resources, and special knowledge in the company. Hence, a question arises of internal generation of resources, for example, through hiring and training of new personnel (Lockett et al. 2011). Lockett and colleagues (2011) have said that there is always some resource slack in companies, which offers an opportunity for the company to grow organically by exploiting new market opportunities. Hirvikorpi and Swanljung (2008) define organic growth as natural growth of sales and staffing that is occasioned by an increase in sales of services or products. Hence, a firm that is growing organically will typically recruit new personnel (Järvenpää & Länsiluoto 2008). Storbacka (2005) adds that organic growth is growth that is achieved without purchasing of existing business outside the company.

For many companies, organic growth involves a natural, typical, and conscious decision to grow. Also, many investors appreciate organic growth since it typically does not result in extra costs. (Penrose 1995; Hoch et al. 1999) Organic growth is often a recommended growth strategy especially for smaller and newer firms (Penrose 1995; Delmar et al. 2003; McKelvie et al. 2006). Organic growth has also been described as most probably generating a smoother growth pattern over time than is available to firms that have grown mainly through acquisitions (Penrose 1995) Hence, in organic growth, there is no need for the sudden and dramatic changes often observed when growth comes about via acquisitions (Collins & Porras 2005). Collins and Porras (2005) agree that organic growth is the most controlled way to grow but also typically the slowest.

Naturally, there are both positive and negative sides to organic growth. One positive factor is that existing knowledge is typically widely and deeply understood within the organization (Karim & Mitchell 2004), making it available for utilization during growth. As a firm grows organically, it will also probably increase its headcount (Järvenpää & Länsiluoto 2008), thereby accumulating knowledge resources (Lockett et al. 2011). This, in principle, increases the potential for new knowledge combinations, though those new combinations have to fit the requirements of the business before they can generate growth (Lockett et al. 2011). Regardless of these considerations, organizations tend to hire people whose competencies are similar to those of existing personnel and who match the existing culture (O'Reilly & Chatman 1986; Penrose 1995; Lockett et al. 2011). Hence, there is a danger that, on account of repeated

replication, the company's knowledge base narrows, its organization becomes increasingly simple (Penrose 1995; Vermeulen & Barkema 2001; Lockett et al. 2011), and the development of too similar resources hinders the development of new unique resources (Lockett et al. 2011). Thus, new opportunities may not emerge. Hence, a company wanting to continue its growth will also 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). It has been stated that in organic growth there is a problem of myopia and path-dependence and, therefore, the possibility of limited learning in areas other than those that are already well known (Cohen & Levinthal 1990; Lockett et al. 2011). So contemporary organically growing companies have been finding it difficult to extend their operations to new areas and thus meet one prerequisite for continuation of the growth (Lockett et al. 2011).

Generating organic growth is no easy task. Managers need to have the ability to see the potential for growth. Managers will be required to spot growth potential while focusing on operations tasks and employing recruitment and delegation tactics to deal with some other management tasks. Hence, the managerial ability to steer internal resources and processes efficiently for maintaining a successful growth path is required. (Penrose 1995) The typical characteristics of organic growth described above can be summarized as in Table 3, below.

Table 3. The typical characteristics of organic growth.

	<i>Organic growth</i>
<i>Typical characteristics</i>	Use of internal, unused productive services, resources, and special knowledge within the company to generate growth
	Recruitment of new employees, typically with similar competencies
	A reasonable growth strategy, especially for smaller and newer firms
	A smooth but a rather slow way to grow: no need for sudden and dramatic changes
	Existing knowledge being widely and deeply understood inside the company
	A danger that, because of repeated replication, a company's knowledge base narrows and the organization becomes increasingly simple
	Internal managerial abilities, which are crucial

As has already been stated, companies have a tendency to make the best use of the old resources (March 1991). This naturally leads to homogenization of knowledge. One way to prevent this is to bring outsiders into the company. (Lockett et al. 2011) Acquisitions can be seen as one way to bring outsiders in, to reshape the company's resource and knowledge base, which may lead to heterogenization of knowledge (Ireland et al. 2001). Next, acquisitive growth is presented with greater precision.

### *2.4.2 Acquisitive growth*

Acquisitive growth is the other of the two basic growth strategies alongside organic growth (Penrose 1995; Vermeulen & Barkema 2001). By acquisitive growth we refer to growth that is generated through acquisition of an existing company, of external resources (Penrose 1995; Vermeulen & Barkema 2001; Chui 2011). Hence, in acquisitions lies a possibility for fast access to new knowledge and resources (Harrison et al. 1991; Vermeulen & Barkema 2001).

There are various reasons for acquisition. Some companies buy production capacity or competence, some buy interesting products, or a “bundle” of resources may be acquired (Barney 1986; Stewart 2001; Laukkanen 2007). Some attempt to gain rapid entry to markets / new fields, and sometimes acquisition is done to buy a competitor out of markets (Stewart 2001; Laukkanen 2007). Another reason for acquisition may be to create a stronger and more competitive entity from two separate actors in the pursuit of greater market power (Vermeulen & Barkema 2001; Laukkanen 2007). Also, overcoming barriers to entry may be a reason for acquisition. In addition, acquisitions often revitalize the acquiring company and enhance its long-term survival by adding to its ability to react to changing circumstances. (Vermeulen & Barkema 2001) Acquisitive growth has been presented as a growth strategy without the problems associated with path-dependence, with which organic growth is often burdened, and a growth strategy allowing a possibility of broadening the knowledge base and thus creating new synergies (Lockett et al. 2011).

Acquisitions simultaneously bring a company new personnel, new products and services, new processes, etc. This typically leads to large-scale growth of resources and knowledge, which also often increases the diversity and reshapes the resource and knowledge base (Ireland et al. 2001; Lockett et al. 2011). Thus, also new non-path-dependent resources are typically absorbed (Lockett et al. 2011). This creates possibilities for new resource combinations and synergies (Lockett et al. 2011), which also may result in the rigidities and routines of the company being broken down (Harrison et al. 1991; Vermeulen & Barkema 2001). Hence, there is fruitful ground for birth of new knowledge (Kogut & Zander 1992). New knowledge and new combinations, on the other hand, enhance the new growth opportunities (Lockett et al. 2011).

Acquisition typically involves major change, and that brings its own challenges. In the wake of acquisition, there might be, for example, different structures, different processes, and different cultures in place (Chatterjee et al. 1992). This creates many challenges, since the management must try to bring everything together in a single, united company. Hence, acquisitions demand great effort and resources for integration of the acquired company into the acquiring company (Vermeulen & Barkema 2001), especially since acquisitive growth is more typical of larger companies than of small ones (McKelvie et al. 2006). With acquisition-based growth, there also typically is a

bigger need for capital and management resources than with organic growth (McKelvie et al. 2006). For one thing, managers ought to have a good understanding of the nature of the resources of their firm and those of the acquired firm (Lockett et al. 2009). Hence, acquisitions pose a great challenge for managers, who must devote time and attention to integrating the acquired company with the acquiring company (Vermeulen & Barkema 2001; Lockett et al. 2011). This is not an easy task. In fact, despite high expectations, acquisitions often are associated with implementation problems and unsatisfactory post-acquisition performance. These issues are often caused by the differences between the companies involved (Vermeulen & Barkema 2001; Chui 2011; Junni 2011), which may lie, for example, in organizational culture, structures, systems, and management styles (Chatterjee et al. 1992). Indeed, “culture clashes” and tensions are quite typical in acquisitions (Haspeslagh & Jemison 1991). These may lead to problems and unsatisfactory performance (Vermeulen & Barkema 2001). However, the differences may also lead to enrichment of the knowledge base, learning, and breaking down of company rigidities and routines (Harrison et al. 1991; Vermeulen & Barkema 2001). However, the differences should not be so large as to prevent synergies, learning, and value creation (Harrison et al. 1991; Vermeulen & Barkema 2001), since these may render new combinations and possibilities nonexistent (Lockett et al. 2011). Instead, there should be some resource synergies (Harrison et al. 1991). The typical characteristics of acquisitive growth described above are summarized in Table 4, below.

Table 4. The typical characteristics of acquisitive growth.

	<i>Acquisitive growth</i>
<i>Typical characteristics</i>	A major change and challenge in a company
	Fast access to new knowledge and resources (personnel, products and services, processes, etc.) and enrichment of the knowledge base
	Differences between the companies involved: appearance of different structures, processes, cultures, systems, management styles, etc., with a danger of clashes and tensions
	Need for a good deal of effort and resources to integrate the companies and need for capital and also time and attention from managers
	An approach more typical of larger than smaller companies

Acquisitions has been presented as one way to bring outsiders into the company to reshape the company’s resource and knowledge base and so avoid the utilization of only the old resources. Networking can be seen as bringing the same positive angle. Networking can provide the resources required to fortify growth, but at the same time it can mitigate the bureaucratic costs related to the internalizing or even merging of operations that is typical of acquisitive growth (Penrose 1995; Peng & Heath 1996). Networked growth is now presented in more detail.



### *2.4.3 Networked growth*

Networking can be seen as a third growth strategy (see, for example, Pfeffer & Salancik 1978; Jarillo 1988; Jarillo 1989; Powell 1990; Peng & Heath 1996; Johannisson 2000; Grandori & Cacciatori 2009), alongside organic and acquisitive growth. Networked growth can be described as relationships with other companies for access to new resources and creation of new resources to generate company growth (Lechner & Dowling 2003). Networked growth can be seen as a way to gain new knowledge without acquisitions (Lockett et al. 2011): the idea is to utilize the resources of the network partners without the need for (often expensive) bringing of partners' operations in-house, to create opportunities for growth (Penrose 1995; Peng & Heath 1996).

Networking can support growth from several angles (Doz & Hamel 1998). With networking, companies typically seek reduction of uncertainty, fast access to knowledge, reliability, and responsiveness (Powell 1990; Ståhle & Grönroos 1999). Networking allows a company to get more resources and complement its competencies, concentrate on its core competencies, and become able to learn new things and acquire new competencies (Doz & Hamel 1998). Networking can also create new strategic possibilities and adaptability (Jarillo 1988; Forrest 1990). In the most fruitful networking circumstances, the partners' strategic goals converge, but at the same time their competitive goals diverge (Lorange & Roos 1991). This can be seen to support the growth of the partners the best.

A network is formed of inter-organization relationships (Easton 1992) that are long-term, close, and deep (Jarillo 1988). Mutual interest, interdependence, reciprocity, common values, and flexibility among network partners are typical characteristics of networking (Jarillo 1988; Jarillo 1989; Easton 1992). Also typical is mutual planning of business processes, although the operations of partners do not become internal (Johannisson 2000). The behavior required of each partner should be expressed explicitly, and clear communication of the rules of commitment is needed (Das & Teng 1997). Hence, management attention and efforts form a prerequisite for this growth strategy too. Just as much, complementary resources and skills, compatible objectives, and trust between partners are needed (Brouthers et al. 1995). The strengths of one partner should offset the weaknesses of another, and vice versa (Lynch 1990; Carlile 2004).

A network approach takes into consideration relationships between actors (Håkansson & Snehota 1989), and typically networks are stable but not static (Easton 1992). Given the relationships between actors in the network, evolutionary changes are more the norm than radical changes. The interdependencies among the organizations typically affect the structure of the network: the greater the interdependence of the organizations, the clearer the structure of the network. There may be "tight" networks, featuring many bonds between the actors and well-defined roles and functions, and "loose" networks

characterized by the opposite features. (Easton 1992) The typical characteristics of networked growth described above can be summarized as in Table 5, below.

Table 5. The typical characteristics of networked growth.

	<i>Networked growth</i>
<i>Typical characteristics</i>	Utilization of the resources of network partners without the operations of the network partners becoming internal
	Long-term, close, and deep relationships
	Mutual interest, interdependence, reciprocity, common values, and flexibility among network partners
	Mutual planning of business processes
	Need for managerial attention and efforts
	Complementary resources and skills, compatible objectives, and trust among network partners
	A stable but not static networks
	Evolution over time, and evolutionary changes
	A clearer network structure accompanying greater interdependence of the organizations
	An especially recommendable strategy for new firms

Networked growth can be viewed as especially recommendable for new firms (Grandori & Cacciatori 2009). Networked growth also is suited especially well to knowledge-intensive businesses wherein the business environment requires quick adoption of new knowledge (Powell 1990). Therefore, networked growth can be regarded as a potential growth strategy for companies operating in the software business. It is to the software-business context that we now turn.

## 2.5 The software business

As stated above, the software business is characterized as a knowledge-intensive industry (Hoch et al. 1999; Rajala et al. 2001; Rajala et al. 2008). In this environment, the roles of knowledge and innovativeness are regarded as especially critical if one is to stay competitive and safeguard one's potential to grow (Hoch et al. 1999; Dayasindhu 2002). This requires that employees be competent and have a high level of professional knowledge and that they be independent and creative (Bettencourt et al. 2002; Løwendahl 2005; Miles 2005). Abstractness is another characteristic that is typically connected to the software business. The software development and production processes, and also the results of the process (software and programs), are often abstract (Hoch et al. 1999). This typically emphasizes the importance of intellectual property rights.

The software business is one of the most rapidly growing fields of industry. Many software companies demonstrate a continuous aspiration for growth, and rapid growth of software companies has become a typical feature of the business (Hoch et al. 1999; Hecker 2005; Lacey & Wright 2009), with another typical feature being rapid job growth. In fact, job growth in this field has clearly exceeded the average growth rate of jobs in many other areas of business. (Hecker 2005; Lacey & Wright 2009) The fast growth has had an effect on the sizes of the companies in the field. The software business has largely been occupied by a multitude of small or medium-sized companies, but the overall growth of the business has also led to considerable emergence of larger companies in this field (Fayad et al. 2000). The growth of the software business is one factor that reflects the significance of this business to the modern economy: the software business has a substantial role in driving and supporting today's economy which has led to the potential for growth (Hoch et al. 1999). Even though the whole industry has displayed strong growth, there also is a problem, in that many software firms never find the path of growth (Miettinen et al. 2010).

Fast growth has also been one of the factors leading to keen competition and turbulence in the business (Suomalainen et al. 2011). It has been stated that, especially in highly competitive environments, it is very challenging for a firm to possess all the resources needed to compete effectively, including knowledge (Pfeffer & Salancik 1978; Dyer & Singh 1998). For example, cultivating and maintaining the ability to recruit competent people has not always been an easy task for software companies (Ghosh & Geetika 2007). Also typical in this business is continuous and rapid change (Hoch et al. 1999). Hence, also short technology life cycles are often seen in the software business. The continuous and rapid changes in the software business and the importance of innovativeness underline the importance of utilization of knowledge resources (Torrise 1998; Rajala et al. 2008).

Standardization is yet another characteristic often referred to in discussion of the software business (Messerschmitt & Szyperski 2000; Helander 2004). Standardization is considered one way to support the development of the field, and in some cases even an essential enabler. Standardization encourages both competition and specialization of the industry. (Messerschmitt & Szyperski 2000)

The typical characteristics of the software business can be summarized as in Table 6, below.

Table 6. The typical characteristics of the software business.

	<i>The software business</i>
<i>Typical characteristics</i>	Highly knowledge-intensive industry
	Need for innovativeness
	Competent, independent, and creative employees with a high level of professional knowledge
	Abstractness of development and production processes and of results of the processes: software and programs, along with importance of IPRs
	A rapidly growing branch of industry with rapid job growth
	An area that has largely been occupied by a multitude of small or medium-sized companies, but nowadays also considerable emergence of larger companies
	Keen competition and turbulence
	Challenges in recruitment of competent people
	Continuous and rapid changes, and short technology life cycles
	Standardization

Next, in the final section of the chapter, a summary of the theoretical background of the study is presented. The purpose of the individual theoretical parts of the study and the relationships between them are reviewed.

## 2.6 Summary of the theoretical background

The study started with clarification of the research phenomenon in terms of the relevant theory. The analysis this entails, based on previous literature on knowledge-sharing barriers, special characteristics of the various growth strategies, and characteristics of the software business, created a solid theoretical basis for the study. This is depicted in Figure 8, below.

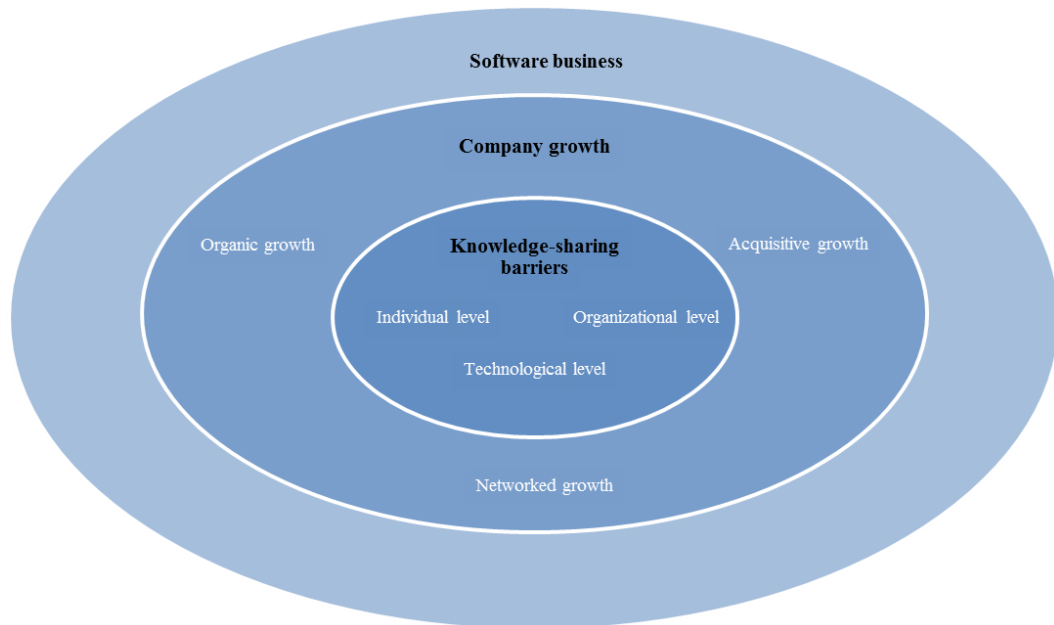


Figure 8. The theoretical basis for the study.

The discussion above has shown that many issues pose a challenge to knowledge-sharing in organizations. The literature has identified diverse barriers to knowledge-sharing. The barriers can be presented by categorization among the individual, organizational, and technological level, as described above. This grouping was considered to be good because it encompasses all three integral elements of knowledge management: the level where knowledge resides (the individual level), the level at which knowledge attains its economic and competitive value (the organizational level), and the level that provides integral tools for knowledge sharing (the technological level). This categorization was also found to be a useful tool for more ready apprehension of the whole.

To understand the key knowledge-sharing barriers in the specific context of company growth, we explored the literature on growth. Stemming from previous literature, three distinct growth strategies (organic growth, acquisitive growth, and networked growth) were contemplated, for these were found to be relevant growth strategies for modern companies. The special characteristics of each of the growth strategies were identified. This work created a basis for understanding the phenomenon of company growth more deeply. Also, because the software business was chosen as the research context of this

study, literature on that field was explored, and thereby the characteristics that make the software business a special context were identified.

### 3 THE RESEARCH PUBLICATIONS

This chapter presents the research papers that form part of the study and their relationship to the main research question and the subsidiary research questions. Firstly, the relationships between the research papers are presented, along with summaries of the individual papers. Then, the relationship between the papers and the sub-questions is presented, to show how these contributed to answering the main research question.

Answers to the main research question and the subsidiary questions were sought in a process that involved first contemplating the phenomenon under study theoretically. Then, examination of the phenomenon in three, different empirical cases provided a further basis for cross-case analysis of knowledge-sharing barriers of the distinct growth strategies in the software business. The results from the theoretical phase and from the three cases have been published in the form of four research papers (see Figure 9).

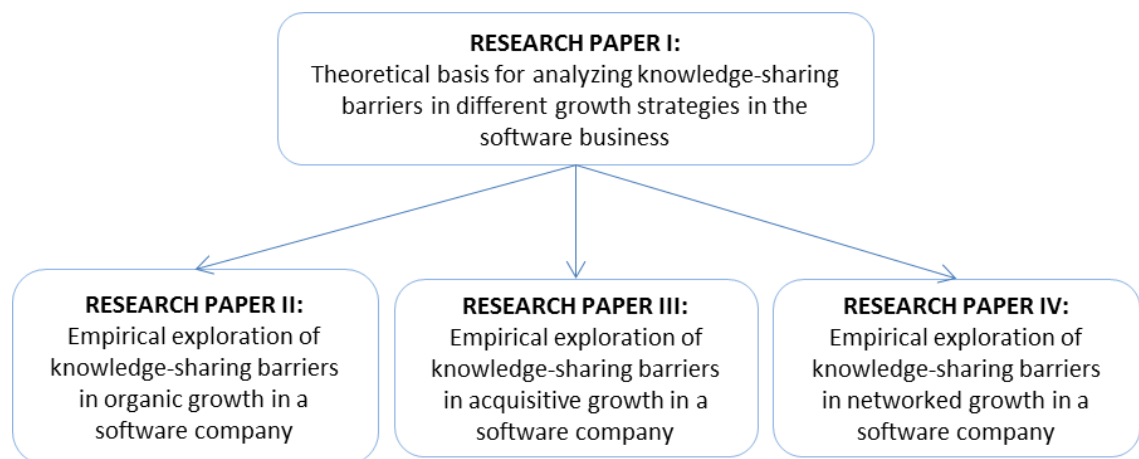


Figure 9. The relationships between the research papers.

Next, summaries of each of these individual research papers are presented, with the research paper that provided a theoretical basis for the study (Research Paper I) addressed first, then the research papers presenting the empirical exploration of the research phenomenon (research papers II, III, and IV).

#### **RESEARCH PAPER I:**

##### **Knowledge Sharing Barriers in Growing Software Companies**

Kukko, M. & Helander, N. 2012

*Proceedings of the 45th Annual Hawaii International Conference on System Sciences HICSS*, January 4–7, 2012; Grand Wailea, HI, USA; pp. 3756–3765

The first research paper is theoretical in nature. This paper constitutes an attempt to consider the challenging phenomenon of knowledge-sharing barriers and company growth strategies in combination in the context of the software business. The aim of the

paper was to identify the key challenges in knowledge sharing faced on different growth paths. This identification is based on analysis of previous literature. The role of this paper is to create a theoretical basis for empirical exploration of knowledge-sharing barriers across growth contexts. The paper starts with presentation of the special characteristics of the software business, specifying the context for the study. Then, the types of growth strategies are considered, following a review of knowledge sharing and barriers related to it. After this, the key barriers to knowledge sharing in each of the distinct growth strategies are presented on the basis of analysis and synthesis of previous literature.

The author's role in this paper was, in collaboration with the co-author, to design the study and write the paper. The main emphasis of the author's work was on the themes of organic and acquisitive growth (here termed acquisitioned growth) and on knowledge sharing and the barriers to it.

