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CHALLENGES FOR GROWTH IN SMALL FINNISH SOFTWARE FIRMS: A MULTIPLE-CASE STUDY

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ABSTRACT

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Based on a literature review and an empirical research, a growth challenge model for small Finnish software firms is introduced. The literature review covers such topics as research on growth of a firm, reasons, and ways to grow, and various ways to measure the growth. Some growth stage models and the software industry in general are additionally discussed. The empirical part of the study consists of a growth challenge analysis of four Finnish software firms, reflecting on conducted thematic interviews and questionnaires.

One of the main findings of the study is that Finnish software firms are most often facing challenges related to human resources: Acquiring new and managing existing personnel are constant challenges for management in the labor-intensive business. Other important industry specific challenges for software firms seem to be relating to competition, and sales and marketing. Some industry qualities such as short technology and product life cycles, and knowledge intensity seem to be causing these challenges.

KEYWORDS: growth of a firm, software industry, software business, small firms, growth model, growth barriers, growth challenges

TIIVISTELMÄ

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Kirjallisuuskatsauksen ja empiirisen tutkimuksen pohjalta, tutkielmassa esitellään pienten ohjelmistoyritysten kasvuhaastemalli. Kirjallisuuskatsauksessa käydään läpi aiheita yrityksen kasvun tutkimuksesta, kasvun syistä sekä eri tyypeistä, sekä kasvun mittaamisesta. Myös muutama kasvuvaihemalli sekä ohjelmistoalan yleiset piirteet käydään läpi. Tutkielman empiirisessä osuudessa neljän suomalaisen ohjelmistoyrityksen kasvun haasteita analysoidaan teoriaa sekä suoritettujen haastattelujen ja kyselyn aineistoa reflektoiden.

Yksi tutkielman tärkeimmistä löydöksistä on huomio siitä, että suomalaisten ohjelmistoyritysten kasvun haasteet liittyvät pitkälti henkilöstöresursseihin: uusien työntekijöiden rekrytointi ja olemassa olevien johtaminen ovat keskeisiä haasteita työvaltaisessa liiketoiminnassa. Erityisesti ohjelmistoyrityksille tulee haasteita myös kiristyvästä kilpailusta sekä myynnistä ja markkinoinnista. Jotkut ohjelmistoalan erityispiirteet kuten lyhyet teknologia- ja tuote-elinkaaret sekä korkea tietointensiivisyyden taso aiheuttavat osaltaan näitä haasteita.

AVAINSANAT: yrityksen kasvu, ohjelmistoteollisuus, ohjelmistoliiketoiminta, pienyritykset, kasvumalli, kasvuhaaste

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1 INTRODUCTION

The background and the motivations for studying software firm growth, both on economical and personal level, are covered first in chapter 1.1. The research problem, objectives, and scope are defined in chapter 1.2, while chapter 1.3 describes the outline of the study as a whole.

1.1 Study background and motivations

Growth of a firm has been long one of the most researched topics in the history of economical studies. No wonder, since the importance of growing firms is so huge to the present day economies around the world. Especially small firms, which constitute of around 95 % of all the firms in the European economy, are very important considering job creation, innovation, and long-term economical development (Storey, 1994).

For anyone who is interested in growth of a firm, growth of software firms is an exciting topic for several reasons. Nations around the world have been and are currently developing and transforming from industrial societies to knowledge societies (Seppä, 2006, pp. 1-2), and software is a key enabler in this process. In all, software plays a significant role as a key enabler of other industries (Ali-Yrkkö & Martikainen, 2008): "Software—nothing but pure knowledge in codified form—largely drives and enables today's economy" (Hoch, Roeding, Purkert, Kindert, & Muller, 2000, p. 6). Furthermore, many research findings made inside software industry context may be highly applicable to other high-technology industries as well (Nambisan, 2002). Interestingly, other industries are becoming more knowledge-driven and thus increasingly similar in their management problems with the software industry (Hoch et al., 2000).

At the time of writing, the economy is in recession, and no-one seems to know its duration or final implications yet. Only time will tell how firms around the world are to overcome the situation and how their growth is going to be affected by it. Economic recession, however, is only one of many issues for firm managers, who in daily basis are confronted with multitudes of challenges that threaten the growth, development, and even existence of the firm. The purpose

of this study is most of all to explore these challenges and the reasons behind them.

