



Author(s) Kukko, Marianne; Helander, Nina

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Knowledge Sharing Barriers in Growing Software Companies

Marianne Kukko
Tampere University of Technology
marianne.kukko@tut

Nina Helander
Tampere University of Technology
nina.helander@tut.fi

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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