### **RESEARCH PAPER II:**

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

Kukko, M. 2013

*International Journal of High Technology Management Research*, vol. 24, no. 1, pp. 18–29

The second research paper is empirical in nature. This paper carries on where the first theoretical, paper left off. It presents an empirical case study examining the key knowledge-sharing barriers with organic growth in the context of the software business. The paper starts by presenting the special characteristics of the software business and organic growth, to create a basis for the study in this specific context. Then, the knowledge-sharing barriers are reflected upon in this specific context, through analysis at a theoretical level. After this, the research methods and the case organization are presented. The selected case company represents well an organic growth company in the software business: a growing firm in the field of software architecture consultation and software system delivery. It had been increasing its sales through cash-flow financing, without any acquisitions or networking. The introduction of the case company is followed by empirical identification of the key knowledge-sharing barriers in organic growth of a software company. The author is the sole author of this paper.

### **RESEARCH PAPER III:**

#### **Knowledge Sharing Barriers of Acquisitioned Growth: A Case Study from a Software Company**

Kukko, M. 2013

*International Journal of Engineering Business Management*, vol. 5, no. 8, pp. 1–12

The third paper is an empirical one. This paper too is a continuation from the first, theoretical paper. This paper presents an empirical case study examining the key



barriers to knowledge sharing in acquisition-based growth in the context of the software business. The structure of the paper largely follows the structure of Research Paper II. Firstly, the special characteristics of the software business and the specific growth strategy considered, here termed acquisition-based growth, are presented. The aim in this is to create a basis for the next part of the research paper: the theoretical analysis of the key knowledge-sharing barriers in this specific context. Then the methodological choices of this study and the case organization are presented. The case company meets the criterion of a software company that has grown through acquisitions well. This company, which aimed to achieve sales growth through several acquisitions, is a software company selling large and complex ICT systems in business-to-business markets. From the presentation of the case company, the research paper moves on to empirically based identification of the key knowledge-sharing barriers in acquisition-based growth of a software company. The author is the sole author of this paper.

#### **RESEARCH PAPER IV:**

##### **Knowledge Sharing Barriers in Networked Growth in the Software Business**

Kukko, M. & Helander, N. 2013

*The International Journal of Business Competition and Growth*, vol. 3, no. 2, pp. 105-120

The fourth research paper too is empirical in nature. As the second and the third research paper do, this research paper continues on from the work of the first, theoretical paper. This paper presents an empirical case study examining the key knowledge-sharing barriers in networked growth in the context of the software business. In the main, the structure of this paper follows that of the first two empirical research papers (Research Paper II and Research Paper III). Firstly, the special characteristics of the software business and networking are presented. The purpose is to create a basis for the next part of the research paper, theoretical analysis of the key knowledge-sharing barriers in this specific context. Then, the research methods and the case organization of this study are presented. That the case company had chosen a networked way of doing business to increase its sales renders it a good example of a company engaged in networked growth, and also the condition of operating in the software business is met: the company operates in business-to-business markets in the industrial-automation sector, selling a wide range of devices and larger automated production systems based on the integration of software with hardware. The presentation of the case company is followed by empirical identification of the key knowledge-sharing barriers in networked growth of a software company.

The role of the author in this paper was as follows. The author designed the study with the co-author and wrote the paper in collaboration with the co-author. The main emphasis of the author's work was on identification of the knowledge barriers, theoretically and empirically.

Each of the research papers has a specific role in the dissertation project’s search for answers to the subsidiary research questions and, through these, the main research question. The relationships between the research papers, the sub-questions, and the main research question are presented in Figure 10, below.

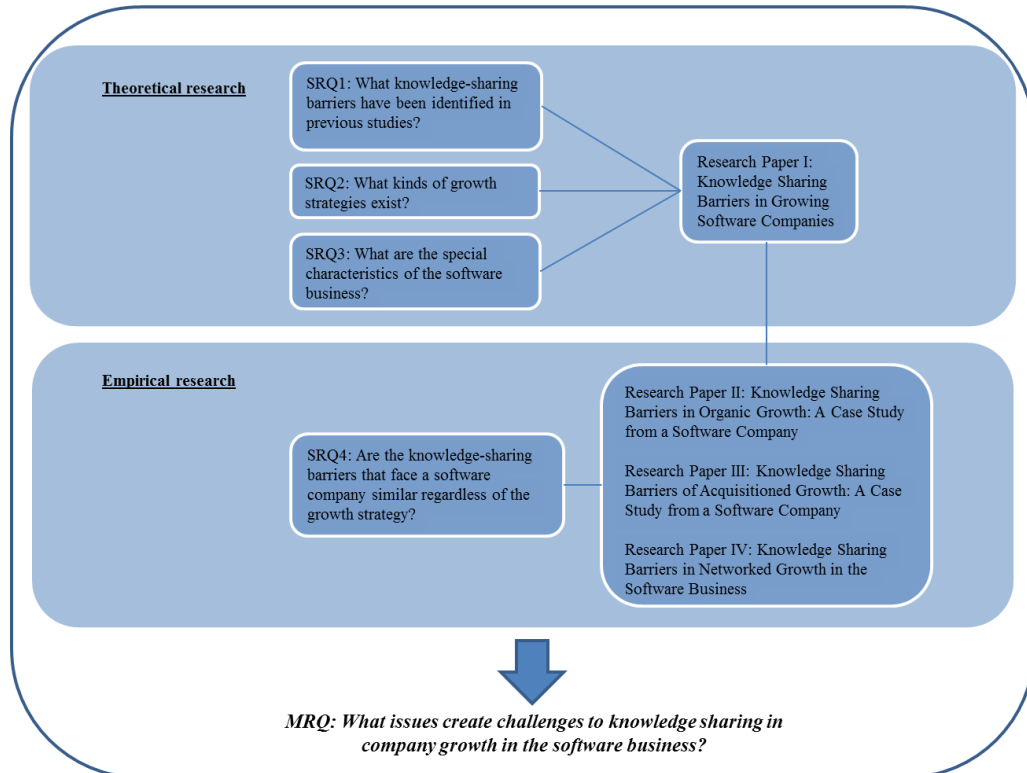


Figure 10. The relationships between the research papers, the subsidiary research questions, and the main research question.

Through the theoretical research paper (Research Paper I), the first sub-question – *What knowledge-sharing barriers have been identified in previous studies?* – was answered, as was the second sub-question (*What kinds of growth strategies exist?*) and also the third (*What are the special characteristics of the software business?*). This was done via discussion of the knowledge-sharing barriers, the distinct growth strategies, and the software business on the basis of previous literature. In this paper, the theoretical basis for empirical exploration of knowledge-sharing barriers in company growth in the context of the software business was established.

After the theoretical part of the study, the work moved on to the empirical phase, in which an answer to the fourth subsidiary research question was sought through the three empirical cases. For cross-case analysis aimed at revealing the answer to the fourth sub-question, firstly each of the cases was studied individually. The empirical explorations of each individual case are presented in research papers II, III, and IV. These individual studies enabled comparison of key knowledge-sharing barriers across growth strategies and indeed produced an answer to the empirical sub-question “*Are the knowledge-sharing barriers that face a software company similar regardless of the*

*growth strategy?*” The entity formed of the theoretical and empirical research and answering of the four sub-questions through these provided a foundation for analysis of the answer to the main research question of this dissertation: *What issues create challenges to knowledge sharing in company growth in the software business?* This is discussed in Chapter 4.

## 4 THE EMPIRICAL RESULTS

This chapter summarizes the empirical results of the study. The first material presented covers the key knowledge-sharing barriers in each of the cases – organic growth, acquisitive growth, and networked growth. After this, the chapter concludes with the cross-case analysis of the differences and similarities with respect to the key knowledge-sharing barriers of these three growth strategies.

### 4.1 Unfamiliarity of colleagues as one of the key issues posing challenges to knowledge-sharing in organic growth

The case company representing organic growth in the software business was a firm that had increased its sales through use of internal resources, without any acquisitions or networking. It had financed its growth with cash-flow financing and had also increased its personnel numbers through recruitment. In this company, which, as noted above, was selling software architecture consultation and various software systems to business customers, both the management and the employees had recognized a need for knowledge sharing company-wide. Nonetheless, the firm was facing challenges in knowledge sharing. Recognized barriers were hindering or even preventing efficient sharing of knowledge.

At individual level, firstly *lack of time* was evident as a knowledge-sharing barrier. During growth, the employees' work load seemed to be so great that they did not find enough time to seek or share knowledge throughout the company. Instead, they focused on performing their daily tasks with the knowledge they possessed on their own, or, at most, with the knowledge their close colleagues possessed. The employees also felt that they did not have time to learn new things. This lack of time to seek and share knowledge company-wide led to another problem: the employees were *not aware of the knowledge of others or the value of others' knowledge*. These problems were especially typical between members of different teams and between new and old employees.

Another knowledge-sharing barrier that was more evident between people on separate teams and between old and new employees was *lack of trust*. These people were less familiar with each other, so trust was fairly low between them. There were suspicions about the quality of the knowledge held by people who were not so familiar. There was also the issue that these persons *were not able to build new social networks with each other*. Knowledge sharing was based only on old routines and habits – usage of primarily the old social networks in sharing and seeking of knowledge.

At organizational level, the behavior of the management seemed to be one fundamental origin of deterioration in knowledge sharing. Although members of the management highlighted the importance of knowledge sharing, their own activities became a

knowledge-sharing barrier. In practice, knowledge sharing was not a well-formed and well-organized process, because *the management had not been able to connect the purpose of knowledge sharing and the company's goals*. The management level had also *neglected the communication of the meaning and benefits of knowledge sharing*. Hence, the “big picture” of knowledge sharing was not etched into the employees' minds. The management also *gradually reduced the company's recognition of knowledge sharing*, and, in consequence, employees were demotivated from sharing knowledge. All of the aforementioned factors seemed to weaken *the organizational culture with regard to knowledge sharing*, for the employees were thinking that it is enough simply to perform their daily tasks with the knowledge available inside their own team.

The company's growth *increased the complexity* of the company. Also, the physical *distances grew*. These changes made it harder to compass all the valuable knowledge inside the company that could be used. One reason for this was time-related challenges created by the growing complexity and distances – more complex structure and longer distances demanded more time to find the right knowledge and to know where knowledge may be needed. Increasing complexity and distances were, further, factors leading to appearance of *lack of network connections*. The new and old employees found it harder to meet each other, as did different teams, and hence they were unable to create new network connections.

At technological level, no major issues became apparent as knowledge-sharing barriers. One reason for this may be that new technologies were not introduced in the company. However, it cannot be said that knowledge sharing was wholly unproblematic from the technological angle. Although the employees described themselves as familiar with the existing documentation system, they were not totally content with it. They said that as the amount of information increased in the existing system, the system became laborious and time-consuming to use, and that this trend was not changing. Hence, there arose a question of *unusability* of the system. This led to the dilemma that, although the system was found to be useful and important, it was *too time-consuming* to use.

Hence, *unusability* and *time* seemed to be the only elements making knowledge-sharing problematic with respect to technological questions in the company. However, since no new technologies were introduced, one cannot say what the situation would have been if new technologies had been introduced. The situation may well not have been so simple.

The key knowledge-sharing barriers identified in the case of organic growth in the software business are listed in Table 7, below. In keeping with the chosen system of categorization, these are grouped into individual level, organizational level, and technological level. This should not obscure the fact that, as the discussion above makes clear, many of these barriers in organic growth in the software business are interlinked.

Table 7. The key barriers to knowledge sharing in organic growth identified from the case.

<i>Organic growth</i>	
<i>Individual level</i>	Lack of time
	Low awareness of the knowledge possessed and the value of it
	Lack of trust
	Lack of social networks
<i>Organizational level</i>	Poor integration of the purpose of the knowledge sharing with the organizational goals
	Lack of managerial communication about the benefits of knowledge sharing
	A poor organizational culture of knowledge sharing
	Lack of a reward system for knowledge sharing
	Complexity of the organization
	Distance
	Lack or exiguity of network connections
<i>Technological level</i>	Unusable technology
	Lack of time to get acquainted with and lack of time to use the technologies

#### **4.2 Complexity of the growing company as a key factor leading to knowledge-sharing challenges in acquisitive growth**

The company representing a case of growth through acquisitions had increased its sales through several acquisitions in its field of business: selling large and complex ICT systems to business clients. In the case of acquisitive growth too, knowledge sharing throughout the organization, crossing internal boundaries, was seen as important, even vital. The company had introduced componentized software production and development as one way to make knowledge sharing throughout the organization easier. However, as in organic growth, many knowledge-sharing barriers appeared.

At individual level, time challenges were seen in relation to knowledge sharing. Componentization was deemed too time-consuming a way to share knowledge throughout the company. While componentization required more time, especially in the beginning, because of the requirement of universal applicability of components, more

time resources were not allocated to employees. Hence, *lack of time* was found to be a knowledge-sharing barrier. Knowledge-sharing challenges also arose from weak or even nonexistent relationships between members of different teams (typically formed on the basis of the company structure pre-dating the acquisitions). Therefore, *social networks among employees formerly from different companies were nonexistent* and, in consequence, the employees were *unaware of the knowledge possessed by members of other teams*. Being unaware of the knowledge of other teams, the employees, naturally, *were not aware of the value of the knowledge of the members of the other teams either*.

Individual employees also pondered the benefits of sharing knowledge throughout the firm from the angle of their standing in the company. However, they were considering this issue not directly from their personal perspective but from the point of view of their team. They were pondering what the team's standing within the company would be if they were to devote time and resources to something that would make the work of other teams easier while not yielding any financial benefits or recognition for their own team. Hence, sharing of knowledge throughout the company can be seen as a *power tool*.

At the organizational level in acquisitive growth, it was acknowledged that knowledge-sharing throughout the growth company would be needed and componentization could be one way to bring it about. Despite this common understanding, *the management had not been able to communicate all the benefits of knowledge sharing, and especially the connection between knowledge sharing and the company's strategic goals*. Hence, some even saw company-wide knowledge sharing as irrelevant for their job, and at the same time there was some lack of clarity of the roles and responsibilities. Alongside the overall growth of the company and its attendant growing *distances*, this had made the company *more complex* and led to challenges in knowledge sharing. This was the case especially between teams that had their origins in different companies.

Growth in complexity and distances was quite natural, given the large-scale growth involved. These also seemed to be among the reasons new organization-wide network connections did not appear. It was seen as easier to rely on network connections with roots in history, respecting old company boundaries. However, the *lack of organization-wide network connections* was creating knowledge-sharing challenges, since knowledge of all parts of the company was not gained through the old network connections.

The history of the acquired companies also affected the knowledge-sharing culture and attitude of the whole company after acquisitions. With ex-competitors now being part of the company, some *competitiveness* and *lack of a common knowledge-sharing culture and attitude* were seen. These hindered knowledge sharing especially between the teams, because these were mainly based on the structures of the old companies. It was thought that some kind of reward system would have encouraged the employees to share knowledge throughout the company despite the competition, yet there was *no reward system*, which can be seen as playing a part in the scarcity of knowledge sharing.

At technological level, the clearest knowledge-sharing barrier seemed to be the issue of *incompatible technology*. Many, disparate technologies were in use in the various acquired companies, which were not compatible with each other. This made knowledge sharing challenging and even impossible throughout the company. To overcome this problem, a decision on common technologies was made. However, the sense was that the knowledge-sharing challenges originating from incompatible technology would remain relevant regardless. This was because the needs of all the teams could not be met with common technologies. Teams' use of multiple technologies stemmed from long-term client relationships and technical customer requirements rooted in these. Components created via the common technology could not be universal enough for compatibility with all the technologies that had to be used and supported because of the long-term customer relationships and the associated customer requirements. Thus, in practice, there was no possibility of moving to one technology choice throughout the company.

With regard to the technological level, it was stated also that the *management had not communicated enough about the preferred technologies*. This sowed seeds of doubt about knowledge sharing and diminished it. This poor communication had also led to some unawareness as to the training, time, and effort the employees should put into the technologies. Some thought that not enough time had been allocated to training, and some were concerned that it might be assumed that the employees would get acquainted with the new technologies on their own time. Still, it was stated that if the need for training had been brought up, time and resources for it would have been allocated.



The aforementioned key knowledge-sharing barriers in acquisitive growth in the software business are listed in Table 8. This listing too uses the categories of individual, organizational level, and technological level, following the analysis framework; however, from the foregoing presentation of the key knowledge-sharing barriers in acquisitive growth, it can be seen that many of the barriers were interlinked, with one leading to another.

Table 8. The key knowledge-sharing barriers in acquisitive growth identified from the case.

<i>Acquisitive growth</i>	
<i>Individual level</i>	Lack of time
	Lack of social networks
	Low awareness of the knowledge possessed and the value of it
	Power
<i>Organizational level</i>	Lack of managerial communication about the benefits of knowledge sharing
	Poor integration of the purpose of the knowledge sharing with the organizational goals
	Distance
	Complexity of the organization
	Lack or exiguity of network connections
	Competitiveness
	A poor organizational culture of knowledge sharing
	Lack of a reward system for knowledge sharing
<i>Technological level</i>	Incompatible technology
	Lack of communication about the benefits of the technologies

### **4.3 The network partners' independence, among the key factors leading to knowledge-sharing challenges in networked growth**

The case company was operating in the software business, in the industrial automation sector. It was selling its organizational customers a wide range of devices and larger automated production systems based on the integration of software with hardware. This was done by means of networking. The case company had been able to increase its sales through networking with three other software companies and many hardware companies. Open knowledge sharing in the network of partners was seen as a prerequisite for efficient operation of the network. Vertical network partners shared a common history before the launch of the partner network proper. On horizontal level, the partners did not share a common history. They were new to each other. The case of

networked growth too manifested elements hindering or even preventing knowledge sharing.

At individual level, there was the *challenge related to trust on horizontal level* in the network. Although there was trust between partners vertically, on the horizontal level (between the various suppliers) there was no shared history, nor were there personal relationships that would have supported the creation of trust. Instead there was lack of trust between suppliers. This posed a challenge to knowledge sharing. This also led to a problem with *being aware of the knowledge of the partner firms' personnel*. Hence, there were also *challenges in awareness of the value of said personnel's knowledge*. It seemed that the challenge of being aware of the partners' knowledge and its value was also at least at some level a result of *time challenges* arising from networking. As a consequence of networking, haste increased, leading to challenges in finding time to search for knowledge and seek it throughout the network. These challenges had been particularly relevant in the early stages of the networking.

*Power* relationships were also producing knowledge-sharing problems at the time of the study. Instead of sharing and seeking knowledge, some individuals or groups of personnel were using their standing to work only with their existing knowledge, undermining knowledge sharing and its felt importance. Despite some of these power games, social networks were seen as important in knowledge sharing. Yet there were *problems in creation of new social networks*. Among the reasons seen for this were changes in organizational composition such as frequent change of project managers and the largeness of the customer organizations. Customers were seen as one source of another knowledge-sharing barrier also, *language problems*, with salespersons being another cause of the language problems that led to deterioration of knowledge sharing. It was evident that these groups did not have enough expertise to understand the software argot well enough, nor did they perceive the software automation system as a whole – they lacked a common language, and knowledge-sharing challenges resulted.

At organizational level, managerial communication was seen as a cause for knowledge-sharing challenges. *Management communication about the benefits of knowledge sharing appeared flawed*. Also, *concern about the level and honesty of managerial communication rose, leading to challenges in the flow of knowledge and greater lack of clarity as to the organization's direction*. In addition, the management had not been able to communicate about the roles of the actors in the network, and this led to the routes to knowledge being somewhat obscured. One reason for this seemed to be the *complexity* of the network. The level at which decisions should have been made was not clear (and, in fact, they were made at many levels), and there was opaqueness and even confusion in relation to the responsibilities. All this complexity led, for example, to knowledge sharing that was piecemeal.

The network partners continued working on their own premises, which made for long physical *distances*. Distance was seen as a clear reason for knowledge sharing becoming complex – for example, communication chains become over-extended. Accordingly, it was also harder to be aware of all the knowledge needs of the network partners. An *infrastructural challenge* that arose was the issue of there not being enough systematic procedures for compilation and sharing of knowledge in the network.

Since several organizations were joined together to work in cooperation, there were also some technological issues related to knowledge sharing. At the technological level, relevant knowledge-sharing challenges were seen that stemmed from *incompatible technologies*. The partners had differing technological backgrounds and hence differing technological solutions. Because of the difference in background, there were challenges in finding common technologies between partners. Also, common technological solutions were not clearly agreed upon, with results including difficulties in finding common interfaces. These challenges rendered it quite difficult to share knowledge among the partners.

Another technology-related knowledge-sharing barrier was that there was *not enough time* to get acquainted with all the technological solutions. Regardless of the networking and the benefits pursued through it, no more time had emerged for employees: they were at least as busy as before, without more time to learn about those of the partners' technologies that were somewhat unfamiliar to them.

The key knowledge-sharing barriers in networked growth in the software business are listed in Table 9, below. Barriers again are listed in the categories of individual level, organizational level, and technological level, because the analysis applied this categorization. Nonetheless, one must remember that also in the case of networked growth interlinking of the key knowledge-sharing barriers was seen.

Table 9. The key barriers to knowledge sharing in networked growth identified from the case.

<i>Networked growth</i>	
<i>Individual level</i>	Lack of trust
	Low awareness of the knowledge possessed and the value of it
	Lack of time
	Power
	Lack of social networks
	Language problems
<i>Organizational level</i>	Lack of managerial communication about the benefits of knowledge sharing
	Poor integration of the purpose of the knowledge sharing with the organizational goals
	Complexity of the organization
	Distance
	Lack of proper infrastructure
<i>Technological level</i>	Incompatible technology
	Lack of time to get acquainted with and lack of time to use the technologies

#### **4.4 Three root causes of knowledge-sharing challenges in company growth**

All the case companies of the study were operating in the software business. They all were providing their services and products to organizational customers; that is, they were working in business-to-business markets. The companies were striving for growth and had indeed generated growth. However, the case companies were employing different growth strategies. Case company A had chosen organic growth as its growth strategy, company B opted for an acquisitive growth strategy, and case company C was striving for growth through networking. Through organic growth, the relatively small company A had increased its sales along with its personnel numbers. The increase in sales was gained without acquisition of any other companies or use of networking. New personnel had been recruited. No major changes had been made to the processes of the company.

In contrast to case company A, company B was a large firm that had made several acquisitions. It had been able to increase its sales and number of personnel through these acquisitions. Because it had expanded its staff mainly through acquisitions, the growth in personnel numbers had been sudden and large. This necessitated some alterations to the processes of the company, componentization being one example. Finally, unlike the other two case companies, company C was a medium-sized player applying networked growth strategy. It was increasing its sales by offering its customers broader solutions than before through the aid of a networked way of operating. This networking required some common agreement among the partners, but, for example, no personnel of the partners were acquired by the case company and all of the partners were operating as individual organizations.

Comparison of the apparent knowledge-sharing barriers in these three, quite different cases – again, representing organic growth, acquisitive growth, and networked growth – revealed that many of the knowledge-sharing barriers in the individual cases were the same. Figure 11, below, shows which of the knowledge-sharing barriers were found in all three cases, which were found to appear in two of the cases, and which were distinctive to only one case.