My personal interests towards entrepreneurship, software industry, and growth of firms are very strong. I have been studying Information Systems Science, at the Department of Computer Science and Information Systems at the University of Jyväskylä since 2003. In addition, during my studies, I was privileged to be among the first students to participate in – at the time freshly launched – technology business study program at the School of Business and Economics, organized by professor Marko Seppä, where my orientation was on growth venturing. Thus, the choice to study growth of software firms came quite naturally to me. I have also done some previous research on the subject of growth of a firm during my studies. My Bachelor's thesis discussed growth and different life-cycle models especially from technology-intensive firms' perspective. In addition, I was part of a field study team that conducted a review of growth ventures operating in the economic area of Central Finland (see Miettinen, Mäntymaa, & Vorne, 2007). The latter study was an important factor for my personal motivation towards research on growth of a firm.

1.2 Research objectives, problem, and scope

One of the main objectives of this study is to merge knowledge of growth of a firm theories by reviewing relevant literature and thereby to untangle questions such as *why* and *how do firms grow*. Particular emphasis is set on finding and studying models that would explain the growth of a firm from a small software firm's perspective. The most important objective of this study is, however, to determine as many of the most important growth challenges and barriers for growth-oriented Finnish software firms as possible.

The research problem of this study is thus formulated as follows: *How and why are growth challenges manifested on different life-cycle stages of a small and growth-oriented Finnish software firm?* This research problem is further divided into the following research questions:

1. What is commonly understood in relevant scholarship of growth of a firm, and how it is researched?
2. How and why does a small and growth-oriented Finnish software firm face growth challenges and barriers on different stages of its life cycle?

The scope of this study is defined to cover only those Finnish software firms that can qualify certain criteria. Selected firms have to be both strategically growth-oriented and *small in size*[1], or alternatively a firm that has recently reached the status of an *SME*[2] (in past two years). In this study, a software firm is seen as Finnish if it is registered in Finland and if the majority of its revenue creating operations take place in Finland. No other prerequisites are set for the case firms. Thus, the objective for the theoretical part of this study is to review mainly those studies relating to the aforementioned criteria.

This study focuses on growth challenges that especially software firms are facing when attempting to grow. However, in order to understand the reasons behind growth challenges, some fundamental concepts behind the growth of a firm have to be taken into consideration. These concepts include topics such as firm growth theory, firm growth drivers, and firm growth measurement.

Internationalization of firms is an important topic when discussing the growth of a firm. There is a distinct field in the scholarship solely focusing on this issue. However, internationalization cannot be discussed in the present thesis to its fullest extent as this would most likely require a study of its own. Nonetheless, as the scope for the present study is set to small firms' growth, internationalization does not play that significant role in this case, as internationalization is often carried out only at later stages of the life cycle of a firm, if at all.

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1 A small firm is "an enterprise which employs fewer than 50 persons and whose annual turnover [sales] and/or annual balance sheet total does not exceed EUR 10 million" European Commission [EC] (2003, p. 39).

2 SME is an acronym for small- and medium-sized enterprises. According to (EC, 2003, p. 39), SMEs are firms that "employ fewer than 250 persons and which have an annual turnover [sales] not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million".

1.3 Structure and outline of the study

The second chapter presents the theoretical framework for this study. It attempts to address the questions of *why* and *how do firms grow*. Additionally, firm growth research in general as well as firm growth measurement are discussed. In the following chapter 3, special focus is on growth models that are relevant when considering small Finnish software firms. Chapter 4 introduces the reader to the software industry, its segmentation, special characteristics and challenges caused by them. The empirical research part of the study and its settings are explained in chapter 5. It is followed by chapter 6, wherein the findings and analysis from the empirical research are gone through. Finally, in chapter 7, the implications of the study as well as its limitations and further study possibilities are discussed.

2 THE GROWTH OF A FIRM IN THEORY

This chapter discusses what can generally be understood by the growth of a firm, basing the argumentation on distinguished and recent entrepreneurial and managerial studies and theories. An introductory to firm growth research and theories is given in chapter 2.1. It is followed by chapter 2.2 wherein the diversity of firm growth research is discussed. Chapter 2.3 deals with some reasons behind the growth of a firm, while chapter 2.4 gives an insight to how firms are understood to achieve it. Finally, issues behind measurement of the growth of a firm are covered by chapter 2.5.

2.1 Introduction to firm growth research and theories

Different approaches and varying views make firm growth a multi-faceted phenomenon on one hand, and an extremely complicated research topic on the other. Growth can be approached through many fields of science ranging from biology to social sciences and psychology. In the field of business economics, many different views on firm growth exist, for example in forms of entrepreneurship, finance, and management.

According to Ala-Mutka (2005), entrepreneurship focuses mostly on small and medium-sized enterprises. It started to emerge as a field of research in the 1970s, and has since evolved into a wide and complex phenomenon due to varying activities that occur inside different kind of organization types. Entrepreneurship can be approached by utilizing differing frameworks like economics, sociology, anthropology or management. (Ala-Mutka, 2005, p. 5) The main view of this study to firm growth is entrepreneurship due to its focus on small firms. In addition, some managerial issues are also discussed.

Entrepreneurship research in economics constitutes of such viewpoints as financing, international entrepreneurship, public sector involvement and wealth creation, creation of new enterprises, innovation, growth strategies, small business management, and growth venturing (Ala-Mutka, 2005, p. 5).

There are also many different stakeholders involved that can be studied as distinct actors in entrepreneurship. These actors include the entrepreneur him- or herself, the founding team, the venture capitalist, business angels, boards of directors, corporate governance, and incubators. (Ala-Mutka, 2005, p. 5). By collecting tax, setting laws etc., also governments on national and international levels play significant role in this complex. Institutions such as universities and research institutes are also important actors, e.g. as a result of creating new knowledge and giving birth to new innovations. All these stakeholders have naturally varying roles in the entrepreneurial process and views on firm growth in general. When the implications of one of these actors is studied in separation, it may cause criticism because such a multi-faceted phenomenon as entrepreneurship cannot be explained by a single factor (Ala-Mutka, 2005).

Notwithstanding the fact that there are numerous theories on the growth of the firm, many scholars seem to consider Penrose's book, *"The theory of the Growth of the Firm"*, which was first published in 1959, one of the most distinguished and seminal on the subject (see e.g. Ala-Mutka, 2005; Davidsson, Achtenhagen, & Naldi, 2005; Delmar, Davidsson, & Gartner, 2003; Gilbert, McDougall, & Audretsch, 2006; Rönkkö & Mutanen, 2008; Storey, 1994; Virtanen, 1999). Although, one might argue that the *Penrosean theory* is inevitably outdated to some extent, it is nowhere near to being obsolete. Quite the contrary, Penrose seems to have been, in many ways, almost ahead of her time, for example, in acknowledging the role and significance of knowledge in the growth process of firms. This issue is increasing in importance as nations develop and transform from industrial societies to knowledge societies (see Seppä, 2006, pp. 1-2; see also Hoch et al., 2000).

2.2 Diverseness in firm growth research

Growth of a firm is not an unambiguous, unidimensional phenomenon, but rather a highly diverse and multidimensional concept (Autio, Miikkulainen, & Sihvola, 2007; Delmar et al., 2003) where economical, social and cultural factors combine (Autio et al., 2007). Universal explanatory model for firm growth has been searched throughout the history of entrepreneurial research. This kind of a

model has not been found though, and as Autio et al. (2007, p. 2) argue, one can never be found. One probable reason is that "[t]here is no such thing as a *typical* growth firm. Rather, there are many different types of growth firms with different growth patterns" (Delmar et al., 2003, p. 191).