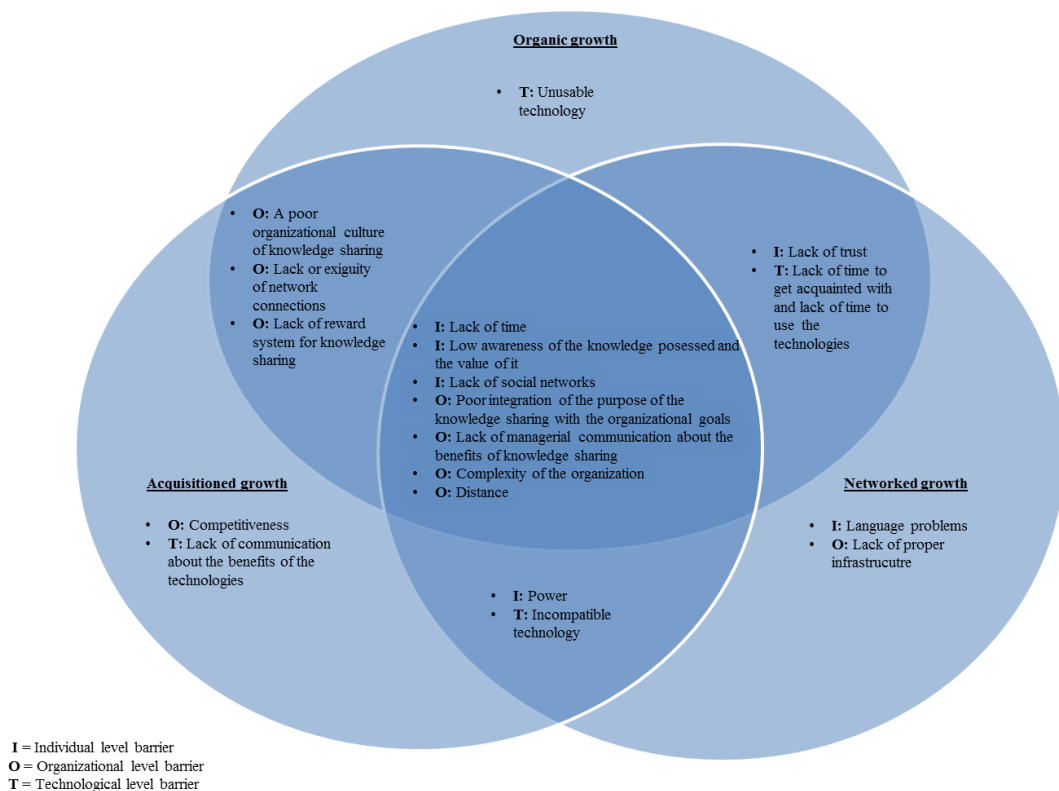


Figure 11. Differences and commonality in the knowledge-sharing barriers across the cases.

Knowledge-sharing barriers common to all of the cases were found at the individual and the organizational level. Lack of time seemed to disturb knowledge sharing in all three

cases. This is not very surprising, since typically growth requires quite a lot of effort and as the scale increases it can be regarded as natural that finding time to share knowledge becomes challenging too. In all the cases, again representing different growth strategies, an increase in the number of individuals whose knowledge might be useful is typical, although this occurs in different ways with different growth strategies. Hence, it is natural that in all of the cases it was found challenging to know all the individuals in the company that had exhibited the growth. This led to a knowledge-sharing barrier of not being aware of all individuals' knowledge and its value. The increase in numbers of co-workers seemed also to be one reason for emergence of another knowledge-sharing barrier common to all of the cases – lack of social networks. Because in this situation many co-workers were unacquainted with each other and it can be argued that creating bonds among unacquainted people is more challenging, greater difficulty in creation of social networks manifested itself.

In all of the individual cases, the growth seemed to be such effort that the management did not notice or did not have the ability to direct its attention and resources enough to the issues of knowledge sharing. Because all of the growth strategies require a great deal of managerial time and effort, it seems that the management steers its time and effort to other issues than knowledge sharing, no matter its importance. Although the management found knowledge sharing to be crucial in all the cases, management actions did not support it. In all of the cases, challenges were faced in terms of the management connecting the purpose of the knowledge sharing and the company goals, just as much as in managerial communication about knowledge sharing's benefits. Amid all the haste, the management focused mainly on other issues than issues of knowledge sharing. Also, the complexity of the organization grew in all cases, and it was commonly seen as a reason for the routes of knowledge becoming more obscured. Also, growth of distances was a knowledge-sharing barrier common to all of the cases. Both the increase in complexity and the growth in distances can be assessed as related to increase of the scale of operations in all of the growth cases. With this kind of situation, it can be argued, knowledge sharing gets more time-consuming too.

There was one knowledge-sharing barrier that was found only in the case of organic growth. This was unusability of technology. Since organic growth is typical of small companies, it may be that a company of this sort does not have such resources to invest heavily in technology. Accordingly, also usability issues may not get enough weight. This can be seen also as a managerial question. If the management completely understands the importance of knowledge sharing, it should direct investments to knowledge-sharing technologies and their usability as needed. In this, attention should be paid both to physical resources, such as information systems, and to immaterial resources, such as time. In the case company, the management was taking some actions to get this issue under better control.

Three knowledge-sharing barriers were found to be hindering knowledge sharing with both organic and acquisitive growth: exiguity of network connections, a poor organizational culture for knowledge sharing, and lack of a reward system for knowledge sharing. In these two growth strategies, there seemed to be difficulties in breaking away from the old, existing network connections and creating new ones. In both cases, employees were using the networks that were in place in the old form of operations (before the growth) and were not creating new ones with new co-workers. It can be stated with confidence that in neither of the cases were the organizational structures designed so as to facilitate new network connections appearing. In both cases, the management was, for example, keeping the teams largely the same as they had always been. The birth of new network connections would have required “mixing” of people. It can be argued that this could have been brought about through a management decision to break up the existing teams, building new ones by mixing members of separate teams together more in the new composition.

Both in organic and in acquisitive growth, there were problems associated with knowledge not flowing well between teams and between long-term and new employees. An organization-wide knowledge-sharing culture to support internal boundary-crossing knowledge sharing was lacking in both cases. Additionally, the new co-workers were unacquainted with each other, which is typical of both of these growth strategies, since in organic growth new employees are recruited and in acquisitive growth new employees are gained from the acquired companies. Managerial support also in relation to this issue was argued to have aided in improving the situation substantially, since the importance of management factors in creation of organizational culture is commonly recognized. The third knowledge-sharing barrier common to these two growth strategies – lack of reward systems – can also be seen as largely a managerial problem. In both of the case companies, managerial attention and rewards were longed for, to encourage knowledge sharing. Managerial recognition or rewarding of knowledge sharing would underline the importance of sharing knowledge.

Organic growth and networked growth shared two knowledge-sharing barriers. These were lack of trust and lack of time to get acquainted with and lack of time to use the technologies. First, lack of trust seems to be related to the issue of people unacquainted with each other working together. In organic growth, new and more long-term employees did not share any history or other connections that could have served as a basis for creation of trust. The same situation was seen between the horizontal partners in the networked growth case. Lack of time to get acquainted with and to use technologies seemed to be related to increase of knowledge in both of the cases. In the case of organic growth, the amount of knowledge input to the system had increased so much that the system was time-consuming to use. In networked growth, the number of individual technologies to get acquainted with (the technologies of the partners) was so

large that with all the increased hurry there was not enough time to get to know all of them.

Two knowledge-sharing barriers were found only in the case of acquisitive growth. These were competitiveness and lack of communication about the benefits of the technologies. The former seems to be explained to a great extent by acquisition of competitors. The management had not been able to create an understanding that the ex-competitors were now working toward common goals. Instead, suspicions flourished between the various acquired units, and these people were also unacquainted with each other. This situation was not improved by the fact that the management was not blending the units together: the units were working with almost the same composition as before the acquisitions. While the management had made a decision to support the unification of the company, deciding to use common technologies throughout the company, it had neglected one critical issue – communication about the benefits of these common technologies. These elements can be argued to constitute a challenge when taken together because growth is characterized as a major change and challenge that requires a lot of time and attention from managers.

Acquisitive growth shared two knowledge-sharing barriers in common with networked growth: power issues and incompatible technology. These can be considered, quite naturally, to be knowledge-sharing barriers common to these two growth strategies, since both cases involve many, quite different organizations meshing to work together. These different organizations have their own histories with their own ways of working and their chosen technologies in use. Hence, it can be regarded as fairly understandable that questions of power arise, along with difficulties with the compatibility of technologies. However, these arguably can be overcome if the management takes a strong role. The management should put a lot of effort into creating common rules and procedures and into communicating the benefits of the new situation and details of the decisions made.

Two of the knowledge-sharing barriers were evident only in the networked case: language challenges and lack of proper infrastructure. One factor in these can be argued to be the fact that the partners' operations are not internalized. On the whole, these problems can also be argued to be the culmination of the activities of the management. In a networked style of operation, the business processes should be planned mutually among the partners. Obviously, this had not been handled carefully enough by the management: there were both infrastructural problems and unwillingness of some parties to learn a common language. Also, the typicality of a complementary rather than similar nature of the knowledge acquired may be seen as a cause for these challenges. Fitting complementary knowledge resources together can be argued to be more challenging and time-consuming than the equivalent synthesis with similar knowledge resources.



When considering the similarities and differences between the knowledge-sharing barriers of different cases through division of these barriers into individual, organizational, and technological level, one cannot say that the barriers of some level are more evident than those of other levels in any of the cases. In each case company, knowledge-sharing barriers were found at every level. An interesting finding too was that there were not any technical-level barriers that could reasonably be identified in all three cases, and that technological questions did not emerge as so significant. This finding seems to support the conclusion of previous studies that technologies have only a supporting role in knowledge management. It has to be recognized that also the field of business chosen as the context of this study may have an effect in this respect. Employees with expertise in technologies may be one reason for technology-level barriers being less evident in companies that operate in the software business.

From the analysis presented above, one can conclude that many of the knowledge-sharing barriers identified were the same across the various cases. There were also knowledge-sharing barriers that were common to two of the cases or evident only in one. However, from the discussion above, it can be argued that in all of the cases the phenomenon of knowledge sharing is hindered by a few common basic issues lying behind the individual barriers to knowledge sharing. Given the empirical results above, one can list these as *time, the role and activities of the management, and unacquainted people working together*. In view of this study, these can be seen as *the root causes of knowledge-sharing challenges in company growth in the software business*.

## 5 DISCUSSION AND CONCLUSIONS

This chapter concludes the first part of the dissertation, the introductory part. First is discussion of the results of the study in terms of the subsidiary research questions of the study and then the main research question. This material is followed by evaluation of the study. After this is contemplation of how the study contributes to research. Because the meaning of a study in management practice is also important, this discussion is followed by examination of the managerial implications of the study. Avenues for future research are considered at the end of this final chapter.

### 5.1 The results of the study

*SRQ1: What knowledge-sharing barriers have been identified in previous studies?*

The answer to this sub-question was sought through existing literature. The idea was to identify the knowledge-sharing barriers found in the literature, to establish a theoretical basis for the study of these in the empirical context.

Prior research has indicated that knowledge can be a source of competitive advantage for a company. However, it also has concluded that management and, especially, sharing of knowledge is often a challenging task. To overcome this challenge, companies should recognize barriers that hinder or even prevent knowledge sharing. Prior research has demonstrated that companies may face many, quite different knowledge-sharing barriers, and these barriers can be categorized as falling into three levels: individual, organizational, and technological level. This categorization was found to be a useful tool for understanding of the issue also in this study.

In the present study, challenges to knowledge sharing that stem from individuals' actions or attitudes were placed in the category of individual-level knowledge-sharing barriers. This category of barriers was deemed important, since this has been stated to be the level at which knowledge resides. Hence, prevention of knowledge-sharing barriers that arise from the level of the individual can be regarded as an integral part of knowledge management. From previous literature, the following individual-level barriers were identified: lack of time, lack of trust, low awareness of the knowledge possessed and of its value, power issues, lack of social networks, and language problems.

Organizational-level knowledge-sharing barriers were considered important to identify, because the organizational level is the level at which knowledge gains its economic and competitive value. It is at this level where the circumstances are created in which knowledge sharing can occur organization-wide. To get a picture of organization-level

knowledge-sharing barriers, the project examined previous literature in its analysis of factors hindering or preventing knowledge sharing that are related to structures and operations involving several individuals. In view of this, the following were identified from the literature as organizational-level knowledge-sharing barriers: an unsuitable organizational culture for knowledge sharing, lack or exiguity of network connections, complexity, distance, lack of proper infrastructure, competitiveness, poor integration of the purpose of knowledge sharing with the organization's goals, lack of managerial communication about the benefits of knowledge sharing, and lack of a reward or incentive system for knowledge sharing.

It has often been stated that technologies provide integral tools for knowledge sharing. Therefore, it was also seen as important to identify knowledge-sharing barriers at the technological level. The perspective was that of the use of technologies, not the technical details of individual technologies. From this perspective, the following were listed as the key knowledge-sharing barriers at technological level, identified in previous literature: reluctance or aptitude issues affecting use of the technologies, lack of training in the technologies, lack of time to become familiar with and use the technologies, unsuitable technology, incompatible technologies, unrealistic expectations of a technology, and lack of communication about the benefits of the technologies.

These theoretically identified knowledge-sharing barriers were used as tools for the empirical identification of knowledge-sharing barriers in different growth strategies. Hence, this exploration of the various barriers to knowledge sharing created a foundation for studying the phenomenon of knowledge-sharing challenges in a specific context.

*SRQ2: What kinds of growth strategies exist?*

As stated above, an answer to this sub-question too was sought theoretically. The aim was to identify distinct growth strategies and their characteristics. This work created a theoretical basis for analyzing knowledge-sharing barriers in different growth contexts.

On the basis of previous literature, organic and acquisitive growth strategies were regarded as two basic growth strategies. In organic growth, the growth is generated through use of previously unused internal resources. In contrast to organic growth, acquisitive growth is generated by companies acquiring other organizations – in other words, acquiring external resources. Typically, acquisitive growth entails major change for a company, since, for example, the number of employees typically increases dramatically and suddenly, and different structures, processes, etc. are to be united. Organic growth is often considered a smoother growth pattern, because the number of employees does not typically grow in a single dramatic leap; instead, the change comes about through individual recruitment processes, and there is not necessarily a need for sudden changes to company structures, processes, etc. However, acquisitive growth does feature the positive side of fast access to a large amount of new knowledge.

Another difference between these two growth strategies identified from the previous literature is that organic growth is typically a slow way to grow whereas acquisitive growth is considered to involve rapid growth. Organic growth is typically recommended for smaller and newer firms, while acquisitive growth is more typical of larger companies. This pattern indeed seemed to match reality as described in the previous literature, although there are indications that acquisitions may have a better growth effect on small companies (see, for example, Lockett et al. 2011). This is because small companies typically have a narrow resource base while larger companies have a more diversified one (Lockett et al. 2011). These two growth strategies both require a lot of attention and considerable abilities from managers.

Alongside these two basic growth strategies, the existing literature supported the idea of networked growth as a third growth strategy for modern organizations – and a highly relevant one. This growth strategy was regarded as a hybrid model blending organic and acquisitive growth strategies. Through networking, an attempt is made to generate growth through a combination of the firm's own resources and resources of other organizations; however, unlike acquisitive growth, this growth does not involve acquisition of operations or employees of the other organizations involved. Though the operations of the other organizations are not acquired, similarities can be seen between networked and acquisitive growth. Networked growth is also characterized by mutual planning of business processes among the parties involved. This can be argued to create challenges for networked growth, since it is in all likelihood a great challenge to plan the business processes of different organizations mutually. One reason for this is that, unlike in internal actions and development (cf. acquisitive growth), in networks commands cannot be used to bring about changes – everything has to be negotiated by the partners (Heikkilä & Heikkilä 2006). It is understandable that the need for managers' time and effort is common in networked growth, as it is in organic and acquisitive growth. Previous literature indicates that not just organic but also networked growth is recommendable especially for new firms. One major difference between networked and acquisitive growth seems to be that deep and close relationships that involve trust is characteristic of networked growth, whereas in acquisitive growth even competitors are often acquired. Also found to be typical of networked growth is that the network evolves over time, and hence evolutionary changes characterize it. In acquisitive growth, the changes are sudden and rapid.

Although there can be identified some similarities in the characteristics of these three growth strategies, each has its distinguishing characteristics. Because of this, it was worthwhile to study whether the different growth strategies create a special environment in which the knowledge-sharing challenges occur. This provided a basis for analysis of whether the key knowledge-sharing barriers of the individual growth strategies are similar or differ. This made it possible to analyze whether company growth should be

regarded as constituting a well-bounded phenomenon when one is considering knowledge-sharing challenges.

*SRQ3: What are the special characteristics of the software business?*

The answer to the third sub-question too was explored in light of previous literature. The aim was to identify the characteristics that make the software business a special business field. Those identified were used as lenses for empirical analysis of the phenomenon under study in this specific industry.

The special characteristics of the software business too were identified from previous literature. Knowledge-intensiveness can be seen as a characteristic that holds a central role. It can be said that another characteristic, abstractness, has much of its origin in this knowledge-intensiveness. One can see the importance of intellectual property rights in this business as stemming from these two traits. This being the case, it is quite natural that competent, independent, and creative employees were also seen as typical of the software business.

The software business is also characterized as a rapidly growing field with keen competition and turbulence. These can be concluded to lead to other issues characteristic of the software business. Rapid job growth can be considered a natural result of the fast growth of this industry, and industry-wide growth can be seen as a challenge to the recruitment of competent people. Keen competition can be argued to be one cause of the need for innovativeness that is also typical in the software business. Innovative companies can support their competitiveness. It can also be said that, at least at some level, the innovativeness in this field is one cause of continuous and rapid changes, alongside the short technology life cycles that are typical of the business. Regardless of the fierce competition in the field, standardization was also highlighted as characteristic of the software business. Another characteristic element has been stated to be the multitude of small or medium-sized companies. However, nowadays there is also a considerable number of larger companies in the field. One reason for this may be that the field has developed and is not so young anymore: there has been time for small and medium-sized companies to grow. Large companies may have emerged also because of the fast growth of the business. High demand may make it easier to invest more heavily in growth.

Many of the characteristics of the software business can be seen as interlinked. It can be argued in addition that some characteristics of the software business may be typical also in other fields of business. However, the literature did point to these as typical characteristics of the software business. Those make the software business a special context, worthy of study.

*SRQ4: Are the knowledge-sharing barriers that face a software company similar regardless of the growth strategy?*

An answer to the final sub-question was sought empirically. The aim was to identify which of the knowledge-sharing barriers presented in the literature exist in the various growth strategies applied in the software business. This enabled empirical comparison for identification of which knowledge-sharing barriers are similar and which differ between the individual growth strategies manifested in the software business.

On the basis of the empirical exploration of the three cases, it can be said that many of the knowledge-sharing barriers are similar across the individual growth strategies. However, it was also found that not all of the knowledge-sharing barriers were similar in all of the growth cases. Some barriers were shared by two of the growth strategy cases, and others were shown empirically to be present in only one of the cases. All the individual knowledge-sharing barriers identified in the empirical cases are presented in sections 4.1–4.3. Comparison identifying the similarities and differences in knowledge-sharing barriers across the cases are presented in Section 4.4.

Proceeding from the empirical exploration, one cannot say that knowledge-sharing barriers at any particular level (individual level, organization level, or technological level) dominate in company growth in the software business. However, it was interesting to find out that technological barriers did not receive very great emphasis. One reason for this may be that the study was conducted in the software business, in which the centrality of knowledge-intensiveness and technologies in the work might be factors that diminish technological-level barriers, one might argue.

It can be argued also that many of the similarities in the knowledge-sharing barriers are causes of the some of the similarities seen between the individual growth strategies. These were assessed to be the following: regardless of the growth strategy, growth is always such a great effort and change that it leads to major time demands; growth in the number of individuals unacquainted with each other whose knowledge resources should be used is common to all of the growth strategies; and management abilities play a crucial role in every growth strategy. Hence, although some differences in individual knowledge-sharing barriers were identified in all three cases, in-depth comparative cross-case analysis revealed that a few issues common to all the growth strategies seem to be behind the knowledge-sharing barriers identified as accompanying all of the growth strategies. We refer to these as *the root causes* for knowledge-sharing challenges in company growth in the software business. The following root causes were identified: *time, the role and activities of the management, and unacquainted people working together*. Therefore, it can be concluded that the fundamental issues behind the knowledge-sharing challenges are similar no matter the growth strategy applied, at least in the software business.

*MRQ: What issues create challenges to knowledge sharing in company growth in the software business?*

On the basis of this empirical case study, it can be argued that knowledge sharing does face challenges in situations of company growth in the software business. We identified a large catalogue of knowledge-sharing barriers that hindered or even prevented knowledge sharing in the context under study. Again, many of these barriers were found to be similar across all three cases – i.e., across different growth strategies, along with the barriers found to be similar in two of the growth strategies or unique to only one growth strategy. Although the identification of individual knowledge-sharing barriers and the similarities/differences in their existence in the cases of different growth strategies can be regarded as important, more interesting is that these revealed common root causes for knowledge-sharing challenges in company growth in the software business. These root causes, we argue, underlie the individual knowledge-sharing barriers. This case study indicates that these root causes are similar across all of the growth strategies. That is, the root causes for knowledge-sharing challenges are independent of the growth strategy.

So, when we look behind the individual knowledge-sharing barriers in company growth in the software business, as described in Chapter 4, the issues we find that hinder the knowledge sharing of a growing company in the software business are *time, the role and activities of the management, and unacquainted people working together*. No matter the growth strategy, growth always entails change for a company. It cannot be assumed with all this change that a company could keep working in exactly the same way it had been working before. Efficient knowledge utilization demands efficient knowledge sharing. To guarantee efficient sharing of knowledge during and after the change, the organization should be developed. However, this is not always easy, on account of time pressures brought by the scale of the growth. These lead to knowledge-sharing challenges. During growth, the number of people increases. People who are unacquainted with each other should get to know each other. This would aid in knowledge sharing. It can be argued that this requires effort both when it comes to making the organizational structure such that people can meet each other and in terms of people building trust so that they will start sharing knowledge. The knowledge-sharing challenges in company growth in the software business are related to the root cause of the role and activities of the management. If the management does not see the point and importance of knowledge sharing, there is no foundation in place for knowledge-sharing practices. The management determines the importance of knowledge sharing, justifies it, and provides resources for it.

The identification of the root causes for knowledge-sharing challenges in company growth in the software business can be regarded as significant. The individual knowledge-sharing barriers can each be seen as a symptom of knowledge-sharing challenges. However, the main causes of these single barriers – and behind the

knowledge-sharing challenges in general – are these root causes. Hence, to overcome the challenges in knowledge sharing, the root causes need to be overcome; while one can attempt to reduce the individual knowledge-sharing barriers, this can only ameliorate the situation, not overcome the whole issue of knowledge-sharing challenges. Clearly, the root causes of the knowledge-sharing challenges should be overcome or, even better, prevented. This is why we consider the identification of the root causes as a crucial finding in tackling of the issue of knowledge-sharing challenges in company growth in the software business.

## **5.2 Evaluation of the study**

Every study must be evaluated, and this study is no exception. It aimed to increase understanding of knowledge-sharing challenges in company growth in the context of the software business. The idea was to shed light on what similarities and differences in knowledge-sharing barriers can be identified, depending on the growth strategy. Through this, the purpose was to examine whether it can be said that knowledge-sharing challenges of a growth company are general, not affected greatly by the growth strategy. With this knowledge, growth companies would know which knowledge-sharing issues they should focus on, and whether these are dependent on growth strategy or not. Thus, one could say that the aim of the study was to provide support for companies on a path of growth. The context of the study was the software business. The study reached its aim by answering the four subsidiary research questions and thus the main research question – *What issues create challenges to knowledge sharing in company growth in the software business?*

The research framework of the study was fruitful and made it possible to answer the sub-questions and the main research question of the study. The researcher had been working with growth companies and noticed that growth is accompanied by many challenges. The literature highlighted that knowledge management could support the growth of companies but is often problematic. It was these observations that together inspired the idea of addressing the need to study the phenomenon of knowledge-sharing challenges in company growth in more detail. With the researcher encouraged by this, the research framework for the study was planned. A comprehensive framework was seen as a pillar for success in the study.