The lack of a universal explanatory model causes great diverseness among research methods and settings used by researchers (Mutanen & Rönkkö, 2008). Thus, researchers have to be able to analyze new research data by utilizing and combining different kind of research methods (Autio et al., 2007, p. 2). Davidsson & Wiklund (2001) describe entrepreneurial research as a multiple-level analysis. The authors stress the fact it is characteristic of entrepreneurship to occur and have effect on different societal levels. Furthermore, Autio et al. (2007) propose that the new knowledge of firm growth produced by researchers, sooner or later, begins to affect the companies under study. This occurs, because the explanatory models developed by researchers become a part of the same context, which is under examination. According to the authors, this phenomenon unavoidably causes a temporary nature for all entrepreneurially driven firm growth explanatory models. (Autio et al., 2007). Altogether, the diverseness and multitudes of research levels lead to a situation, where it is challenging to get a coherent view of firm growth by reviewing existing literature and studies (see e.g. Davidsson et al., 2005).

Penrose (1995, p. 1) describes the phenomenon of firm growth as follows:

> The term ´growth´ is used in ordinary discourse with two different connotations. It sometimes denotes merely increase in amount; for example, when one speaks of ´growth´ in output, exports, sales. At other times, however, it is used in its primary meaning implying an increase in size or an improvement in quality as a result of a *process* of development, akin to natural biological processes in which an interacting series of internal changes leads to increases in size accompanied by changes in the characteristics of the growing object.

Thus, in spite of the diversity of the scholarship field, growth studies in entrepreneurship can be divided into two categories, some focusing on the *growth process* of firms and others on the *determinants of growth* (Rönkkö & Mutanen, 2008; see also Kontio et al., 2008). On one hand, studies on growth process indicate that growth progresses through different stages separated by organiza-

tional crises and changes (Davidsson et al., 2005; Rönkkö & Mutanen, 2008)[3]. According to Rönkkö & Mutanen (2008), research on determinants of growth, on the other hand, is based on identifying several factors that affect firm growth. These factors include motivation, strategy, resources, firm external opportunities, characteristics, the educational background and business experience of firm founders, social capital and financing. (Rönkkö & Mutanen, 2008; see also Kontio et al., 2008).

Furthermore, according to a literature review by Nambisan (2002), four different paradigms of firm growth research are evident in the relevant scholarship: the stage model or the life-cycle model, the strategic management approach, the stochastic model, and the industrial economics approach (see Table 1). The first two paradigms are addressing the factors that affect firm growth internally, while the last two approach firm growth mainly through external factors such as the market and the industry.

Table 1: Four main theoretical groups of firm growth studies (O'Farrell & Hitchens, 1988 cited by Nambisan, 2002, p. 143)

Focus	**Paradigm**	
internal	stage model or life-cycle model	strategic management approach
external	stochastic model	industrial economics approach

The *stage models* or *life-cycle models* generally suggest that a firm's growth can be predicted to progress through certain evolutionary stages on which different crises or management challenges are faced. *Strategic management* approach has focus on the business strategies that are needed by the entrepreneurs and managers in order to maintain continuous growth (Nambisan, 2002). Strategic management can be seen relating to the determinants of growth approach discussed earlier.

According to Nambisan (2002), within the *industrial economics* paradigm there are several varying viewpoints such as the evolutionary and the transaction cost

3 The stage approach – or life-cycle approach – is further discussed from small software firms' point of view with examples in chapter 3.

perspectives. The former is largely in line with the Penrosean theory as it "depicts the firm as a bundle of resources and routines, and the availability of managerial capabilities to utilize these resources is emphasized as the principal constraint of firm growth through generic expansion" (Nambisan, 2002, p. 143).

It is worth noticing that this division is not total nor distinct; other, possibly overlapping approaches to firm growth exist, e.g. the network approach. These paradigms are purely theoretical classifications of types of growth studies, and hence many approaches are likely to overlap these boundaries. This grouping merely illustrates some of the different – though likely most prevailing – views to firm growth theory. Additionally, it is widely based on now dated studies, and thus does not necessarily represent the full scale of approaches used in the present day firm growth studies.

In Table 2 below the different paradigms are aligned and compared by their focus and views to growth.