The first step in building this framework was to create a theoretical basis for empirical exploration of the research phenomenon. The streams of literature on knowledge management – in particular, knowledge-sharing barriers – and on company growth were explored. The software business was assumed to be a fruitful context for the study because it is characterized as a knowledge-intensive field exhibiting rapid growth. Knowledge-sharing issues were assumed to be a central force in companies in this field, and growth was assumed to be of interest to many companies in the field. For these



reasons, the software business was assessed as a fruitful context for the study. For a sound enough theoretical basis for the study, also the literature on the software business was explored. Theoretical identification of the knowledge-sharing barriers, the types of growth strategies, and the software business created an interesting basis for the next step of the study: studying the research phenomenon empirically. In connection with the choice of the three cases, each representing one of the three growth strategies, for the empirical exploration of the research phenomenon, it must be pointed out that this choice of only one representative of each of the three growth strategies brings with it challenges of generalizability. It cannot be concluded that the results of the study are borne out in every situation of a certain growth strategy. However, this issue was acknowledged in the planning of the study. At the expense of this generalizability, the selection of only one representative of each of the growth strategies enabled focusing resources on gaining in-depth knowledge of the phenomenon. These multiple cases also created a good basis for a comparative study aimed at profound understanding of the phenomenon of company growth as a whole. Therefore, the cases were studied individually, and then, generating the most interesting results, these served as a foundation for the cross-case analysis. With diligent filling out of the research framework, it was possible to increase understanding of knowledge-sharing challenges in company growth in the software business. This kind of research framework, wherein first a good theoretical basis is created and then the phenomenon is studied empirically in a specific context, is typical in, for example, medical science. In this study, use of this kind of systematic research framework can be seen as a crucial factor in arriving at the answers to the sub-questions and the main research question, and in conducting of a successful study overall.

Since this study is qualitative in nature, more specific evaluation of it must utilize metrics that are suitable for qualitative research. Reliability and validity are typical metrics used in evaluation of quantitative research. However, there are varying views as to whether these can be, or further, how they can be addressed in evaluation of qualitative research (see, for example, Yin 1994; Stake 1995; Lee 1999; Ghauri & Grønhaug 2005; Koskinen et al. 2005). Hence, next, this study is evaluated in view of the relevant concepts, revealing that the design and execution have been suitable for qualitative research.

Evaluation of qualitative research, if carried out appropriately, addresses both reliability and validity (see, for example, Lee 1999). Reliability refers to the replicability of the research: if another researcher were to follow the procedures of the research exactly and do the same case study (not replicating the procedures in another case study), he or she would end up with the same findings and come to the same conclusions. (Yin 1994) Proof is arguably very challenging, since the cases are typically unique – it is, therefore, quite natural that it has typically been stated that reliability is the hardest thing to prove in qualitative research (Yin 1994; Lee 1999; Ghauri & Grønhaug 2005). The challenge

is that the data collection in qualitative research is typically so multidimensional and versatile a process that it is often challenging to perform similarly ever again. Hence, it has been suggested that one way at least to prove that another researcher could possibly repeat the research is to document the procedures of the research (Yin 1994; Koskinen et al. 2005). In this study, the interview themes were documented. Also, the interviews were transcribed to guarantee that the material from the interviews existed not merely in the mind of the researcher or in tape recordings of the interviews.

As for validity, different types have been presented (see, for example, Yin 1994; Ghauri & Grønhaug 2005; Koskinen et al. 2005). When speaking about the evaluation of a qualitative case study, researchers often apply perspectives presented by Yin (1994), according to which validity can be seen as comprising construct validity, internal validity, and external validity. In construct validity, the question is that of “establishing correct operational measures for the concepts being studied.” (Yin 1994) As a way of increasing construct validity, this study used multiple sources of evidence. The interviews comprised the primary dataset, with the data being collected from several interviewees, from different groups of personnel, in each individual case. Also, complementary data such as memos from meetings and the published annual reports were gathered.

Internal validity has to do with assessing whether the results of a piece of research are the truth and whether a causal effect occurs between variables. It has been described as associated with only explanatory or causality research. (Yin 1994; Ghauri & Grønhaug 2005) Because this study was not explanatory or causally oriented, its internal validity is difficult to assess. However, an attempt was made to seek internal validity through the selection of the interviewees. Through selection of several interviewees, with both long- and short-term experience in the case companies and with different perspectives, the researcher attempted to obtain versatile, profound, and extensive perspectives on the phenomenon under study.

In contrast, external validity involves the question of whether the findings of the research are generalizable beyond the immediate case study. Because this study applied hermeneutic research aimed at understanding of the phenomenon under study (Olkkonen 1994) – knowledge-sharing barriers of company growth in the software-business context – a qualitative case study was quite a natural choice for seeking answers to the subsidiary research questions and the main research question alike (Denzin & Lincoln 1994; Yin 1994). With this as the nature of the study, it has to be understood that the aim was not to obtain generalizable results *per se*. When one is speaking about a qualitative case study, generalizability does not mean generalizing the results to a larger population as much as it does generalizing “a particular set of results to some other broader theory” (Yin 1994; Koskinen et al. 2005). Hence, instead of statistical generalization, analytical generalization should be evaluated (Yin 1994; Koskinen et al. 2005). Since the aim of this study was to increase understanding of

knowledge-sharing challenges in company growth in the context of the software business, the results of the study are tied to this specific context. The idea has been to inspect the theoretical views on knowledge-sharing barriers and adjust them to be more suitable for the situation of company growth in the specific context of the software business. Accordingly, from the perspective of analytical generalization, the results add dimensions of company growth in the software business to the previous theoretical discussion of knowledge-sharing barriers.

Although this was a case study focusing on a specific phenomenon with quite a small quantity of data, the decision to examine all three typical growth strategies, instead of focusing only on one of them, has provided a wider and more in-depth view of the phenomenon (*issues posing a challenge for knowledge sharing in a growing company in the software business*). This decision has also made it possible to analyze whether growth can be seen as a uniform context when one is speaking about knowledge-sharing challenges or, instead, the individual growth strategies create such different contexts for knowledge sharing that the special characteristics of each growth strategy should always be taken into consideration when one is addressing knowledge-sharing challenges in the growth context. This could not have been done if the cases had represented only one growth strategy. However, while each of the growth strategies was represented, it must be remembered that there was only one case company representing each of the growth strategies. For truly generalizable results, more research would be required.

Because this study has focused only on the software business, the results cannot directly be generalized to any other fields of business. However, for example, Shapiro and Varian (1999) have stressed the similarities between the more traditional economy and the digital economy by pointing out that, although technology changes, the basic economic laws remain the same. So, to some extent, the general theories and models drawn from management literature also apply to the software business (Hoch et al. 1999; Messerschmitt & Szyperski 2003). Therefore, some of the results may be generalized to other fields of business.

### **5.3 The contribution of the study**

Every piece of academic research must add something to the existing knowledge of the phenomena under study. Hence, we next discuss what this study adds to the prior research. Since research in this field should also yield new insights for business managers, also managerial implications are discussed.

#### *5.3.1 Contribution to the body of research*

Knowledge-management studies have been carried out for many years now. However, knowledge management is still rather young as a field of study, and needs for empirical

studies especially have been addressed. This study has advanced knowledge-management studies by adding empirical knowledge of knowledge-management practices, precisely knowledge-sharing challenges in a specific empirical context. This is an important contribution, since it has often been stated that the issues hindering knowledge sharing have not been studied enough in different contexts (see, for example, van Burg et al. 2008). Because knowledge-management practices can have different faces in different contexts, it proved important to study knowledge-management practices in the specific context of company growth in the software business. This study proves that knowledge sharing faces challenges in this special context. The knowledge-sharing barriers identified in the previous literature were found in the empirical contexts of this study. Thus this study supports the previous literature: the barriers presented are evident also in the context of company growth in the software business.

This study has proven that many of the key knowledge-sharing barriers in different growth strategies in the software business are similar, but also some differences in the knowledge-sharing barriers between the growth strategies exist. Nonetheless, the study has shown at the same time that the main reasons behind the individual knowledge-sharing barriers are the same in all the growth strategies. These can be seen as root causes for knowledge-sharing challenges. Hence, this study adds to existing knowledge-management literature by proposing that before or even instead of focusing on the knowledge-sharing barriers in company growth, one should identify and take care of the root causes of knowledge-sharing challenges. Only after this it is worthwhile to tackle the individual knowledge-sharing barriers.

This study contributes also to the literature on growth. Previous studies have indicated that knowledge management could support company growth (see, for example, Salojärvi et al. 2005). This study has gone deeper, for it has studied one close perspective on knowledge management, knowledge-sharing challenges, in the growth context. The study provides company-growth literature with an understanding of the similarities and differences between the individual knowledge-sharing barriers of different growth strategies, a new aspect of company-growth literature.

This study found common root causes of knowledge-sharing challenges among all the growth strategies. The study adds to the company-growth literature the idea that where the basic issues underlying the knowledge-sharing challenges of a growth company are concerned, the choice of growth strategy does not have an effect. Thus this study adds knowledge that, in the context of the root causes of knowledge-sharing challenges, company growth can be regarded as a consistent phenomenon across growth strategies.

### *5.3.2 Managerial implications*

This study has relevant implications for management practice. The study demonstrated that knowledge sharing encounters challenges in a growth context in the software business. Many, very different knowledge-sharing barriers come into existence during growth. The study pointed out several knowledge-sharing barriers, to which managers should pay attention if they want to use the knowledge resources available in the best possible way. The management can use this identification of individual knowledge-sharing barriers accompanying the various growth strategies as a checklist when dealing with knowledge-sharing challenges. However, what can be regarded as a more important finding for managers is the uncovering of the root causes of knowledge-sharing challenges in company growth. It is argued that the management should pay attention to the root causes first, instead of first focusing on individual knowledge-sharing barriers. Thus, managers should take care of the causes of the “illness” first, as was implied at the end of Section 5.1. Only after this, the symptoms – the individual knowledge-sharing barriers – should be taken care of, if they still exist. However, it can be assumed that just through addressing of the root causes, most of the individual knowledge-sharing barriers will disappear.

The study provides management practice with the relevant knowledge that the root causes of knowledge-sharing challenges do not depend on the growth strategy that has been chosen. The study also gives management practice the knowledge that whatever growth strategy is chosen, knowledge sharing faces challenges if the root causes identified in this study take strong root. This knowledge provides the management with an opportunity even to keep knowledge-management challenges from appearing, if it focuses its time and effort on prevention of the root causes identified. By recognizing the root causes of knowledge-sharing challenges, the management can act to preempt them and hence support the growth better. When it comes to the root cause related to time, managers should recognize that, regardless of the increase in employee resources, time resources at individual level seem to diminish. To overcome time challenges, “slack” time should be allocated for all individual employees. Only with this assignment of time can it be guaranteed that employees will have enough time to share and seek knowledge and also have enough time to internalize new things. Unacquainted employees working together can, it is presumed, be conquered as a root cause in quite a simple way: through creation of possibilities for employees to meet. This can be done, for example, by breaking free of the existing team structures and mixing together unacquainted people, modifying the physical work environment to make meeting of people easier, and organizing company-wide events (both formal and informal) that allow employees to meet. The main root cause can be stated to be the role and activities of the management. Hence, the most important thing, one could argue, is that the management recognize its own role as a crucial starting point in company-wide knowledge sharing in company growth. To overcome this root cause, the management

must understand the meaning of knowledge sharing for a growing company. It must support knowledge sharing by allocating enough resources for it. Also important is that the management act as a role model to the employees by itself sharing knowledge. Also, the resolution of the other two root causes may well require actions by the managers; managers can make the decisions on time allocation and on assigning resources for the activities needed to get the people to meet each other.

Although the prevention and elimination of the root causes is argued to be the most important thing when one is fighting the knowledge-sharing challenges in company growth, the identification and elimination of the individual knowledge-sharing barriers cannot be said to be unimportant. The study's identification of the individual knowledge-sharing barriers in different growth strategies in the software business provides managers with a helpful checklist is their efforts to alleviate the symptoms, the individual knowledge-sharing barriers. It can be said that, although the choice of growth strategy is irrelevant in terms of the root causes, the growth strategy selected does have slight significance at the level of individual knowledge-sharing barriers in company growth in the software business. Considering this, we argue that which growth strategy the management ultimately chooses is not totally irrelevant from the standpoint of knowledge-sharing barriers. Hence, by pointing out the key knowledge-sharing barriers with the individual growth strategies, this study may help the management in the choice from among the possible growth strategies. Overall, on the basis of this study, it can be recommended that managers of growth companies pay more careful attention to the knowledge-sharing practices of the company and the issues affecting these.

#### **5.4 Avenues for future research**

The case study described here has contributed as an empirical study of knowledge-sharing barriers in company growth in the context of the software business. Although this study was able to add knowledge of knowledge-sharing challenges in the case of company growth, and of similarities and differences in knowledge-sharing barriers between growth strategies, it is not free of limitations. However, the study can still be seen as an interesting basis and a starting point for much future research.

First, since this study is a case study and only one case company represented each of the growth strategies, the results of the research cannot be considered very generalizable. Hence, it would be useful to perform quantitative research into the phenomenon under study, to get more generalizable results. Through quantitative study, it would be possible to obtain more generalizable results related to knowledge-sharing barriers with each of the individual growth strategies but also in relation to growth as a whole.

Second, this study has limited its perspective to the software business. Some of the findings may be applicable also in related fields or even in all industries. However, as presented in the study, the software business has its distinct characteristics. Hence, one

should be careful in generalizing the findings of the study to other industries. Instead, this is left as an avenue for further research. Since this study was limited only to one industry, it would be interesting to study whether the findings would be similar in other knowledge-intensive industries. Also, research conducted in industries not characterized as knowledge-intensive or as reliant on experts would be of interest. Such research would provide information on whether or not the knowledge-sharing challenges of company growth are industry-bounded.

Company growth was chosen as the focus of this study. The reason was the objective of gaining knowledge of this specific context, because the importance of growth of companies is considered high. Although similar knowledge-sharing barriers may be found also in software companies that are not growing, the results of the study cannot be generalized to all software companies. Hence, knowledge-sharing barriers overall in software companies would be interesting ground for future research.

Because the study identified the root causes of knowledge-sharing challenges in company growth in the software business, it would also be interesting to conduct a study wherein solutions to overcome these root causes are thoroughly sought and tested. Since the role and activities of the management as one factor in knowledge sharing came up as significant, it would also be interesting to study the effects of leadership and management styles on knowledge sharing.

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## **PART II: ORIGINAL PUBLICATIONS**



## PAPER I

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# Knowledge Sharing Barriers in Growing Software Companies

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## Abstract

*The software business is a fragmented business segment, where there are few big players, some medium-sized companies, and a large number of small companies. Many of these medium-sized and small companies have an aspiration to grow. However, getting a company onto a path of sustainable growth is not an easy task. Although some previous studies have argued that knowledge sharing can be one potential way to support growth, other studies suggest that knowledge sharing is, in fact, a highly challenging task, even a problem, for a growing company. By drawing on previous studies on knowledge sharing barriers and different growth paths in the context of software business, this paper aims to increase our understanding of the knowledge sharing challenges that software companies may face in different growth paths.*

## 1. Introduction

Managing knowledge is considered an important capability for a successful company as knowledge is considered the primary source of competitive advantage for modern companies [1, 2]. Knowledge, and especially the management of it, can support long-term sustainability and success [2, 3]. Both academics and practitioners have focused on knowledge management (KM) for several decades already. Often the role of knowledge sharing has been regarded as a critical one in knowledge management [e.g., 4, 5]. Knowledge sharing is vital, especially for knowledge-intensive organizations where the business is based on knowledge and its utilization, e.g. software companies.

Many companies have a great aspiration to grow [6, 7]. There are multiple reasons why companies desire growth. Some see growth as “glamorous”; many also see that a growing company can offer increased career opportunities with higher personal rewards, which make a growing company more attractive in the eyes of current and potential employees. It is also often seen that growth is both a

sign of success and a requirement to remain successful. [6] Typically, the growth of companies also generates both employment and welfare [8]. Therefore, the growth of companies is also commendable from the viewpoint of the national economy.

The management of organizational knowledge, unique to a firm, is presented as one potential way of supporting growth [7]. There are indications that higher levels of KM maturity correlate positively with long-term sustainable growth. There is also some evidence that by applying a comprehensive knowledge management approach companies might be able to shift to higher growth. [9, 10] In order to avoid stagnation, grown companies should accumulate and apply knowledge in the best possible way, thus knowledge sharing should be effective [11].

Although there is high awareness of KM in many companies, not so many have been able to utilize KM-related activities to support growth [9]. Matlay [10] has also discovered that the management of knowledge in order to sustain and advance a company’s competitive advantage is found to be difficult, even a problem, in a grown company.

The objective of this paper is to identify the key challenges in knowledge sharing faced in different growth paths. By identifying these key challenges based on previous literature, we are able to verify them in further empirically oriented studies and, more importantly, also suggest solutions to overcome the barriers.

Previous studies have presented the barriers that hinder or prevent knowledge sharing [e.g., 12-14]. There are also studies identifying different kinds of growth paths for companies [e.g., 15, 16]. However, there is a lack of studies that systematically look at knowledge sharing challenges within different growth paths. This paper presents a literature study that combines studies of knowledge sharing barriers and studies of different growth types in context of the software business. As software represents a business segment where all of the different growth paths, namely organic growth; growth by networking; and growth through acquisitions, can be found, this paper

has practical relevance for software companies. Theoretically, the paper aims to fill the gap between KM-focused knowledge sharing literature and more general management-oriented business growth literature.

The structure of this paper is as follows: in the next section there is an introduction to the research context, i.e. the software business. After this a theoretical discussion on different ways to grow and different aspects of knowledge sharing are presented. This is followed by a section where the presented literature is synthesized. The paper ends with a summary of the key points and concluding thoughts.

## **2. Special characteristics of the software business**

The software business plays an important role in modern society [17, 18] as an increasing number of our everyday tasks are based on the utilization of software. Thus it is not a surprise that this business segment has grown rapidly [e.g., 19]. The growth of the segment is explained both through the entering of new companies into the segment due to the software industry's relatively low entry barriers [20], as well as the growth of "old" players within the segment.

The nature of the software business can be understood by examining the similarities and differences between the software industry and more traditional industries. This discussion pays particular attention to the question of whether the software business is something special compared to other businesses, or if it is just a normal business segment. It may be impossible to find a straightforward answer, but some guidelines can be drawn from the discussions in literature on digital economy versus traditional economy and high technology versus low technology. For example, Shapiro & Varian [21] stress the similarities between the more traditional economy and the digital economy when pointing out that although technology changes, the basic economic laws remain the same. On the other hand, several studies concentrate on analyzing the differences between high-tech markets and low-tech markets [22, 23], between software and hardware products and the corresponding areas of business [e.g., 24, 25], and between information society and more traditional society [e.g., 21, 26]. Thus, to some extent, the general theories and models drawn from management literature can be applied directly in the empirical context of the software business, although there is also a need for some modifications due to the special characteristics of software [cf., 17, 18].

A major difference between the software industry and more traditional industries is that the software industry is much younger and typically knowledge-intensive [27]. The software industry may not have as well structured processes as the more traditional industries have [28]. Due to this knowledge sharing processes may also not be as straightforward. The strong role of knowledge and competence in the software industry [29] and the abstractness of software [18] highlight, even more, the importance of knowledge sharing in the software industry [30]. Knowledge-intensivity also creates a need for highly competent experts. However, the ability to recruit competent people is not always an easy task for software companies [31]. Moreover, the continuous and rapid changes in the software industry and the importance of innovativeness [32] emphasize the importance of utilization of knowledge resources [33]. All this makes the software industry a relevant and rich research context for this study.

## **3. Different ways to grow**

Studies on firm growth are heterogeneous in nature [e.g., 16]. There are also many ways to define company growth: the growth of earnings per share, shareholder value [6], personnel, revenue of the company, profits, etc. Revenue is a good indicator of viewing growth, since it is one of the basic measuring instruments of business as there is always an exchange of money involved. Revenue is also a good indicator of growth as it does not differentiate networked companies, whose personnel, for example, might be hard to define. [34] From the viewpoint of a single company, growth is often considered to be a way of seeking success, profitability and better competitiveness [8]. Thus, it is something to strive for many companies. Even so, growth is not easy to actualize – especially sustainable growth. [15]

Traditionally thinking, growth can happen either organically or non-organically, i.e. typically through acquisitions [15]. However, a third way to grow can be defined as growth through strategic partnerships and networking [35]. Next, these three different growth paths are examined more carefully.

### **3.1. Organic growth**

Growing organically is often considered a wise way to grow. As Penrose [15] states, organic growth will probably show a smoother growth pattern over time compared to firms that have grown mainly through acquisitions. Collins and Porras [36] agree that organic growth is the most controlled way to

grow, but also typically the slowest way. Penrose [15] recommends organic growth especially to smaller and newer firms.

Organic growth is a natural and conscious choice to grow for many companies. Also, many investors appreciate organic growth as it typically does not result in extra costs. Organic growth can be defined as natural growth of revenue and personnel by adding sales of services or products [37]. Sveiby [38] also connects business concepts and levels of knowledge to organic growth; when the business concept is strong and the level of knowledge is high, more and more customers will become interested in the offerings of the company and the company will grow.

Storbacka [39] defines organic growth as growth that is achieved without buying existing business outside the company. Organic growth is generated inside the company as unused productive services, resources, and special knowledge of the company are taken into use [15]. In organic growth the company can also recruit new personnel either to expand its knowledge base or to “get more hands” to do the work. Despite the arrival of new people in the company, the structures, culture, etc. typically remain quite the same.

### **3.2. Acquired growth**

There are various reasons for acquisitions. Some companies buy production capacity or competence, some buy interesting products, some try to get fast entry to markets/new fields, and sometimes acquisitions are made to buy a competitor out of markets [40]. Another reason for acquisition may also be to get the stronger and more competitive entity out of two separate actors [40]. Acquired growth is more typical of larger than small companies. Typical of acquisitions is a higher need for capital and management resources than organic growth. [41]

There are different kinds of acquisitions. Acquisitions should be viewed along a continuum where at one end there is an acquired firm that operates independently and at the other end an acquired firm that is fully integrated [41]. Acquisitions where companies truly merge together in order to gain benefits in the form of new competencies and synergy are the focus of this study. Thus, companies that need knowledge sharing throughout the newly formed company are of interest in this study, and not companies that keep working as independent companies after acquisition.

In acquisitions growth is achieved through acquiring external resources. Through an acquisition a company acquires new personnel, new products and

services, new processes etc. at the same time. Thus, acquisition typically involves a major change in a company. After acquisition there might be, for example, different structures, different processes, different cultures etc. in place. There are many challenges in getting all this work done in the same company.

### **3.3. Networked growth**

Strategic partnerships and networking have become relevant ways to seek growth for many modern companies. Networked growth can be seen as a transitional form of organic and structural growth; there are no acquisitions involved, but still the relationships in networks can be so tight that the partners form so great a part of the business process that they can be seen as important structural parts of the whole production process.

By networking companies typically seek a reduction of uncertainty, fast access to knowledge, reliability, and responsiveness [42]. Networks can support growth from different angles. Through networking a company can get more resources and complement its competencies, concentrate on its core competencies, get the possibility to learn new things and acquire new competences. [43] Networking can also create new strategic possibilities and adaptability [44, 45].

In networking, business processes are planned together, and central features of networking are mutual interests, interdependence and reciprocity [42]. The networked way of doing business means that relationships between companies are long-term, close, and in-depth [46]. Trust, common values, and flexibility are also integral elements of networking. Networking fits especially well with knowledge-intensive businesses where the business environment requires the fast adoption of new knowledge. [42]

Networked growth can be seen as a mix of organic and acquired growth, as the company remains working as an independent organization, and thus typically its personnel and culture remain the same. At the same time it should tie in with the other companies of the network, and through that questions arise regarding the processes, structures and culture of the whole network.

## **4. Barriers to knowledge sharing**

Knowledge sharing can be seen as a process of identifying existing and accessible knowledge and transferring and applying this knowledge inside the organization [47]. The aim is to solve specific tasks

better, faster and cheaper than they could be solved without knowledge sharing [47]. Hendriks [48] states that knowledge sharing links the individual and organizational levels. Thus, knowledge sharing is a vital process in an organization, as the level where knowledge resides (individual level) and the level where knowledge attains its economic and competitive value (organizational level) are connected [48].

Van den Hooff and Huysman [49] have stated that knowledge sharing results from a natural motivation to share knowledge since the person sharing knowledge is socially embedded. However, management can support knowledge sharing by stimulating and creating suitable conditions and environments in a cultural, structural and technological sense. [49] Thus, physical, social and resource allocation structures should be created so that knowledge can be utilized extensively throughout the whole organization [50]. As there are possibilities to enhance knowledge sharing through different supportive actions, it is important to study the typical issues which inhibit knowledge sharing. By recognizing typical barriers to knowledge sharing management can steer their actions towards the elimination and prevention of these barriers.

In previous literature, knowledge sharing problems have been studied from different angles. For example, Haldin-Herrgard [13] has studied difficulties in the sharing of tacit knowledge; Cabrera and Cabrera [14] have conducted a study on knowledge sharing dilemmas; Lindsey [51], amongst others, has studied knowledge sharing barriers from the perspective of communication; Bradfiel & Gao [52] have studied knowledge sharing problems in the new product development process in the context of a multi-national manufacturing company; Christensen [47] has studied knowledge sharing problems from the viewpoint of social and knowledge dilemmas; Kimble, Grenier and Goglio-Primard [53] have studied the problems of knowledge sharing between groups of professionals, and Riege [12] has made a comprehensive study by compiling the knowledge sharing barriers presented in previous research and identifying three dozen knowledge sharing barriers.

In his [12] extensive review of previous studies on knowledge sharing, Riege has analyzed both literature concentrating on issues that support knowledge sharing and on issues that may hinder knowledge sharing. Based on his comprehensive study he has categorized knowledge sharing barriers into three levels: the individual, organizational, and technology level [12].

According to Riege [12] the *individual level* barriers that hinder knowledge sharing can be

summarized as the following issues: lack of time; lack of trust; low awareness of the value of possessed knowledge; power relationships; personal characteristics and interpersonal skills; lack of social networks and language problems [12]. This suggested list of individual level knowledge sharing barriers is also supported by many other authors. For example, Haldin-Herrgard [13] and Christensen [47] support the idea of lack of time as a knowledge sharing barrier, as they both state that the internalization of knowledge typically requires a lot of time and time is also needed for building trust within the organization. Furthermore, they [13, 47] have also identified the problem of awareness of the value of the possessed knowledge, as people do not always have knowledge about all the available knowledge in the organization and individuals are not always aware of the full range of their own knowledge [54]. The barrier of power relationships is also widely discussed, e.g. Thompson [55] has stated that especially people who have critical knowledge tend to become bottlenecks as they try to obtain power through sharing and especially not sharing knowledge – because knowledge is power [56, 57]. This barrier relates also to personal characteristics, e.g. Cabrera and Cabrera [14] point out that certain individuals tend to pursue maximum pay-off from knowledge sharing and this can lead to a lack or diminishing of knowledge sharing. If employees fail to see any personal benefits in knowledge sharing, they typically are reluctant to share knowledge [14, 47]. Naturally, besides the motivation to share knowledge, there needs to be a relation between the knowledge sender and receiver as Christensen [47] has stated. Thus, there need to be relationships between the actors forming wide social networks. Lastly, the language barrier can occur, according to Haldin-Herrgard [13], simply because it is not easy to put into words something that seems natural and obvious to oneself. Also, if parties, such as novices and experts, do not have any common, shared experiences and same absorptive capacity it is very hard for them to understand the thinking process of others [3, 47] and to find a common terminology.

On the *organizational level* the generic problem in knowledge sharing is that companies try to adjust their organizational culture to fit knowledge management and knowledge sharing plans, instead of fitting them to the organizational culture [12]. A poor organizational climate and culture can contribute to unsuccessful knowledge sharing, as there is no support for the emergence of “an *attitude of wisdom*”; in other words, people will not want to seek and share knowledge with others [58, 59]. Besides the organizational culture, other organizational level barriers can be summarized as

poor integration of the knowledge sharing purpose with the organizational goals, lack of managerial communication about the benefits of knowledge sharing, distance, lack of infrastructure for knowledge sharing, lack of a reward system for knowledge sharing, and the external and internal competitiveness of different units [12]. The general prevailing attitude is also stated as a key factor for unsuccessful knowledge sharing [60]. In addition, competitiveness inside the organization has been related to individual knowledge sharing reluctance. A competitive internal work environment may lead to thoughts of personal vulnerability through revealing the secrets of one's own competitive edge through knowledge sharing. [14] Competitiveness inside the organization usually originates from the organizational climate and culture; in some organizations competitiveness is emphasized as it is thought to lead e.g. towards better sales results. An organizational barrier can also be caused by the complexity of the organization structure, i.e. teams and different organizational units may not know that useful knowledge already exists in some other team or unit and where that knowledge resides. The potential lack or exiguity of network connections makes it even more difficult for a team to map potential knowledge inside the organization [61, 62].

There are also knowledge sharing barriers on the *technological level*, even though several previous studies have shown that technology can support knowledge sharing. Riege [12] has listed the technology-related barriers to knowledge sharing as unsuitable technology, unrealistic expectations for the technology, reluctance to use the chosen technologies, lack of training and lack of communication about the benefits of the technology [12]. Time is a relevant factor also on the technology level. If the employees do not have time to learn how to use an available information system it is almost impossible to use the system [14].

## **5. Barriers to knowledge sharing in the context of grown software companies**

In this section the literature discussed above on growth types and knowledge sharing barriers are synthesized in the context of the software industry. In this synthesis we examine what might be the most relevant knowledge sharing barriers in each of the growth types.

In **organic growth** several *individual level* barriers to knowledge sharing can be identified. First of all, in organic growth it is typical to recruit new personnel. Recruitment of competent people has not,

however, been an easy task in the software business due to the tough competition for good programmers. This may lead to an insufficient recruitment of competent people, which further leads to a growing work load and lack of time resources for the existing employees. Continuous recruitment may also lead to lack of trust if there is no time to introduce new and old employees to each other properly. Also, a lack of social networks can become a relevant knowledge sharing barrier in an organically grown company. As small software companies typically grow organically, it can be assumed that strong ties between old employees exist. In this case new employees may find it hard to create social networks with old employees as they may be seen as "outsiders". In organic growth knowledge sharing problems might also occur because of language problems, especially if a lot of novices are recruited during the growth. Potential problems arise, e.g. if the novices have been trained in the newest tools of software programming at university – while older ones are still emphasized in the company.

As there are software companies with highly competent experts, it can be assumed that there are no problems where the employees would not be aware of the value of the possessed knowledge. Organically grown companies also still often stay rather small with a low hierarchy, thus it can be assumed that power relationships do not create big knowledge sharing problem.

At the *organizational level* knowledge sharing barriers related to organic growth can also be assumed to exist. In many cases of organic growth, managers are quite busy supporting growth, for example, by making and supporting sales. Thus, if managers face difficulties in finding time to pay attention to communication of the importance of knowledge sharing, this can lead to diminished knowledge sharing. Also, as small software companies typically grow organically, it may be challenging to service the growth with proper infrastructure, as there are not necessarily the needed resources to put into infrastructure. Moreover, there can be a temptation to hold on too strongly to the old ways of doing things, i.e. old information systems or knowledge sharing processes. In organic growth the growth is sought through internal resources, so there may be a danger that there is no attention paid to network connections and because of that network connections may even be non-existent.

The small size of organically growing software companies can diminish the potential for knowledge sharing problems related to distance. In small companies, distances are typically not so big and people easily "bump" into each other, and knowledge

sharing can occur. Moreover, the competitiveness of different units can be assumed to be very small in organically grown companies as there are typically tight connections between employees in small companies. It can also be assumed that small organically growing companies are not very complex, and thus knowledge sharing problems do not arise. Also, small companies often have a low hierarchy and thus presumably power relationships do not create big knowledge sharing problem.

It can be assumed that since the software business is the context of the research, there are not so many *technology level* knowledge sharing problems. As there are software experts involved and the hierarchy of small companies is typically low, presumably the expertise of software experts is used if new technologies are taken into use, and thus unsuitability problems can be avoided. Also, the employees' expertise in technology can be assumed to diminish unrealistic expectations towards technology and reluctance to use the chosen technologies. However, in many cases of organic growth the time pressure increases, and it can happen that there is no time e.g., to get acquainted with possible new technologies, or that there is no time to communicate about the benefits of chosen technologies.

In **acquisitioned growth** a common knowledge sharing barrier at the *individual level* can be lack of trust. As suddenly many people unfamiliar to each other are expected to work together and share knowledge, it cannot be expected that they immediately trust each other. As has been stated, there are software companies with highly competent experts, so that there are presumably no problems in terms of the employees not being aware of the value of possessed knowledge. This can be assumed to be the case regarding their own knowledge, but not the case between employees formerly working in other companies. Also power relationships can appear as a knowledge sharing barrier in acquisitioned growth, as e.g. competition for positions may occur and employees may try to search for their places in the new structure of the company. Creation of new social networks can also become a problem as many people accustomed to old habits are expected to get acquainted with each other.

As resources such as the amount of employees grows steadily with the growth in acquisitions, it can be assumed that there are fewer problems related to time. Thus, e.g. the daily tasks of employees can be assumed to stay quite the same as before the growth. Due to this it can be assumed that they also potentially have time to e.g. share knowledge and to get acquainted with new technologies. The assumption can also be made that in acquired growth

language problems are not likely, as the employee structure of the acquired company is quite balanced and there are not, for example, a lot of novices.

On the *organizational level* in acquisitioned growth, distance problems can become major, as in many cases companies involved remain working in their old premises and thus the distance between personnel can be quite big. Even if after acquisition everyone could work in one place, the amount of employees would have typically grown so extensively that the distance would grow anyway. In companies grown by acquisitions, challenges regarding the adjusting of the infrastructures of different companies together can also occur. In companies grown by acquisitions competitiveness between the buyer company and the acquired company can be very high, especially if the different units are not properly united and have not become familiar with each other or they e.g. compete for the same customers. It can also be assumed that as companies that have been working as independent units are united, the complexity of the organization will increase as the amount of employees, processes etc. grows. In acquisitioned growth there is also a high potential for lack or exiguity of network connections. For united companies there is a high temptation to stay working as they have been working, and not to seek new network connections from other united companies.

Since the focus of this study is acquisitions where companies truly merge together in order to gain benefits in the form of new competencies, it can be assumed that there is no problem in integrating the knowledge sharing purpose with the organizational goals. As the purpose of the whole acquisition is to get new competencies into use, the integration of the knowledge sharing purpose with the organizational goals can be assumed to be quite built-in. In this case it would be natural that the whole purpose of the acquisition is clearly communicated to the employees.

At the *technological level* the most likely knowledge sharing barriers may occur through unsuitable technology and reluctance to use the chosen technologies. In the case of acquisitions, there is a high possibility that there are different technologies in use in merged companies. These technologies may be incompatible with each other and knowledge sharing barriers may occur. The solution may be that there are common technologies chosen for the united company. In this case reluctance to use new chosen technologies may exist since many experts, especially software experts, like to do their work with specific technologies.

In **networked growth** several *individual level* barriers can also occur. Even though trust is an integral element in networking, it can be argued that in networked growth there is still a high potential for lack of trust. E.g. as people typically work in their own premises it may take a tremendously long time until trust between different parties of a network is created. It may also be that as the relationships within a network are typically not as tight as they would be if everyone were working in one place, there can be below awareness of the value of the possessed knowledge of the network partners. Distance between network partners can also cause a lack of social networks between network partners. Language problems may not be so relevant, as typically network partners are chosen on the basis of some substance similarities in order to get the network working.

At the *organizational level* in networked growth, distance can be a relevant issue generating knowledge sharing problems, as already indicated above. At the organizational level it may be that there are also infrastructure problems, as the network partners are typically chosen on the basis of substance synergies, not purely on the basis of similar infrastructure for knowledge sharing. Thus, challenges in adjusting the infrastructure of different companies together can also occur. In networked growth it can also be assumed that complexity increases as there are different, independently operating organizations involved. Due to this the routes towards knowledge sharing can become more complicated.

At the *technological level*, networked growth can involve the risk of technologies of different partners being incompatible with each other. In this case there may be problems in knowledge sharing as a reluctance to use the technology of other partners might emerge, since people are accustomed to using the technologies of their own company.

As the point in networked growth is usually to get more resources into use, it can be assumed that there will not be a lack of time for knowledge sharing. Presumably, power conflicts also will not occur as cooperation is aimed at benefitting all parties. Also, because the business processes are planned together in networking, it can be argued that a separation of the knowledge sharing purpose with the organizational goals is unlikely and also that managerial communication about the benefits of knowledge sharing will not be neglected. As the partners remain working mostly independently, but cooperate where they gain something positive, it can be assumed that the partners do not need to compete with each other. As the whole point of networking can be seen as benefitting from the resources and

competence of one's partners' and as the business processes are planned together, presumably there is no lack of network connections. This can also lead to new technologies being introduced after the common planning of business processes, with communication about them as well as training also being planned and implemented well, with reasonable time.

## 6. Synthesis and discussion

Knowledge sharing challenges in different growth companies in the context of the software industry has been the focus of this paper. The paper has suggested the most typical knowledge sharing barriers in different growth types on the basis of synthesis of knowledge sharing barrier literature and growth literature. These knowledge sharing barriers are synthesized in Table 1.

It is evident that knowledge is a highly important resource for software companies and thus special attention to knowledge sharing should be paid. Still, as the software business is a rather young industry it can be assumed that many software companies do not have well structured processes, including knowledge sharing processes. Also the abstractness of software can create challenges in knowledge sharing. Knowledge about abstract issues is typically not so easy to perceive and share with others, e.g. between software developers, salesmen and customers.

Continuous and rapid changes that are typical of the industry also create challenges from a knowledge sharing perspective. Software companies need to acquire and cultivate knowledge all the time to keep up with the pace of the industry. Also the typical nature of fast technology cycles creates turbulence in the business, and furthermore causes the challenge of updating the knowledge of the company continuously.

Because we are looking at grown software companies, there is probably not so much a problem in the awareness of the value of possessed knowledge, as it can be argued that typically experts are highly acknowledged and aware of their knowledge. Also, as the involved persons are accustomed to working with technology, they presumably do not have unrealistic expectations of technology. Despite this, problems may occur if it is forgotten that technology experts also need training in new technologies and that there is a need for communicating the benefits of technology that supports knowledge sharing.

When it comes to personal characteristics as possible knowledge sharing barriers, it is probable that the type of growth has no connection to personal

characteristics, as this is a totally personal issue. It can also be argued that the type of growth as well as poor organizational climate and culture as knowledge sharing barriers cannot be clearly analyzed, as culture is a creation of individual characteristics, habits, interaction, etc., that has been created over a long

period, and it is more likely that culture affects the growth type than vice versa. Also, a reward system for knowledge sharing is independent of growth type, as it can be seen related to the appreciation of knowledge sharing and company culture.

**Table 1. Key knowledge sharing challenges in the different growth types of software companies**

Knowledge Sharing Barriers		Type of Growth		
		Organic	Acquisitioned	Networked
Individual	Lack of time	x		
	Lack of trust		x	x
	Low awareness of the value of possessed knowledge		x	x
	Power relationships		x	
	Personal characteristics			
	Lack of social networks	x	x	x
	Language problems	x		
Organizational	Poor organizational climate and culture			
	Disintegration of the knowledge sharing purpose from the organizational goals	x		
	Neglect of managerial communication about the benefits of knowledge sharing	x		
	Distance		x	x
	Lack of infrastructure to share knowledge	x	x	x
	Lack of reward system for knowledge sharing			
	Competitiveness of different units		x	
	Complexity of the organization		x	x
	Lack or exiguity of network connections	x	x	
Technological	Unsuitable technology		x	x
	Unrealistic expectations			
	Reluctance to use the chosen technologies		x	x
	Lack of training	x		
	Lack of communication about the benefits of chosen technologies	x		
	Lack of time	x		

Thus, there are many knowledge sharing barriers that may not be problematic in growing software companies. However, on the basis of this study, it can be argued that there seem to be differences in knowledge sharing barriers depending on the type of growth.

For example, in organic growth the time pressures increase, which has an effect on knowledge sharing on many levels. It can also be assumed that management does not have enough time to pay attention to knowledge sharing issues. Furthermore, the time pressure on employees can lead to a deterioration of knowledge sharing. Also, the assumed small size of organically growing companies presumably has an effect on knowledge sharing. In small companies hierarchy is low and

personal relationships are tight, which correlates positively to knowledge sharing. However, it can also have negative effects, as cliques may exist and new employees are left out of knowledge sharing circles.

On the other hand, in acquisitioned growth big size and growing distances are major causes of different knowledge sharing barriers. For example, trust and networks may be hard to create as the size of the company suddenly increases substantially. Overall, it is assumed that it is challenging to get companies that have been working totally independently to work as one united unit, and to share knowledge throughout the entire grown company.

Lastly, in networked growth some of the same knowledge sharing barriers exist as in a company



grown through acquisition. However, as a company grown through networking remains an independent company, it seems to lack some of the knowledge sharing barriers that apparently have a connection with big size, such as competitiveness between the teams. At the same time, the company may face some challenges related to distance, such as lack of social networks.

On the basis of this theoretical study it seems that there are differing knowledge sharing barriers, depending on the type of growth path of the software company. It can also be summarized that knowledge sharing barriers are overlapping and interrelated. Since these interpretations are based only on the theoretical study of synthesizing literature of growth and knowledge sharing barriers in the context of the software business, it is also important to carry out empirical research. This paper is a part of a bigger study, and on the basis of this paper, three empirical studies will be carried out, where the expected knowledge sharing barriers of each growth type are studied empirically in software companies that have grown through different growth strategies. In light of these future empirical studies we will be able to also make suggestions in terms of managerial implications that will help software business managers to better evaluate and overcome potential pitfalls in the chosen growth strategy.

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## **PAPER II**

Kukko, M. 2013, Knowledge Sharing Barriers in Organic Growth: A Case Study from a Software Company, *International Journal of High Technology Management Research*, vol. 24, no. 1, pp. 18–2



# **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 & Lämsiluoto, 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 & Lämsiluoto, 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

	<i>Software business</i>	<i>Organic growth</i>
<i>Typical characteristics</i>	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-intensity	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.

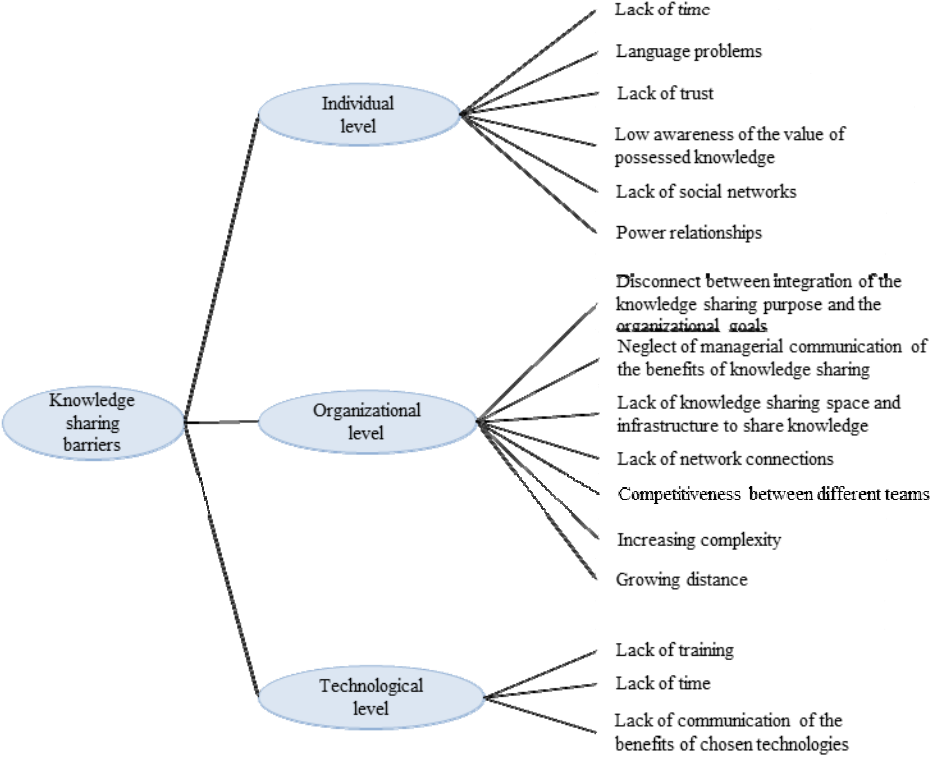


Figure 1. The potential knowledge sharing barriers facing an organically growing software company

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.

<i>Type of data</i>	<i>Purpose</i>	<i>Description</i>
<i>Interviews</i>	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
<i>Company specific written material</i>	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).

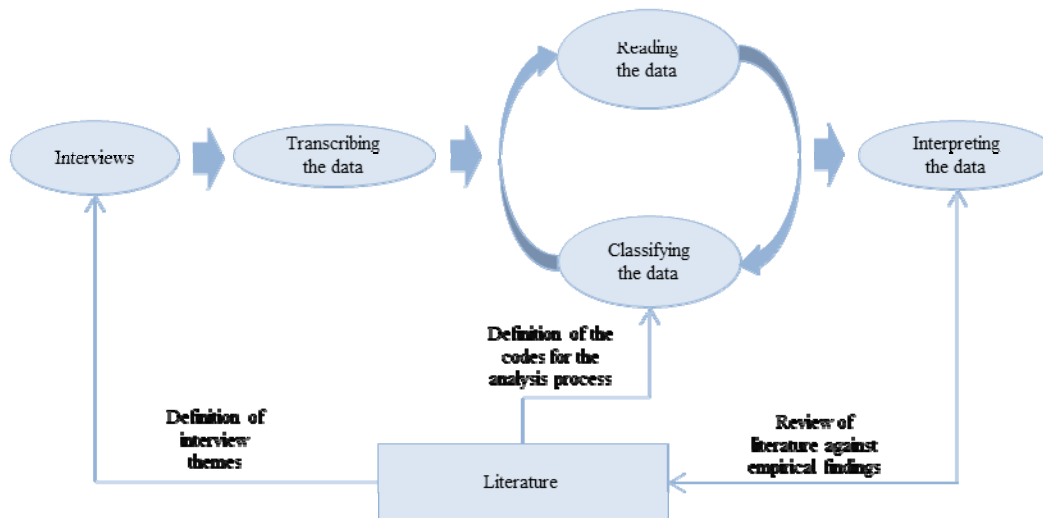


Figure 2. The summary of the analysis process

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 that 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.