Table 2: Aligning firm growth research paradigms and views to growth

Paradigm	Focus	View to growth
stage model or life-cycle model	internal	process
strategic management approach	internal(/external)	determinants
stochastic model	external	process
industrial economics approach	external	determinants
internationalization[4]	internal/external	process
network approach[5]	external	process

2.3 Why do firms grow?

One essential question arises, when discussing growth of firms: The question of *why* do firms grow. In other words: what are the drivers for growth? Mutanen & Rönkkö (2008) pointed out, conforming to the Penrosean theory, that a consensus of the fact that growth occurs when motivation and opportunity exist, and also when adequate strategies and resources are utilized seems to be extant in the scholarship. Because this conclusion is considered rather trivial among scholars, most of the studies "focus on which factors are the strongest determinants for growth and under what conditions these forces operate" (Mutanen & Rönkkö, 2008, p. 3).

In order to understand the reasons behind firm growth and the success factors of firms, one must combine both new and existing research knowledge (Autio et al., 2007). That is exactly what Gilbert et al. (2006) did in their review of existing studies of new venture growth[6]. Most important predictors of new venture

4 For more on internationalization, see e.g. Bell (1995); Johanson & Vahlne (1977); Ojala & Tyrväinen (2007).

5 For more on the network approach to growth of a firm, see e.g. Coviello & Munro (1995); Hoang & Antoncic (2003); Yli-Renko & Autio (1998).

6 New venture growth can be linked to the growth of small firms in this study to a large extent, because of the assumption that all the firms that are studied have an intention to grow, and are thus relatively new firms because they are still small in size.

growth seem to be entrepreneur characteristics, resources, strategy, industry, and organizational structure and systems (Gilbert et al., 2006).

Nambisan (2002) made a literature review on firm growth from software firms' perspective and found out several external and internal factors determining software firm growth and evolution (see Table 3).

Table 3: Determinants of software firm growth and evolution: a literature review (Nambisan, 2002, p. 152)

External factors	Internal factors
• **Industry Characteristics** (market structure, competitive environment, etc.) • **Technology Characteristics** (technology life cycle, technology standards, etc.) • **Economic & Technological Infrastructure** (venture capital, manpower resources, telecommunication infrastructure, etc.) • **Regulatory Infrastructure** (taxation & fiscal incentives, intellectual property regime, etc.) • **Regional Culture & External Stakeholder Characteristics** (innovation-orientation, experience, regional networks of learning, etc.)	• **Founding Conditions of the Firm** (initial technology strategy, initial financial resources, etc.) • **Strategic Factors** (strategic aggressiveness, strategic alliances, product strategy, etc.) • **Firm Resources & Competencies** (managerial capabilities, development processes, marketing skills, etc.) • **Internal Stakeholder Characteristics** (personality traits, demographics, experience, innovation-orientation, etc.)

2.3.1 Growth motivation

One might also ask, why some firms grow more and faster than the others. According to Wiklund (1998), in addition to abilities and available resources, motivation plays a significant role when comparing the results of slow-growth and rapid-growth small firms (see Figure 1).

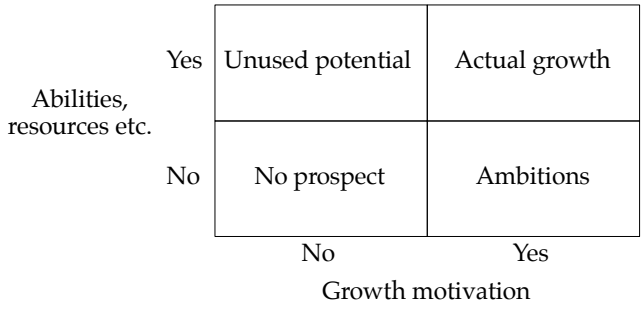


Figure 1: Four types of firms in relation to their ability and motivation to grow (Wiklund, 1998, p. 264).

Wiklund (1998, p. 259) argues, motivation is "more important than any personal abilities" in terms of small business growth, and "´[w]hat I want´ has a larger influence on actual outcomes than ´what I know´". According to Gilbert et al. (2006, p. 927), both new and small firms are faced with a lower likelihood of survival, "but as firm size and age increase, the adverse impact of lack of growth on firm survival is reduced". This is one of the strongest motivational factors for small business managers to seek growth (Wiklund, 1998). Additionally, for larger firms, it is easier to divest resources such as employees, and thus, survive crises (Wiklund, 1998). Furthermore, according to Wiklund (1998), there exists a strong relation between financial performance and growth. In other words, in most cases, growth means more money, which is naturally a possible motivator for any entrepreneur to grow his or her firm.