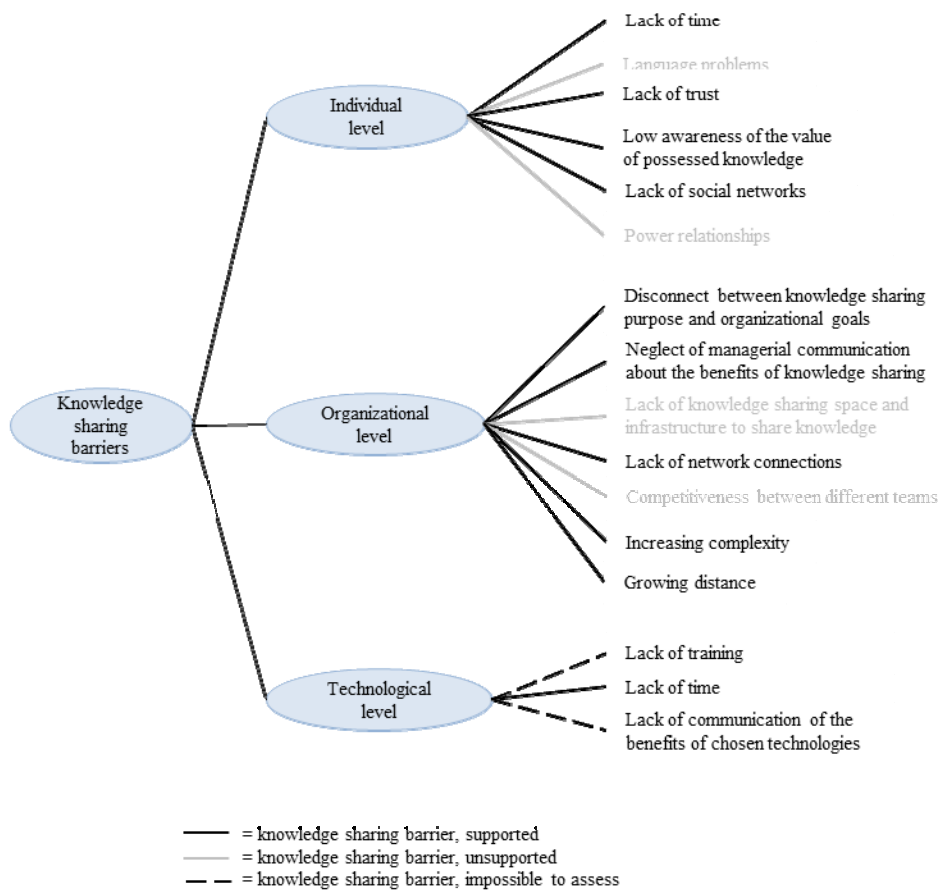


Figure 3. The knowledge sharing barriers potentially affecting an organically growing software company

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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### **PAPER III**

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# Knowledge Sharing Barriers of Acquired Growth: A Case Study from a Software Company

Regular Paper

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**Abstract** Acquisition as a growth strategy is often burdened by subsequent unsatisfactory performance. The literature suggests that a potential cause is mismanagement of knowledge. Such mismanagement may occur if the barriers to knowledge sharing in acquired growth are not adequately understood. Hence, the aim of this study is to improve understanding of the potentially most restrictive knowledge sharing barriers in acquired growth. It does so through a case study in the context of the software business. The findings of the study will help companies with a strategy of growing through acquisitions to better prepare for the challenging task of managing such growth. The paper also contributes to the literature on knowledge management by defining knowledge sharing barriers in the context of acquired growth in the software business. A contribution to growth literature is made by touching on the issue of the management of acquisitions from the perspective of knowledge management, and especially knowledge sharing.

**Keywords** Acquired Growth, Acquisitions, Knowledge Management, Knowledge Sharing Barriers, Knowledge Sharing, Software Business, Case Study

## 1. Introduction

Acquisition is one of the two basic strategies available to a firm seeking to grow, the other being organic growth [1]. Although it is a common growth strategy, it is often burdened by subsequent unsatisfactory performance [2-4]. One problem said to afflict growth is the management of knowledge [5], and especially the sharing of it [6-8]. This is the case although it has been argued that sharing of knowledge plays a crucial role in companies [9] and further in specific company situations, such as acquisitions [3].

Relatively few companies have successfully employed knowledge management procedures to support growth [10]. It also has been stated that there are not enough empirical studies on the challenges of knowledge sharing. While the positive issues of knowledge sharing have been quite widely studied, the challenging issues and risk factors remain less studied. [11] This remains the case despite the fact that unrestrained knowledge sharing can provide important support for acquired growth. Without effective knowledge sharing the knowledge is likely to have a limited impact on the effectiveness of

organization, as new knowledge combinations, learning and value creation may remain unrealized [2, 9]. Furthermore, if knowledge sharing processes are not functioning, the creation of new knowledge for future business opportunities may stagnate [12]. That makes it important to specify the barriers hindering or preventing knowledge sharing in acquisitioned growth. To that end, this study aims to determine the potentially most restrictive knowledge sharing barriers to acquisitioned growth.

Software companies are characterized as knowledge-intensive companies [13], where the role of effective knowledge sharing can be assumed to be crucial. The software business itself is also a business of rapid growth rates [13-15], and hence, offers an interesting field in which to examine knowledge sharing barriers to acquisitioned growth.

This paper should be relevant to companies with an intention to grow through acquisitions, as its findings can help prepare for the challenging task of managing growth by pre-empting knowledge sharing barriers, and perhaps offering ideas to overcome them when they are unavoidable. The paper also contributes to the literature on knowledge management by defining knowledge sharing barriers in the context of the acquisitioned growth of a software company, and to the literature on growth by touching on the issue of management of acquisitions from the perspective of knowledge management, and within it, especially knowledge sharing.

The following section presents the theoretical background of the study. In the third section, the method of data collection and analysis are explained. A case study on a software company then offers empirical evidence. Finally the paper closes with discussion and conclusion sections.

## 2. Theoretical background

We start by explaining the software business and the role of acquisitioned growth so as to set a context for the study. Subsequently, we review knowledge sharing barriers as they function in that context so as to prepare the ground for our empirical study.

### 2.1 *The software business and acquisitioned growth*

The software business is known as a knowledge-intensive business field. The software development and production process and also the results of the process, software and programs, are knowledge-intensive and often abstract. [13] The work is done by independent, competent and creative people [16, 17] who possess highly developed professional knowledge [18].

The software business largely drives and facilitates today's economy. The growth rate of a business is one factor that reflects its significance in the modern economy, and the rapid growth of software companies has become a typical feature of the business. The growth in the number of jobs has been far more rapid in the software business than in most other business fields. [13-15] This has also led to the emergence of larger companies in the field, which had largely been occupied by a multitude of small or medium-sized companies [19].

The software business is also portrayed as a turbulent and competitive environment [20]. That highly competitive environment is what makes it very difficult for a firm to gather and retain all the resources needed to compete effectively [21, 22]. Expanding firms therefore often face a resource gap, and one way for them to bridge it is through acquisitions, that can offer rapid access to new knowledge and resources [2, 23].

Acquisitions and organic growth are stated to be the two fundamental growth options for firms [1, 2]. As the name suggests, acquisitioned growth entails generating growth by acquiring an existing company: by acquiring external resources [1, 2, 4]. Hence, acquisitions simultaneously bring a company new personnel, new products and services, new processes etc. This will typically lead to a large-scale growth of resources and knowledge, which also often increases diversity [4, 24], reshapes the resource and knowledge base of a company [25], and leads to the enrichment of knowledge base and learning, and also to the rigidities and routines of the company being broken down [2, 23]. Consequently, a firm typically also absorbs new non-path dependent resources [24].

Success is, however, dependent on the differences between the acquiring and acquired companies not being so great that they prevent synergies, new resource combinations, learning and value creation [2], which typically leads to growth of knowledge [26]. New combinations increase new growth opportunities [24]. However, if resources are not shared throughout the expanded company, new combinations and opportunities might never emerge.

Acquisitions often revitalize the acquiring company and enhance its long-term survival by adding to its ability to react to changing circumstances [2]. However, acquisitions typically involve major change and that brings its own challenges. Following acquisitions there might for example, be different structures, different processes, and different cultures in place [27] that senior management must try to unite in one and the same company.

Acquisitioned growth is more typical of larger than of smaller companies. Acquisitions demand more capital

and management resources than organic growth does. [28] Resource and effort are further absorbed in integrating the acquired companies with the acquiring company [2], and managers will probably face considerable demands on their time and attention required to push that integration through [24]. Despite the high expectations that accompany them, acquisitions are in fact often associated with implementation problems and unsatisfactory post-acquisition performance. The issues are often caused by the differences between the companies involved. [2, 3] Those differences may for example lie in organizational cultures, structures, systems and management styles [27] and in fact cultural clashes and tensions are quite typical of acquisitions [29].

The typical characteristics of the software business and acquisition growth are listed in Table 1 below.

	Software business	Acquisition growth
Typical characteristics	Knowledge-intensive business field	A major change and challenge in a company
	Independent, competent and creative employees, with a high level of professional knowledge	Rapid access to new personnel, products and services, processes etc.; enrichment of knowledge base
	Abstract development and production process and results of the process; software and programs	Differences between the companies involved: appearance of different structures, processes, cultures, systems, management styles etc.
	Fast growing industry branch with rapid job growth, and emergence of also larger companies	Need for good deal of effort and resources to integrate the companies; need for capital and also time and attention from managers
	Turbulent and competitive environment	More typical of larger than smaller companies

**Table 1.** The typical characteristics of software business and acquisition growth

In the following paragraphs, we will connect the typical characteristics of a software business and acquisition growth with the various knowledge sharing barriers.

## 2.2 Knowledge sharing barriers in the acquisition growth of a software business

The barriers to knowledge sharing can be categorized at three levels: the individual, organizational, and technological levels. This categorization is a useful tool to contemplate knowledge sharing barriers, as it encompasses all the 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) [30], and the level which provides integral tools for knowledge sharing (the technological level) [31]. The categorization also makes it easier to understand the whole.

### 2.2.1 Individual level knowledge sharing barriers

Acquisitions can be seen as a one way for a software company to realize its aspirations of rapid growth. Acquisitions typically bring about a rapid increase in personnel numbers [2, 23]. Hence, *trust* may appear as a potential knowledge sharing barrier [9, 32], owing to the

development of trust demanding time and effort [33, 34]. There is a danger that employees who are unfamiliar with each other coming to work together in an expanded organization will not have had enough time together to develop the trust required to share knowledge.

As staff in the software business are characterized as being competent [16, 17] and possessing high levels of professional knowledge [18], it can be assumed that they are well aware of the value of their own knowledge. However, that might not be true of their knowledge of others, especially those from newly acquired companies. Employees who do not know each other well, naturally struggle to be aware of others' knowledge, let alone the value of such knowledge. Hence, *low awareness of the knowledge of others and its value* may be a potential knowledge sharing barrier [35-37].

The acquisition of a company may also raise the issue of a *lack of social networks* [32, 36, 38] between the employees of the newly expanded company. Because employees once from different companies are united into a single workforce does not mean that they immediately bond and create social networks. The creation of social networks in a firm expanded by acquisition is in fact likely to be slowed not only by people being unfamiliar with each other but also because people typically hang on to old routines and continue to use resources in the same familiar way [2, 9, 39, 40], leading to the continued use of past social networks.

Incorporation of the companies involved in acquisitions usually demands considerable effort and change [2]. The acquiring company is often quite large [1, 28] making it particularly challenging for management to define a common culture, structures, and processes that can be adopted by the expanded company going forward [27]. Hence, there is also a risk of overlapping jobs. This may lead to uncertainties which may manifest as "power games" [21, 41, 42], between employees competing for positions and trying to establish their places in the new structure of the company. It is a situation that encourages the view of knowledge as power and the concomitant choice of which knowledge to share and which not to [21, 41-43]. Hence, *power relationships* can emerge as a potentially very restrictive knowledge sharing barrier affecting acquisition growth in the software business [32, 36, 37].

As the number of employees often grows quite dramatically in acquisitions [24], and more employees should produce some synergies and time saving [24], one might assume that there are relatively few problems related to time as a knowledge sharing barrier [32, 35]. Employees should potentially gain time to share and internalize knowledge [35], however, the opposite may also be the case. If distance between people grows, it may

take more time than it did previously to find the right person and the right knowledge, leading to *time* emerging as a knowledge sharing barrier [32, 35].

We might also assume that language problems [9, 35] are unlikely to feature in the acquired growth of a software company, as companies typically acquire others with similar resources [2, 23] and an argot is shared by all staff. However, as acquisitions often increase the diversity of the resource and knowledge base [24], there may be a danger of *language problems*, especially if different occupational groups are merged into a single workforce [44].

### 2.2.2 Organizational level knowledge sharing barriers

Acquisitions in the software business usually cause a rapid increase in personnel numbers for the acquiring company [2, 14, 15, 23]. Furthermore, the characteristics of the industry mean that the employees involved may continue working in their existing premises. Thus, the *distance* between personnel can become quite big, causing knowledge sharing challenges [9, 35, 36].

Companies that have grown through acquisitions may also face challenges regarding the adjustment of their respective infrastructures to share knowledge originating in the different companies [32]. That there are potential *infrastructural differences* between merged companies is quite natural [2, 27]. Nevertheless, for companies to work as a united whole, requires the establishment of common infrastructures for knowledge sharing, although doing so can be impeded by the tendency of individuals to hang on to old ways of doing things [2, 39, 40]. Integration following acquisitions also demands a great deal of effort and resources [2], and the time consuming management challenges related to acquisitioned growth make creating a common infrastructure particularly challenging [24, 28].

In companies that have grown through acquisitions, *competitiveness* [32] between people who previously worked for different firms can feature strongly, especially if the different units are not properly integrated and the personnel have not become familiar with each other. The situation can become especially acute if one reason for the acquisition was to buyout a competitor [45]. Former competitor firms may continue to target the same customers, which naturally causes competition and may lead to knowledge not being shared between newly integrated firms [32]. Another factor that may impede knowledge sharing in the current context is the highly developed expertise of the individual software specialists [18], which may cause them to be reluctant to share their hard-earned knowledge.

Acquisitions also typically increase the *complexity of the organization* [46, 47]. As the scale of the business grows

many issues become more complicated and new ways of doing and organizing things have to be considered [1]. In integrated companies, differences in cultures, structures, systems, management styles etc. are likely to become evident [27], causing complexity and knowledge sharing issues [32]. Complexity issues can also give rise to *challenges to network connections*, making knowledge sharing more problematic, especially between the personnel of formerly separate companies [32]. People tend to continue working as they have been working [2, 39, 40] and there is often little impetus to create new network connections in the expanded company that include the staff from an acquired company that would facilitate mapping potential knowledge inside the new organization [32, 46, 47].

Since the purpose of acquisitions is typically to gain benefits and synergies in the form of utilization of the competencies of two or more companies [2, 24, 26], it might be assumed that there are no major issues integrating the knowledge sharing purpose with the organizational goals [32]. If the purpose of acquisitions is to bring all the competencies that formerly resided in separate companies into use in the expanded company, the integration of the knowledge sharing purpose with the organizational goals should have been built-in to the strategy. The benefits of knowledge sharing should also be properly communicated to employees by management. However, we know that acquisitions demand a lot of time and attention from managers [24, 28], and prior research indicates that not all companies are able to utilize knowledge management related activities to support growth [10], and that gives rise to a danger that *the communication of the benefits of knowledge sharing will be neglected by management* [32, 38].

Examination of the role of *organizational culture and climate* issues as knowledge sharing barriers, is not a straightforward task. Differences in organizational culture and climate issues related to knowledge sharing [27], may provoke cultural clashes and tensions [29] causing knowledge sharing to deteriorate [36, 38]. Alternatively, if the organizational culture and climate of the companies that are combined is oriented toward knowledge sharing and they share some similarities, cultural clashes and tensions may not arise and organizational culture and climate issues will not contribute to knowledge sharing barriers.

### 2.2.3 Technological level knowledge sharing barriers

At the technological level, the potentially most damaging knowledge sharing barriers in acquisitioned growth may arise as a consequence of *unsuitable or incompatible technology* [32, 38, 48] and *reluctance to use the chosen technologies* [48, 49]. In the case of acquisitions, it is very possible that the acquirer and acquired companies used



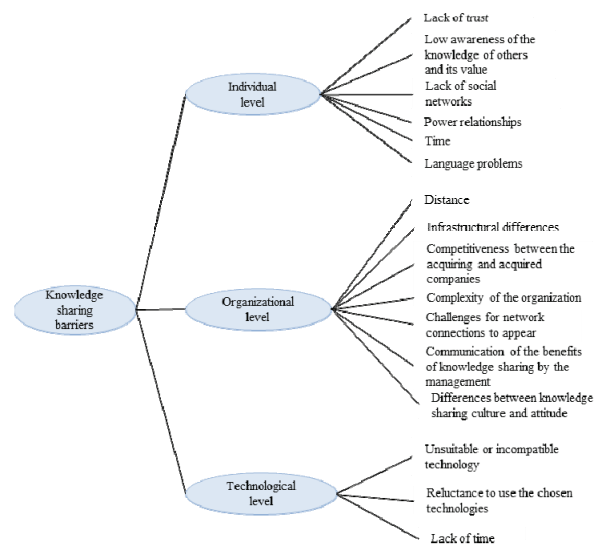
different technology [27]. If that technology is incompatible, knowledge sharing may be complicated. As people are usually routinized to do things in ways they have been used to doing them [2, 39, 40] they may be reluctant to use unfamiliar technology [49]. The highly developed expertise of software business specialists [18] can also cause them to be reluctant to utilize technology other than that they are expert in.

To overcome these challenges, the benefits of the chosen technology should be communicated properly. This is a task for management. We have noted that an acquisition demands a lot of time and effort of managers [24, 28], and it may be *challenging for them to find the time to communicate the benefits of the technology* [38, 49]. This may be especially apposite in the software business, as management may assume that the staff's technological expertise makes them aware of the benefits of all relevant technologies [13, 18], and therefore that the onus is not on management to communicate those benefits.

Acquisitions can also be assumed to generate some synergies [2]. This fact tends to lead to the assumption that employees would be able to find time to learn and absorb technologies new to them. It follows that *lack of time or lack of training in a technological sense* would not form a potential knowledge sharing barrier [32] in acquisitioned growth. However, there may have been considerable differences in the technology applied in the acquired company to that in place in the acquiring company [2]. Employees can find themselves expected to quickly absorb a huge volume of new material. Internalizing new technological material will often require a good deal of training, making the whole process a time consuming one. Yet, sufficient training on the new technologies adopted in the acquiring company is a potentially important element of stemming the rise of knowledge sharing barriers.

As a rule, however, it can be assumed that technology-related barriers to knowledge sharing are not so very restrictive in software companies. At least, as the subjects are software companies and people acquainted with working with technology who possess relevant expertise [16-18], it can be assumed that there are no unrealistic expectations of the technology, something previously cited as a knowledge sharing barrier [32].

The knowledge sharing barriers suggested by the literature review to be most relevant to a software company growing through acquisitions are presented in Figure 1 below. The barriers have been categorized at individual, organizational or technological levels as suggested by the literature.



**Figure 1.** The potential knowledge sharing barriers facing a software company growing through acquisitions based on the analysis of the existing literature

The barriers summarized in Figure 1 will be used as a framework to study the issues empirically. In the next section, the research methods of the study are outlined and details of the case organization presented. This is followed by the empirical study itself.

### 3. Research methods and the case company

The presentation of methodological choices starts the chapter. After this, the context of the study is presented by introducing the case company.

#### 3.1 Methodological choices

A qualitative case study was chosen as the research method to ensure an in-depth and holistic understanding of the research phenomenon, which is strongly tied to its context [50], specifically that of a software company that has grown through acquisition. The data were gathered in forty-two semi-structured, themed, interviews. The central subject matters, or themes, were specified beforehand [51, 52]. Themed interviews were chosen to ensure that the same sets of themes were addressed in all the interviews, while allowing space for the order and form of questions to be flexed, and also for follow-up questions to be asked. These techniques were applied to provide a comprehensive picture of the phenomenon under study [52]. The interviews varied in length between an hour and an hour and a half.

In order to get the most comprehensive and reliable picture of the phenomenon under study, personnel from different hierarchical levels were interviewed (see Table 2). These levels were management and the support level (managers, members of the architect group), the middle management level (team leaders, unit leaders) and the operational level (software developers, sales people). The

interviewees were selected by purposeful sampling [53-55]. The view of managers and “internal knowledge brokers” were taken into account in the selection of the interviewees, so as to acquire a broad perspective on the phenomena under study. The interviewees also were from different sites (basically from different acquired companies). To strengthen the reliability of the answers, the interviewees were guaranteed anonymity.

Type of data	Purpose	Description
Interviews	The core of the empirical material To identify the knowledge sharing barriers in acquired growth perceived by the company representatives	Management and support (12) - Semi-structured interviews - Duration: 1.5-2 hours
		Middle management interviews (17) - Semi-structured interviews - Duration: 1.5-2 hours
		Operational level interviews (13) - Semi-structured interviews - Duration: 1.5-2 hours
Meetings	To obtain background material on the company and different teams	- Meetings (3) with company representatives

**Table 2.** Empirical data

All of the interviews were recorded and transcribed as detailed interview memos. The data was analyzed qualitatively. The analysis process included the following main phases: reading the data, key word identification, thematization and grouping [51, 56]. The interview texts were read several times to obtain a sense of the whole and to get to know the data. Then the parts of the data that related in some sense to knowledge sharing were marked as interesting [57]. The intention was to extract all the data that were related to knowledge sharing and its possible barriers and enablers.

After that step, the data were coded, or classified which some regard as a better term when speaking of qualitative research [57, 58]. The classification used codes such as “time”, “organizational culture”, “compatibility of technologies” etc. The codes were selected to be “neutral” in tone; so without a positive or negative charge assigned to an issue supporting or preventing knowledge sharing. Following classification, the data was structured under larger analytical categories of “individual level barriers”, “organizational level barriers”, and “technological barriers”. In the next phase, we assessed whether the classified issues related positively or negatively to knowledge sharing. In other words, we asked whether the issues appeared as knowledge sharing barriers or as knowledge sharing enablers. In short, the analysis included reduction and classification/coding of the data, which were followed by combination and interpretation of the data [52]. In addition to the interview data, the authors attended three internal meetings of the organization. The meetings provided background data on the case company.

### 3.2 The case company

[53]The case company is a large software company doing business-to-business trade by providing large and complex ICT (information and communication

technology) systems for its organizational clients. The company has been engaged in rapid acquisition growth for some years. The aim has been to create a “united” company of the acquiring and acquired firms. The reality is, however, that the acquisitions have caused the company to become quite dispersed. The operations of the acquiring company have typically been based on working with separate teams/units. In addition, the operations of the company are geographically dispersed across several sites. The result is a company with many different teams. The teams differ in terms of their organizational backgrounds, technologies and products in use, and also have very different compositions. The physical distance between the teams is in many cases also rather large.

By the time of the study, the company had decided to move to a more productized—or in fact a “componentized”—way of working intending to improve knowledge sharing throughout the organization by reducing redundant information, improving cooperation between teams and increasing productivity. In practice, this component based software engineering meant that in addition of doing their daily tasks as before the employees had to try to identify potential components, i.e. software products, subparts or features that could also be used elsewhere in the company. The components were decided to be entered into the common component library to be available for the others in the organization. This component-based production was launched throughout the whole organization. The case organization had decided to take advantage of using a single shared technology, that is, just one programming environment and language deployed across the whole organization. This technology was already in use in a few teams, but was new to most.

## 4. Empirical findings

### 4.1 Individual level knowledge sharing barriers identified in a software company grown through acquisitions

In the case organization, there was a widespread understanding that organization-wide knowledge sharing would at least be important, if not essential for survival in a fiercely competitive market, and that the idea of software componentization was to share existing knowledge throughout the organization, bridging team and unit boundaries. The alternative would have been for each unit to continue working in isolation from the start to the finish of their project tasks rather than recycling existing ideas. Consequently, the overall idea of componentization was welcomed.

The interviewees felt that in the long run componentization would save time. However, especially in the beginning of the componentization initiative, it was

thought that it would require too much time to apply. Developing a software component requires considerable time, because one must think of its universal applicability. However, no extra resources were allocated to the componentization process, and the employees were too busy performing their daily tasks to assign time to componentization as well. Even so, interviewees thought that there would have been enough time for the componentization initiative, if management had prioritized it and allocated sufficient resources. That would have ensured the staff were absolutely clear that it was something to be prioritized and would have found time to implement the componentization initiative.

Trust was noted as an interesting issue. It was said that there might initially be some suspicion towards components. However, it was assumed that when viable components are identified from the component library, they would be warmly welcomed and suspicions would evaporate. It also was believed that nobody would add components to the component library before they are viable. The software developers saw delivering high quality components as a question of honor, and quality was seen as the key to trust. That said, unviable components would eradicate trust, and earning it back would be very difficult. The informants did therefore confirm a high correlation between quality and trust.

The interviewees did not see problems arising from any lack of awareness of knowledge and its value within their own teams. The team members were so well known to each other that everybody was quite aware of the knowledge they possessed. However, informants admitted to having little or no awareness of the knowledge held by the members of other teams, or of its value. The issue relates to the social networks in the company. There were social networks in place between employees who used to work in the same (acquired) companies, but not between employees of different acquired companies. There was hope that the boundaries between former companies/social networks would disappear little by little and everybody would feel like a member of a single united company. The roles of team leaders and superiors were seen as an important enabler of that unity. They were seen as network weavers, who would support the birth of social networks throughout the different teams and units. It was understood that social networks could prove invaluable to sharing knowledge, and be more effective than formal knowledge sharing channels.

Regarding language, it was stated that a software developer usually knows one programming language well and is expert in only that one. Nevertheless, it was stated that learning a new language is not an onerous task for a competent software developer. Hence, it was believed that technical argot was widely understood by

everybody. Overall, it was found that the terms and concepts used in the company were common, understood, and capable of use by all.

#### *4.2 Organizational level knowledge sharing barriers identified in a software company grown through acquisitions*

As mentioned above, there was essentially a good attitude towards componentization and knowledge sharing throughout the company. Some interviewees did, however, admit that software developers tended to have an attitude that the software code they had developed themselves was superior to any other. Despite this situation being acknowledged, it did not overly jeopardize knowledge sharing, because developers were willing to offer their own code for others to use. Employees also understood that everything that was developed was the company's intellectual property, and therefore that things developed inside the company should be shared and utilized throughout the company.

Nevertheless, the recent acquisitions had provoked some cultural clashes. There was some evidence of personality clashes, and attitudes to knowledge sharing differed according to which company an individual originally came from. Differences were particularly noticeable between people who had formerly worked for competing companies. Hence, the componentization initiative was welcomed, but there were some challenges to get it working on a larger scale throughout the company.

It was widely understood that componentization would support the success of the whole organization. Componentization was seen as a more effective way to use resources, and that was understood to connect to company success. However, management was unable to communicate the importance of componentization at a practical level and connect it to strategic goals of the company. Some employees did not even seem to recognize that componentization was a relevant issue for them, and some felt that their roles and responsibilities were unclear.

One further issue raised was the feeling that acquisitions had caused the company to grow so much that it was impossible to know everybody. Most employees continued to work mainly in their former locations, something that contributed to problems with getting to know new people and the knowledge they possessed. Informants reported that it was harder to share knowledge between people across large distances. One unit had people from different teams situated in the same premises; something considered a good approach to enhancing knowledge sharing between different teams. It was believed that componentization would increase knowledge sharing between teams in different locations, whether near to or far from each other.

Apart from the difficulty of sharing knowledge caused by distance, major infrastructural issues were not advanced as a cause of problems in knowledge sharing. The interviewees felt that there were for example the proper technological tools for componentization, but they did report having to make an effort to get used to the way of sharing knowledge in a bigger company. One example was the necessary use of the company intranet that was viewed as a useful tool, albeit rather illogical and laborious to use.

Some informants asserted that for componentization to really take off, some kind of reward would be needed. Creating components available and suitable for everyone to use required the developers to be motivated and have an incentive to create them. At the same time, some interviewees saw that motivation and incentive to create components would be driven by their appearance in the component library, when their usefulness and acceptable quality standard would be established. Another case made for having rewards was based on the fact that making components required a considerable investment of time and resources from a team. Respondents considered that the absence of rewards would mean that making components would only make the outcome of individual teams worse; one team would sacrifice time and efforts making components for others to use and save time, without gaining any benefits to the team itself. Some respondents believed that if management were to clarify that componentization was a part of everyone's job, they should all implement it without requiring any special rewards, because they were getting their salary from doing the tasks they are assigned to do. Others thought that the workforce might be motivated by the creation of a positive attitude towards componentization, if that were done by persons who were highly appreciated inside the company.

There was evidence of some rivalry between teams hindering the production of components destined to be commonly shared. Teams were under considerable pressure to get results, and that led to some questioning of why one team should "waste" its time and resources to make components for the common good, or to make the work of some other team easier, especially if they received no financial benefit from it. Hence, making a universal component was kind of a "power tool", as the employees were pondering, was it better for the team to make a universal component or not to make one.

The interviewees saw the organization to be quite dispersed. However, this was not viewed as causing major problems in sharing knowledge and components within a team; it was though identified as an issue affecting knowledge and component sharing between teams. It was felt quite unrealistic to expect everyone to know everyone else in different teams. This difficulty

created both knowledge sharing challenges, and made establishing network connections across the whole organization problematical. The staff of the organization had grown to such an extent that it was hard to recognize where the most useful network connections would come from.

#### *4.3 Technological level knowledge sharing barriers identified in a software company grown through acquisitions*

Technological tools that were planned for knowledge sharing (e.g., the intranet and component library) were seen as fit for purpose. However, there were challenges relating to the compatibility of different technologies. The aim was to make components that would be compatible throughout the company, but the problem was that there were so many different technologies in use that creation of universal components was very difficult. Hence, there was a considerable expectation placed on new technological solutions, and new common technologies were supposed to solve most of the incompatibility problems. There was also a belief that the employees were so skilled that they would quickly learn to apply the new technologies.

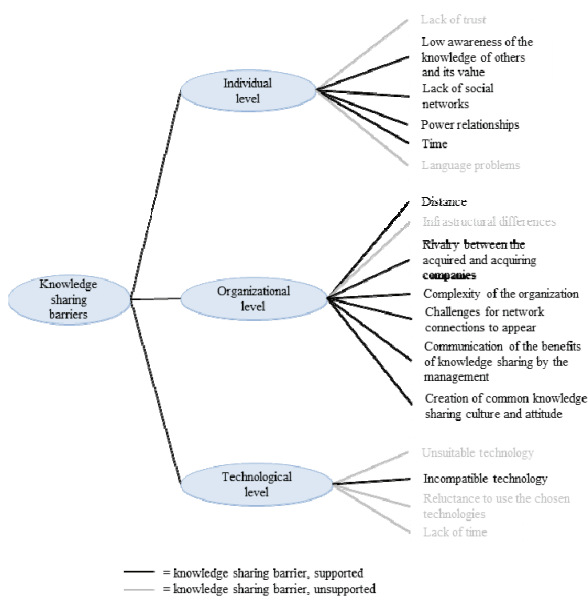
In practice, however, it was not possible to implement the use of new technologies throughout the company, because in some departments the practice of employing other technology was too well established. The situation led to some suspicion that the new technologies were not suitable for use throughout the company and therefore component sharing was not feasible throughout the whole company either. Hence, it can be said that the software professionals were adopting a realistic view of componentization.

The new technologies were welcomed by most. It was seen as a wise way to work and was expected to ultimately make everyone's work easier. However, there were also some that were not enthusiastic about the new technologies and would have preferred to work with the technologies in place prior to the acquisitions. Nevertheless, it was acknowledged that if there were enough training on the new technologies, people would start to use them. Learning to use new technology was not seen as a major issue, because the employees were so highly skilled. However, there were some concerns that insufficient time had been allocated for training. Some respondents were concerned that there was an expectation that employees learned about the required new technologies in their own time, and that was not seen as the best possible solution. It was, however, recognized that if an employee highlighted a need for training, the training opportunity would be offered. Rather than technical training, the bigger issue was seen as acquiring training on the componentization process, in terms of who does what and with which tools. A common

complaint was that management had not only not communicated the process or benefits of componentization adequately, but neither had it found time to communicate adequately about its new preferred technologies.

## 5. Results and discussion

This study suggests that it is possible to identify knowledge sharing barriers associated with the acquisition growth of a software company. The empirical study confirmed the presence of most, but not all, of the knowledge sharing barriers that the literature anticipated would affect a software company growing through acquisitions. These issues are illustrated in Figure 2 below.



**Figure 2.** The barriers potentially affecting knowledge sharing of a software company growing through acquisitions

Rather surprisingly, the empirical study indicated that trust did not play a large part in any knowledge sharing problems. Producing good quality software components was something that every good software developer would aspire to. Hence, it was taken as read that the components would be of good quality and trust would be built on that. Hence, there was no lack of trust creating knowledge sharing barriers.

The literature review indicated that awareness of the knowledge held by members of different teams, and of its value, would be relatively low. This is quite natural, as it is quite unrealistic to expect that large numbers of new employees joining a firm in the midst of rapid expansion could become acquainted with each other's aptitudes and knowledge immediately. Hence, it is also quite natural that, as the literature review implied, there would be an absence of social networks, and that would present knowledge sharing challenges. The idea of power

relationships acting as a knowledge sharing barrier also gained support from the empirical study. However, this came out more from a team level perspective than an individual level perspective, as there was concern over how componentization would affect team results and whether the team would benefit from sharing components it had developed.

Extant literature would suggest the lack of time creates a knowledge sharing barrier in a software company growing through acquisitions. This was also supported by the empirical study. The main reason for this was that management did not really reserve time for employees to build components and to share them with others. The extant literature also suggested that language issues could cause knowledge sharing problems, but that was not the case in the empirical study. Evidently, the argot of the software business is sufficiently common that it militates against knowledge sharing challenges arising.

The empirical study supported the suggestion of the literature review that distance would be a knowledge sharing barrier in the acquisition growth of a software company. It is quite natural that since acquisitions tend to lead to relatively large growth in a short timescale, they would in turn tend to increase distances and greatly increase complexity within the organization. In this situation the establishment of network connections also becomes problematical, making it harder to share knowledge, especially face-to-face. However, the case study, perhaps surprisingly, revealed the employees to be quite satisfied with the infrastructure in place to share knowledge, and they revealed no desire for any immediate improvement in that area.

The literature review also suggested that a positive knowledge sharing culture and climate in the expanded company would reduce knowledge sharing challenges, and that the opposite would apply too. This assertion did not gain empirical support. All the formerly separate companies seemed to have had a good knowledge sharing culture and attitude. However, in the expanded firm there did not seem to be a common knowledge sharing culture and attitude, but instead some rivalry was observed between personnel who originally worked for different companies that prompted some knowledge sharing challenges.

As the literature review suggested it would, the management was able to make the connection between knowledge sharing, i.e. componentization, and organizational goals clear. However, communication of the benefits of knowledge sharing at the practical level was neglected by the management, as the literature review had predicted it might be.

The empirical study did not support the argument that there would be issues arising from the unsuitability of technology leading to knowledge sharing deterioration. However, the argument about incompatible technologies proved to be very real. This is quite natural, as the software business operates in big markets with many different technological solutions, so it would be rather surprising if a company acquired only other companies using very similar technologies.

The suggestion of reluctance on the part of employees to use new technologies was not unambiguously supported in the empirical study. It seems that, generally, software experts are willing to accept the challenges presented by new technology but there were individual exceptions. In contrast to the argument arising from the literature, the empirical study suggests that time on the technology level is not a very relevant knowledge sharing barrier. Obtaining the time to learn new technologies seemed to be more of a question of employees acting to flag up to their superiors the need for time to be dedicated to learning.

At many points of this empirical case study the different challenges related to knowledge sharing were entangled. Furthermore, the sheer scale of the growth occasioned by acquisitions seemed to present many challenges to knowledge sharing. The role of management also seemed to be crucial in terms of promoting unrestrained knowledge sharing in the midst of the acquisitioned growth of a software company. Hence, it can be argued that the knowledge sharing barriers to the acquisitioned growth of a software company are interlinked and highly related to the role of management and to the extent of the relevant growth strategy.

## 6. Conclusions

The aim of this study was to create further understanding of the potentially most restrictive knowledge sharing barriers in an acquisitioned growth context. The current research has presented a case study examining the relevant potential knowledge sharing barriers for a software company growing through acquisition. The findings of the study will help companies sharing an aspiration to grow through acquisition to better prepare for the challenging task of managing growth. The paper also contributes to the literature on knowledge management by defining knowledge sharing barriers in the context of acquisitioned growth in the software business. It makes a further contribution to the growth literature by touching on the issue of the management of acquisitions from the perspective of knowledge management, and especially knowledge sharing.

Based on the literature review and empirical evidence gained from our case study, we suggest that there are

some knowledge sharing barriers that can afflict a software company that has grown through acquisition that are more potentially restrictive than others. For managers leading an acquisitioned growth strategy, it will be useful to know which knowledge sharing barriers have the most potential to derail the strategy, so that they might steer resources toward preempting or dismantling those barriers. The results of the current study suggest that there are a few fundamental issues that demand management attention. One seems to be the attention and effort management assigns to knowledge sharing. First, management should prioritize knowledge sharing. Then it should ensure it communicates its importance well. However, the understanding of the importance of knowledge sharing by management and its subsequent communication seems not to be enough. Management should ensure that the implementation is also conducted properly. The staff of our case firm demonstrated a generally positive attitude towards knowledge sharing. However, to successfully implement knowledge sharing that crosses the boundaries of practice within individual companies, management intervention and resource allocation will be required. This is a need magnified by the often large-scale growth occasioned by acquisitions.

As the current research revolves around a single-case study, further studies would be needed to obtain more generalizable results. A survey would serve that purpose. As an acquisition strategy is but one of the available growth options, it would be interesting to compare the knowledge sharing barriers associated with it and the knowledge sharing barriers arising within firms pursuing organic and networked growth. This comparison is in fact already underway, as this study is a part of a larger study incorporating scrutiny of organic and networked growth. As the role of the management seems to be crucial, it would also be interesting to conduct research on the relationship of leadership and management styles to knowledge sharing barriers.

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## **PAPER IV**

Kukko, M. & Helander, N. 2013, Knowledge Sharing Barriers in Networked Growth in the Software Business, *The International Journal of Business Competition and Growth*, vol. 3, no. 2, pp. 105-120



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# **Knowledge Sharing Barriers in Networked Growth in the Software Business**

## **Abstract**

Business networks can offer ways for companies to leverage their resources to find new opportunities to generate growth. However, the management of networked growth is not an easy task. Rather often the challenges in networked growth surround knowledge management issues as previous research has identified problems occurring especially in knowledge sharing between the network partners. Hence, this paper aims to identify the common knowledge sharing barriers in networked growth, by a case study in the context of the software business. The findings of the study will help practitioners better prepare for the challenging task of networked growth. The paper contributes to the growth literature by touching the issue of management of networked growth from the perspective of knowledge management, especially knowledge sharing. In addition, the paper contributes to knowledge management literature by offering empirical evidence for the earlier theoretical studies about knowledge sharing challenges.

**Keywords:** Company growth; networked growth; knowledge management; knowledge sharing; knowledge sharing barriers; software business

## **1. Introduction**

Research has traditionally presented two fundamental strategies companies desiring growth might employ: organic growth and growth by acquisitions (Penrose 1995). However, an increasing number of companies are attracted to the potential of networking as a growth strategy (Peng, Heath 1996, Jarillo 1988, Johannisson 2000). Networking can provide the resources required to fortify growth (something that is often an issue with organic growth) and can also mitigate the bureaucratic costs related to internalising or even merging operations that are typical of growth by acquisition (Penrose 1995, Peng, Heath 1996).

Although there are many benefits to networks they are hybrids, and consequently often difficult to manage and associated with high failure rates (Miles, Snow 1992, Parkhe 1993). Literature (Brouthers, Brouthers & Wilkinson 1995, Das, Teng 1997, Inkpen 1998) suggests one common reason for unsuccessful attempts at networked growth; the failure to share relevant knowledge in an appropriate manner. Several studies have called for greater understanding of the knowledge management (KM) procedures within a network (Man 2008, Man et al. 2008, Meriläinen, Halinen 2009). It has been stated that there are not enough empirical studies of the challenges of knowledge sharing in networked growth. There is research on the positive side of knowledge sharing in networks, but even though the ability to utilise network resources has been stated to be a critical skill in networked growth (Peng, Heath 1996, Jarillo 1989), the challenges and risks have received less attention (van Burg , Berends & van Raaji 2008). Without knowledge sharing, network partners cannot utilise the specialised resources and capabilities of the whole network, and the creation of new knowledge for future business opportunities may stagnate (Valkokari, Helander 2007). This study aims to enhance understanding of the potentially

most restrictive knowledge sharing barriers (KSBs) facing a company growing through networking.

We have chosen the software business as our research context because previous research indicates that networking is an especially relevant growth strategy for software companies (Hoch et al. 1999, Tyrväinen, Mazhelis 2009), and because software companies are characterised as knowledge-intensive (Hoch et al. 1999) where the role of effective knowledge sharing can be assumed to be central.

The relevance of networking to the software business makes the current research potentially useful to companies operating in that sector. Recognition of the most restrictive KSBs to networked growth would allow management to pre-empt them. Despite the central contribution made by the empirical study, the role of the paper's theoretical review of KM and business network literature remains important. The paper aims to fill the gap between KM-focused knowledge sharing literature, network literature and more general management-oriented business growth literature.

The theoretical discussion is presented in the second section of the paper. The third section explains the research methods and presents the case study. The results of the empirical study are then presented before the discussion and conclusion section.

## **2. Theoretical background**

To understand the specific barriers to knowledge sharing in a software company pursuing networked growth, we first examine the characteristics of the software business and networking. That examination allows us to evaluate KSBs to set a foundation for the empirical study.

### ***2.1. The software business and networking***

The software business is typified by continual and rapid change. It is a high technology and highly knowledge-intensive sector, determined by the software development and the results of the process, its software and programs being knowledge-intensive and typically also abstract (Hoch et al. 1999). A software business would usually be established by independent, competent and creative people (Bettencourt et al. 2002, Løwendahl 2005) with a high level of professional knowledge (Miles 2005). Knowledge and innovation are central to competitiveness (Hoch et al. 1999) and safeguard the potential to grow (Dayasindhu 2002). The technology life-cycles are notably shorter than in many other industries, which underlines the importance of factors like intellectual property rights (IPRs).

The software business exemplifies a field where both growth and networking are not only common, but almost key to survival (Hoch et al. 1999, Frank 2009). The industry is still one of the fastest growing with a high rate of job growth. Many software companies have an ongoing aspiration to grow (Hoch et al. 1999, Hecker 2005, Lacey, Wright 2009), while the high growth rates of the industry as a whole inevitably mean that many software firms never find the path to growth (Miettinen, Mazhelis & Luoma 2010). However, networking might prove a wise growth strategy for many software companies (Hoch et al. 1999), particularly if combined with successful standardisation which provides access to the interfaces of different software systems.

A network is formed of inter-organisational relationships (Easton 1992) which are long-term, close, and deep (Jarillo 1988). Central features of networking include mutual interests, interdependence, reciprocity, common values, and flexibility (Jarillo 1988, Jarillo 1989, Easton

1992). Successful networking utilises the resources of the network partners without a firm having to internalise the operations of its partners (Peng, Heath 1996). This creates opportunities for growth. Although the operations are not internalised, business processes are planned together (Johannisson 2000) and the network approach takes into consideration the relationships between actors (Bradfield, Gao 2007). Networking companies should have complementary resources and skills, compatible objectives and there should be trust between the companies (Miles 2005). The strengths of one partner should counter the weaknesses of another and vice versa (Carlile 2004).

Typically networks are stable but not static. Due to the relationships between actors in the network, evolutionary changes are more the norm than radical changes. The interdependencies between the organisations typically affect the structure of the network: the greater the interdependence of the organisations, the clearer the structure of the network. There may be tight networks, featuring many bonds between the actors and well-defined roles and functions, and looser networks characterised by the opposite features (Easton 1992). The current research's interest is in a network with tight relationships, so that there is a need for real knowledge sharing to stimulate growth. The typical characteristics of the software business and business networks are listed in Table 1 below.

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The combination of the characteristics presented in Table 1 provides a fruitful context to study company growth from the viewpoint of knowledge sharing. There are several challenges characteristic in the software business that are easier to cope with when networked with other organisations. For example, short technology cycles are tackled better when risks and R&D costs are shared with network partners. Another example is standardisation, in which networks and allies of companies offer the power that is needed in order to achieve certain standardisation solution. Furthermore, the software business is an industry sector marked by rapid and continual change, where long-term oriented networks can offer adaptability but also certain stability in the fast changing environment. Hence, scrutiny of the characteristics creates a fresh context for research.

## ***2.2. Knowledge sharing barriers to the networked growth of a software company***

Prior research (Bradfield, Gao 2007, Carlile 2004, Cabrera, Cabrera 2003, Christensen 2007, Haldin-Herrgard 2000, Riege 2005) indicates that KSBs can be categorised as individual, organisational, or technological types. This division of the barriers is useful, as it encompasses all the three integral elements of KM: the level where knowledge resides (the individual level), the level where knowledge attains its economic and competitive value (the organisational level) (Hendriks 1999), and the level which provides integral tools for knowledge sharing (the technological level) (Maier 2002). These levels are also present in networks, as relationships between the networked organisations are always developed by individuals. The organisational level is even more complicated in networks than within a single organisation, as networks usually comprise several companies attempting to jointly define procedures for knowledge sharing and balance different organisational cultures while operating together. Additionally,

technological choices play a notable role in the processes between the network actors. This kind of categorisation also makes it easier to understand the whole.