2.3.2 Willingness to grow

Growth itself is by no means a proper indicator of success, thus small business owners may set their goals based on personal lifestyle or family issues rather than the growth itself (Ala-Mutka, 2005, p. 9). Indeed, "limited growth is not always associated with an inability to grow but may actually be reflective of a limited desire of the entrepreneur to grow the firm" (Gilbert et al., 2006, p. 929). Additionally, according to Kontio et al. (2008), one of the main reasons why some of the software firms in Finland are not growing is the lack of growth motivation of the entrepreneurs. This is also noticed by Rönkkö & Mutanen (2008).

Thus, quite logically, in most cases, there needs to exist some growth aspirations by the management of the firm in order for the growth to materialize.

Wiklund, Davidsson, & Delmar (2003) made a study on how entrepreneurs feel about growth. The results show that small business managers' attitudes towards growth are most often influenced by their beliefs concerning how the growth might affect the well-being of their employees. If the managers believe that the well-being of employees is threatened, willingness to grow is significantly decreased. Ability to ensure crisis survival, regain control over the growth and the independence of the firm were other major concerns of small business managers regarding the effects of growth to the firm. (Wiklund et al., 2003).

2.3.3 Entrepreneur characteristics and entrepreneurial opportunities

Many scholars have examined the character traits of an entrepreneur that are likely to affect the growth of a firm. This is due to "[t]he belief that the entrepreneurial firm is an extension of the entrepreneur" (Gilbert et al., 2006, p. 930). Educational background, prior related industry experience, and prior entrepreneurial or start-up experiences are considered to have direct effects on the sales and employment growth of new firms. Also many personality traits are found to have mostly indirect effects on firm growth (see e.g. Baum, Locke, & Smith, 2001). In addition, an entrepreneur's experience in growing other firms is reported to have caused higher levels of growth in small firms (Gilbert et al., 2006).

In essence, entrepreneurship can be understood of being an activity, where taking advantage of opportunities by combining resources in a way that has an effect on the markets takes place (Wiklund, 1998). Wiklund & Shepherd (2003) have studied the impact of entrepreneurial strategic orientation to firm performance from knowledge-based resources' perspective. Their findings suggest that firm performance is enhanced by discovery and exploitation of entrepreneurial opportunities.

2.3.4 Resources

Although many various resource types enable firms to pursue growth objectives, the most important seem to be financial and human capital (Gilbert et al., 2006). Human capital can be seen as the employees of the firm. Small, start-up firms may require more specialized and skilled workforce than a mature firm (Gilbert et al., 2006). Furthermore, according to the authors, financial capital influences the sales and employment growth of new firms. The higher the level of financial capital the more

> it buys entrepreneurs time to successfully execute strategic objectives, enables entrepreneurs to either undertake more ambitious strategies or change their course of action, and simply empowers the entrepreneurs to meet the financing demands that are required to sustain the growth being realized (Gilbert et al., 2006, p. 932).

One of Penrose's (1995) statements is that firms grow because they have underutilized resources. According to Penrose (1995, p. 71), firms have a natural need to eliminate idle workforce by engaging in large enough operations, and at the same time, "to use the most valuable specialized services of its resources as fully as possible". The latter is especially true in small firms' case, wherein highly specialized employees cannot necessarily utilize all their know-how efficiently because the output of the firm is too small (Penrose, 1995, p. 71). Thus, firms need to grow and elevate their operations in order to take full advantage of their highly specialized workforce.

2.3.5 Market and industry

Basing his argumentation on review of previous entrepreneurial studies, O'Gorman (2001) notes that the different explanations of firm growth can be divided into two generic explanations. In the "strategic choice" explanation firm growth is seen as "the result of the strategic and structural choices made by entrepreneurs", whereas "[t]he ´industry structure´ explanation suggests that for many SMEs the principle determinant of growth is the structural characteristics of the industry" (O'Gorman, 2001, p. 60). In other words, some scholars believe that firm growth is driven by the managerial and strategic choices made by the entrepreneurs, and on the contrary, others believe that it is more or less a result of

external, environmental factors such as the influences caused by the evolving industry.