### *2.2.1. Individual level knowledge sharing barriers*

As networks comprise relationships, the roles and actions of individuals are important. Individuals build and maintain relationships and it is at the individual level, that trust between the partners is built. *Lack of trust* has been identified as a relevant barrier to knowledge sharing (Riege 2005). While trust is important in networking (Miles 2005), it can be a very restrictive KSB as the time and effort demanded of the network partners (Hite 2005, Lorenzoni, Lippardini 1999) to create trust makes its establishment very challenging (Jarillo 1995, McAdam, Marlow 2007).

While a central aim of networking is to utilise external resources to generate growth (Peng, Heath 1996, Jarillo 1989, Borys, Jemison 1989), networking should release resources for knowledge sharing too, and simultaneously reduce the potential influence of *time* as a knowledge sharing barrier. Alternatively, a wide network may necessitate more time to find the right people to talk to and to share knowledge with. People working on their own premises (Peng, Heath 1996) and in a business targeting complementary resources and skills (Brouthers, Brouthers & Wilkinson 1995) may also be less *aware of the value of the knowledge* possessed by those in partner companies (Riege 2005). However, mutual interest, the compatible objectives of network partners (Brouthers, Brouthers & Wilkinson 1995), and the joint planning of business processes (Powell 1990) may help familiarisation and limit the risk associated with a low awareness of the value of knowledge possessed.

Social relationships between the knowledge sender and receiver support knowledge sharing (Christensen 2007). Distance between network partners makes it harder for social relationships to emerge, making knowledge sharing more challenging (Inkpen 1998). If the operations of the network partners are not internalised (Peng, Heath 1996) it may increase the chance of a *lack of social networks* (Christensen 2007). The rapid growth in headcount in the software industry (Hoch et al. 1999, Hecker 2005, Lacey, Wright 2009) also constrains the emergence of social networks between individuals (Christensen 2007). These issues may also lead to the emergence of *power relationships* as a KSB in networked growth, as people who do not know each other well try to secure power through selectively sharing knowledge, that is seen to equate to power (Cabrera, Cabrera 2003, Galbraith 1977, Pfeffer, Salancik 1978, Thompson 1967).

The well-developed professional knowledge of software industry employees (Miles 2005) and network partners being chosen on the basis of complementary resources and skills (Brouthers, Brouthers & Wilkinson 1995) suggests that network partners in the software field share a common language, so reducing the potential of *language problems* to create knowledge sharing problems.

### *2.2.2. Organisational level knowledge sharing barriers*

A common organisational level knowledge sharing barrier is a *poor organisational culture* (Riege 2005). The interdependence of network partners (Jarillo 1988, Jarillo 1989, Easton 1992) may lead to cultural collisions causing knowledge sharing problems, but they may be mitigated by sharing common values (Jarillo 1988, Jarillo 1989, Easton 1992) and joint planning of business processes (Johannisson 2000).

Other typical causes of knowledge sharing problems can be *poor integration of the knowledge sharing purpose with the organisational goals* and a *lack of managerial*

*communication about the benefits of knowledge sharing* (Riege 2005). Networking requires many processes to be jointly planned (Das, Teng 1997) and network organisations have to find mutually acceptable ways to operate (Johannisson 2000). For plans to be feasible, strategic goals should also be compatible and convergent (Brouthers, Brouthers & Wilkinson 1995, Lorange, Roos 1991). Ideally, the purpose of the knowledge sharing and the organisational and networking goals it relates to are not separable. This in turn requires management to diligently communicate the benefits of knowledge sharing throughout the network and employing both formal and informal communication to convince the network partners that all parties are committed to the common agreements (Das, Teng 1997).

*Distance* (Haldin-Herrgard 2000) is also a factor capable of generating knowledge sharing problems. Generally there is little movement of employees between work premises of different network partners (Peng, Heath 1996). This distance between people complicates knowledge sharing (Haldin-Herrgard 2000) and creates *infrastructure challenges* (including information and communication technology demands) to connect people working at a distance from each other (Riege 2005). As network partners are typically chosen on the basis of substance synergies (Brouthers, Brouthers & Wilkinson 1995), not on the basis of similar infrastructures for knowledge sharing, infrastructure challenges are very likely to arise.

There is also a risk of network partners competing (Lorange, Roos 1991), and thus a risk that knowledge sharing deteriorates owing to *the competitiveness between different units* (Riege 2005). Successful network partners should be able to both give to and depend on one another. There is also evidence that a network must advance the strategic goals of each partner to be successful (Brouthers, Brouthers & Wilkinson 1995). The most fruitful situation is where the partners' strategic goals converge, but their competitive goals diverge (Lorange, Roos 1991). Accordingly, the behavior required of each partner and the rules of commitment mentioned above should be explicit (Das, Teng 1997). These rules should be clear to all partners in a harmonious and productive network in order to diminish the kind of competition between partners that would block the sharing of relevant, complementary knowledge between them.

Another barrier to knowledge sharing can be caused by the *complexity of the organisation* (Hansen 1999, Hansen, Nohria & Tierney 1999). Networking can increase complexity, as different organisations are governed by their own structures and procedures (Peng, Heath 1996). Complexity typically manifests in different organisational units not being aware that useful knowledge already exists in some other unit, or if they know of its existence, where that knowledge resides (Hansen 1999, Hansen, Nohria & Tierney 1999).

Another typical organisational level knowledge sharing barrier is the *lack or exiguity of network connections* (Hansen 1999, Hansen, Nohria & Tierney 1999). This is very unlikely to arise as a problem in networks. After all, networking is often a result of existing network connections (Johannisson 2000, Hoang, Antoncic 2003). Furthermore, as a network is an entity in which different human and physical resources are built, adapted, developed, understood, related and combined for the benefit of its members (Håkansson, Ford 2002), it seems very probable that a particular network will embody sufficient network connections on which to build successful knowledge sharing. However, connections should of course be developed on an ongoing basis, bearing mind the effective transfer of knowledge between network partners.

### 2.2.3. Technological level knowledge sharing barriers

Several previous studies have argued that technology can support knowledge sharing, but there are studies that have identified technological level KSBs (Watts Perotti, Wall & McLaughlin



2010). One technological level KSB arises when *technology is unsuitable or incompatible* (Riege 2005). Interdependence (Jarillo 1988, Jarillo 1989, Easton 1992) and utilisation of the resources of a network partner without internalising the operations of those network partners (Peng, Heath 1996) may lead to real incompatibility problems. Shared technology is not typically a basis for selecting network partners, as the predominant criteria are complementary resources and skills, compatible objectives and inter-firm trust (Brouthers, Brouthers & Wilkinson 1995). However, as in networks, business processes are often jointly planned (Johannisson 2000) and there may be the motivation to find compatible technological solutions.

In addition, *unrealistic expectations of the technology* have in many cases created KSBs (Riege 2005). This barrier can be assumed to relate to the nature of the business and the competence of employees and hence is not so dependent on whether the organisation is growing through networking or some other growth strategy. The expectations of personnel operating in the software business with regard to technology (being informed by their shared professionalism) should be realistic (Miles 2005).

A related factor is a *reluctance or lack of aptitude to use the chosen technologies* (Ardichvili 2008), and it can become a relevant knowledge sharing barrier in networking as there is typically no internalising of the operations of the network partners (Peng, Heath 1996). When networks are formed between partners using different technologies, staff may be reluctant to use technology other than that they are accustomed to. A certain reluctance aside, workers in the software field, having a high level of professional knowledge (Miles 2005), should have the aptitude to use new technologies.

*Lack of communication about the benefits of the technology* is another suggested knowledge sharing barrier (Ardichvili 2008). It can be assumed that with a software business, internal marketing focusing on the benefits of technology are not usually required as employees of software companies are probably aware of the technical details of different technologies, but still it is needed for the sake of understanding the benefits that the different technologies can provide for improving knowledge sharing. *A lack of training* on the technology level has also been proposed as a common knowledge sharing barrier (Riege 2005). There is a risk that software business organisations presume all employees are expert in the relevant technology (Miles 2005) and so do not need training to adopt new technologies. However, there may be a real need for training in networked growth as the technological tools of network partners may be new to other partners. In addition, a *lack of time* can be a relevant knowledge sharing barrier in connection with technology (Cabrera, Cabrera 2003). However, if the point of networking is to benefit from the resources and competence of one's partners (Peng, Heath 1996) and if some business processes are jointly planned, (Johannisson 2000) it seems likely that resources would be allocated to understanding new technologies.

Below, we outline our research methods and then examine the KSBs affecting networked growth through an empirical study of a software company.

### **3. Research methods**

The research method chosen is a qualitative case study because the phenomena studied, networked growth and KSBs, are complex and the method yields an in-depth and holistic understanding of the research phenomenon that is strongly tied to its context (Yin 1994).

The case study is built on multifaceted data (see Table 2), at the core of which are 14 semi-structured, thematic interviews. Semi-structured interviews made it possible to ask the

interviewees about the main themes of the research, but also to add more detailed questions as required to obtain genuine answers without leading the interviewees (Yin 1994). The interviews were conducted with representatives of the focal company, but also with selected software suppliers and customers in order to obtain different perspectives. The interviews lasted between 90 minutes and two hours and were conducted in the interviewee's office. The interviews were recorded and field memos were also written during the interviews. Company specific reports were gathered to complement and verify the interview data, the accuracy of which was also checked through meetings with representatives of the focal company.

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The data was analysed qualitatively and the process is illustrated below (see Figure 1). The analysis started by noting those parts of the data that somehow related to knowledge sharing (Seidman 2006), to ensure that any data with any relation to knowledge sharing and its possible barriers were not missed. In this phase of exercising judgment about what is significant in the data the researcher has begun to analyse, interpret, and make meaning of the data (Seidman 2006). Only after this step was the data coded, or classified as some prefer to term it in relation to qualitative research (Seidman 2006, Dey 2005), in more precise level. The codes adopted were derived from the literature of knowledge sharing barriers, and it was used codes such as "time", "organisational culture", "technological tools", etc. The ideas arising during this analysis phase were structured under the broader "individual level", "organisational level", and "technological level" analytical categories (Seidman 2006, Saunders, Lewis & Thornhill 2009). The next step was to determine whether the classified issues hindered or prevented knowledge sharing or enhanced it. The analysis also included interpretation of the codes and categories for thematic connections within and among them (Seidman 2006, Saunders, Lewis & Thornhill 2009). In essence, the analysis included the reduction and classification/coding of the data, followed by the combination and interpretation of the data (Seidman 2006, Saunders, Lewis & Thornhill 2009, Hirsjärvi, Hurme 2004).

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The chosen case company operates in the industrial automation sector and meets the following key criteria: it utilises networking in its operations, its sales have grown during networking, and it does business in the software field. The company operates in business to business markets, providing its organisational customers with a wide range of devices and larger automated production systems based on the integration of software with hardware. The company represents an embedded software business type in the classic typology of software business models (Hoch et al. 1999, Cusumano 2004). Furthermore, the case company has sought growth through networking. It is strongly networked to three other software companies and a large number of hardware companies and that enables it to offer a turn-key production line solution for its customers. This turn-key solution represents an innovative leveraging of the core business of the focal company and also offers a route to sales growth, but such growth would not be possible without the partner network.

## **4. Empirical study**

This section presents the empirical findings of the study. The results will be discussed through the classification of knowledge barriers into individual level, organisational level and technology level.

### ***4.1. Individual level knowledge sharing barriers identified***

Most of the network partners had been working together before the launch of a real partner network. In particular, there were close dyadic relationships between the focal company and each of the software suppliers. This shared history led the interviewees to describe cooperation as working well and personal bonds as very strong. These personal relationships helped the suppliers to trust the focal company and vice versa, and further, to share knowledge openly. However, the three software suppliers had not been working together as closely before the launch of the real partner network and although the suppliers trusted the focal company, they lacked a similar mutual trust. Hence, there was trust on vertical level of the network (between the focal company and suppliers), but there was a lack of trust on a horizontal level of the network (between the different suppliers). This was the case, although knowledge should flow both vertically and horizontally inside a network.

Although one aim of networking is to use external resources to make operations more effective, the current case study suggests that networking demands such an effort that it does not release more time for knowledge sharing, at least in the early stages of cooperation. Those stages were marked by haste, often caused by over optimistic delivery promises, and accordingly knowledge sharing suffered as it became harder to find time to search for and share required knowledge in the midst of learning new things, such as about a partner's technology.

The case network offered examples of issues around being aware of the knowledge possessed by partner firms' personnel, and further, around awareness of how valuable their knowledge was. Informants reported that particularly in the early stages of networking, it had not been easy to determine which skills and knowledge other partners had and to identify what knowledge would be useful for each of the partners. This made knowledge sharing a challenge, however, over time the partners became more familiar with each other, and knowledge sharing became easier. Consequently, trust increased and the allocation of resources became freer, making it easier to discern what knowledge was available, in which situations and business areas that knowledge would be useful, and with whom that knowledge should be shared.

Within the case network, and especially within the focal company, there were some personnel and business units that seemed to have a disproportionate amount of power over others based on their historical positions in the company. One such group was the sales unit whose sales representatives had been in place long before the focal company decided to produce the turnkey solutions that were very dependent on software. Therefore, software was a new thing for the sales staff, and instead of working to familiarise themselves with it, they seemed to exercise power in an attempt to undermine its importance.

The deeper the relationship, the easier knowledge sharing was to achieve, and there was no need to check the quality of knowledge. The informants felt that social networks were developing all the time, and knowledge sharing was becoming easier and more natural. However, there was also a problem with the frequent change of project managers, which made it more

difficult to build social networks. Another difficulty reported relating to the building of social networks was the size of the customer organisations.

Language posed quite significant problems. Not all the partners saw the software automation system as a whole — they did not have a common language. The problem was exacerbated by neither sales people nor buyers having sufficient software expertise to know the language fully. However, some partners who felt that a common language and knowledge sharing were integral to networking made efforts to ensure that different parties understood each other.

#### ***4.2. Organisational level knowledge sharing barriers identified***

The interview data revealed cultural differences between some of the network partners that made knowledge sharing more challenging. The effect was, however, offset by the generally good bonds between network partners committed to cooperation, and the general understanding that knowledge needed to be shared. In fact, there was a common understanding of the benefits of networking; that the aim was to share knowledge between network partners to secure better software products more efficiently. It was also understood that the purpose of knowledge sharing was to create added value for all concerned.

Despite the connection between knowledge sharing and organisational goals being quite well understood, some informants thought that managerial communication of the benefits of knowledge sharing was not undertaken in the best possible way. Informants reported confusion about the roles of the actors within the network and concerns were raised about the level of communication, the honesty of managerial communications, and the flow of knowledge and organisational direction being jeopardised.

In the case network, distance was regarded as a knowledge sharing barrier. Informants stated that proximity supported knowledge sharing, yet, as multiple partners with many offices were involved, distances and cultural differences grew, adding complexity to the knowledge sharing. Overall, there was recognition that networking can lead to over-extended communication chains that makes maintaining awareness of the knowledge needs of different partners problematical.

Some infrastructure challenges to knowledge sharing in the case network were also identified. A lack of clearly agreed roles for the actors in the network, especially in the beginning, led to problems knowing who to ask for what information and who to share knowledge with. Some informants felt that collation and sharing of knowledge was not undertaken systematically enough in the network.

The issue of competitiveness between network partners was not clearly evident. Instead, as mentioned above, network partners shared strong personal chemistry, which supported cooperation and knowledge sharing. The network as a whole had a good climate of cooperation, and social networks flourished. This was certainly helped by some partners having known each other prior to networking. There were deep network connections, which were important for facilitating knowledge sharing, and the maintenance of those network connections was recognised to be important.

The complexity of the network seemed to create challenges. It was seen as problematic that decisions were made at different levels and it was unclear who was responsible for what. It was hoped that just one partner would handle contact with the customers, but a lack of resources contributed to confusion over which partner that should be. Organisational complexity can stifle knowledge flow to areas where it is needed which can threaten the network as a whole. In some

sections, the knowledge sharing and organising of some functions were lost. For example, sometimes knowledge was shared piecemeal, making it harder to refine processes.

Informants noted that the number of areas lacking clarity was reducing as network relationships matured, making it easier to identify knowledge needs and collate the available knowledge.

#### ***4.3. Technological level knowledge sharing barriers identified***

On a technological level, incompatible technology was seen as a quite relevant knowledge sharing barrier. Although common goals existed, network partners also had differing technological needs. This made it challenging to find common technologies, and that led to knowledge sharing becoming a rather complicated process in some sections of the network. It was hard to find common interfaces, and common technological solutions were not agreed upon sufficiently clearly.

The interviewees did not mention any particular problems with expectations towards technology, lack of training on new technologies, or lack of communication about the benefits of chosen technologies. However, there did seem to be issues over time, in relation to the use of technology. The degree of haste did not decline, because required project timescales continued to be underestimated. As a result, there was not enough time to get acquainted with the technological options to share knowledge.

### **5. Results**

Interestingly the empirical study demonstrated that *trust* was not seen as a major issue in the network. This may be because the focal company shares a lengthy history with the specific suppliers and these dyadic long-term relationships did increase the level of trust vertically in the network. However, a *lack of social networks* did cause problems in knowledge sharing in the context of networked growth. From the viewpoint of knowledge sharing it is not always enough that a focal company, as the hub of the network, acts as a link between the other partners to facilitate knowledge sharing. In this mode, there is a great risk that the focal company funnels knowledge sharing and may overly restrict the flow of knowledge. However, when the network develops further and the suppliers get to know each other better along time, both horizontal and vertical knowledge sharing becomes secured.

Prior literature would suggest that a lack of time would not be a relevant knowledge sharing barrier in business networks owing to the ability of networks to free resources. However, the case study revealed a potential for *lack of time to be a barrier to knowledge sharing, both at the individual and technological level*. While in the long run, networks can enhance adaptability and release resources, at the same time the number of individuals in receipt of specific knowledge increases which generates knowledge sharing challenges.

Furthermore (and contrary to the assumptions in the literature) *language problems* appeared to create KSBs between network partners. In addition, there was evidence that *organisational cultures within the network may be so different* that they create knowledge sharing problems. In addition, there were reports of a *neglect of managerial communication of the benefits of knowledge sharing*, even though the theoretical analysis suggested that that would be very unlikely to occur.

Rather surprisingly, the role of technological barriers in general was not as great in the case network as previous literature would indicate. This may be because the case was drawn from the software business, where technological familiarity may be assumed. This could also be a slightly illusory finding as there were other people-related KSBs, which the informants emphasised more strongly and prioritised ahead of any factors related to infrastructure. If such human-related and broader questions relating to the “knowledge management philosophy” of the network are not solved first, there is little point focusing on technological issues.

At many points in the case study, one basic issue related to knowledge sharing led to another. For example, close personal relationships between individuals created trust and increased the number of network connections and also enabled a shared understanding of the network goals and the purpose of knowledge sharing. This may explain the absence of competitiveness between the partners in the network. There was nevertheless evidence of a lack of time and of communication problems on the part of managers within the network. There was also a lack of clarity about the roles of the actors, which gave rise to the biggest challenges to knowledge sharing. We can conclude that in practice, KSBs are at many points highly interlinked and dependent on the structure of the network. It can be argued that if the network and network relationships are tight, there will be fewer KSBs. More deep-rooted relationships and network connections encourage people to share knowledge across network boundaries.

## **6. Conclusions and discussion**

This study contributes to the literature on KM by clarifying the KSBs related to networked growth in the context of the software business. This is achieved through a combination of examination of the literature pertaining to KM and business networks and an empirical study. The study also contributes to network literature by addressing the issue of network management from the perspective of KSBs, something rarely attempted to date.

Based on the findings of the empirical study, we suggest that within a software company pursuing networked growth, some KSBs are more restrictive than others. We would also argue that in practice, individual KSBs identified in the literature are not so distinct. Consequently, for practitioners the list of the potentially most restrictive KSBs is of more use as an aide memoir than an exhaustive checklist. For managers it is important to think about the relationships between the different KSBs. The empirical study suggests that there may even be only a few, rather simple things underpinning several different KSBs. In the case network presented here, many of the KSBs could have been avoided if the management of the partner organisations had jointly defined each partner’s role within the network, and then subsequently clearly communicated those roles to all involved. Hence, internal marketing throughout the whole network about the importance and about the procedures of knowledge sharing throughout the network would have been beneficial.

This study relies upon a single-case study, so it is important to conduct further studies to obtain more generalizable results. In support of that aim, this paper will be complemented by two other empirical studies on KSBs in organic and acquired growth contexts that complete the larger research project. The findings will enable us to identify whether the potentially most restrictive KSBs differ according to growth strategy. A further comparison of the results from a more traditional and less knowledge-intensive business field and those from the software business would also be an extremely interesting course of further study.

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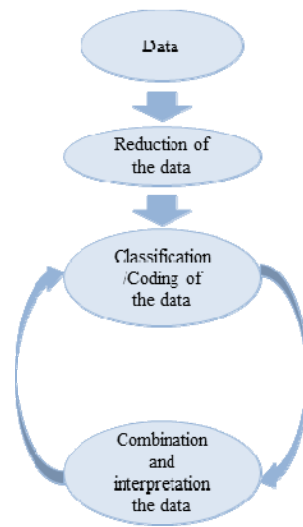
## **TABLES AND FIGURE OF THE PAPER:**

**Table 1. Typical characteristics of software business and networking.**

	<i>Software business</i>	<i>Networking</i>
<i>Typical characteristics</i>	Continuous and rapid changes	Long-term, close and in-depth relationships
	Highly knowledge-intensive	Complementary resources and skills
	Abstract development and production processes and result of the process; software and programs	Mutual planning of business processes
	Independent, competent and creative people	Interdependence of network partners
	Employees with high level of professional knowledge	Flexibility
	Fast growing industry branch	Evolving over time
	Rapid job growth	Reciprocity between network partners
	Importance of IPRs	Mutual interest, compatible objectives and common values of network partners
	Short technology life-cycles	Trust between network partners
	Standardisation	Utilisation of the resources of network partners without internalising the operations of the network partners

**Table 2. Summary of the empirical data.**

<i>Type of data</i>	<i>Purpose</i>	<i>Description</i>
<i>Interviews</i> (The bulk of the empirical material)	To identify knowledge sharing challenges and benefits during networked growth perceived by the network actors	Focal company interviews (6) - Actual interviews with focal company representatives' - Semi-structured/Thematic interviews - Duration: 1.5-2 hours
		Supplier interviews (3) - Interviews with focal company's suppliers - Semi-structured/Thematic interviews - Duration: 1.5-2 hours
		Customer interviews (5) - Interviews with customers of the network - Semi-structured/Thematic interviews - Duration: 1.5-2 hours
<i>Company specific reports</i>	To complement and verify the interview data	- Annual reports of the focal company and its suppliers and customers - Various commercial and technical material related to the system product created in the case network
<i>Meetings</i>	To provide an opportunity to check the accuracy of the data	- Meetings (5) with the focal company's representatives



**Figure 1. Data analysis process.**

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