In his qualitative case research, O'Gorman (2001, p. 71) comes to a conclusion that neither of these aforementioned explanations (strategic choice vs. industry structure) "is sufficient to explain the sustained high growth achieved by some SMEs". Although, in some cases the choice of a market seemed to have been an explanation for varying growth rates, he discovers two challenges in the dualism. Firstly, a firm is unlikely to be able to sustain growth after a high growth period in the market, unless it follows some superior competitive strategies compared to its competitors. Secondly, the market's high growth may in fact be initiated by a firm that has developed better competitive strategies than its competitors. (O'Gorman, 2001). Hence, O´Gorman (2001, p. 71) concludes, "[c]ompanies drive markets as well as markets driving [sic] companies". Furthermore, he also notes, organizational structure or resource qualities might as well explain why other firms perform better than the others (O'Gorman, 2001).

The industry position of a firm has certain driving effects on the growth of a firm (Autio et al., 2007). If a particular industry sector happens to grow, the firm in that industry is likely to feel the pulling effect as the industry "makes" the firm grow with it. This is possibly even better understood in opposing sense: when a particular industry sector is suffering for a reason or another, decreased performances for firms inside it are likely to occur. Gilbert et al. (2006, p. 935) also conclude based on their literature study, "high growth will be realized by firms in growing markets".

According to Gilbert et al. (2006), the stage of the industry is another factor having strong influence on firm growth. Especially emerging or growing markets allow more mistakes as they are not so costly than what they would be in more mature markets. Firms competing in growth industries, on the other hand, may have better opportunities than firms "in emerging or mature markets to provide new product or service offering that fill niches in the market". (Gilbert et al., 2006, pp. 935-6). There are also sub factors inside industry, which include the effects of the role, business model, and network position of the firm (Autio et al., 2007).

2.4 How do firms grow?

Delmar et al. (2003, p. 192) believe, that conflicting theories on the causes of firm growth are born, when an explanation for why firms grow is searched without actual knowledge of *how* firms grow. Therefore, it is important to understand, that firms can, indeed, grow in multiple – theoretically infinite – number of ways. However, as Delmar et al. (2003, p. 211) conclude in their study, "a finite number of empirically distinct and conceptually meaningful growth patterns can be identified". The authors further note in their study, "[a] high relative growth rate in sales — is just only one aspect of how firm growth may occur, and this type of growth appears to be appropriate, only, for certain kinds of firms in certain situations" (Delmar et al., 2003, p. 212).

Delmar et al. (2003, p. 192) state, "firms grow in many different ways and that these patterns of growth, over time, can vary significantly and have different causes". They argue further, basing their argumentation on the Penrosean theory, these patterns of growth are related to firm demographic characteristics, such as age, size, industry affiliation and type of governance (Delmar et al., 2003). In other words, according to the authors, how firms grow is systematically related to these characteristics.

2.4.1 Organic vs. acquisition growth

As is widely known, firms can grow organically, through acquisitions, or, as in many cases, by a combination of both (Penrose, 1995, p. 156; see also Delmar et al., 2003). Organic growth can be seen as a natural growth of a firm through its internal activities, whereas acquisitions expand a firm, for instance, through an external purchase of another firm (Penrose, 1995). Nonetheless, this issue seems to have been neglected in scholarship to some extent (Delmar et al., 2003).

According to Delmar et al. (2003), there are implications of this distinction both at the firm and societal level. The demands faced by managers who attempt to achieve growth through these different paths are likely to vary, as are the effects on firm performance. At the societal level, organic growth creates new jobs, in

contrast to acquisitions, where existing jobs are basically just moved to another firm. (Delmar et al., 2003, p. 196).

2.4.2 Irregularity of growth over time

Delmar et al. (2003) stress the fact that firms can grow rather irregularly, meaning the growth is not a monotonous process. Rather big leaps in growth in a certain time period for a single firm might occur (Delmar et al., 2003). Referencing to the Penrosean theory, Delmar et al. (2003, p. 196) stress, "firms that grow organically will show a smoother growth pattern over time compared to firms that grow mainly through acquisitions", and "organic growth should be more associated with smaller firms, younger firms, and emerging industries whereas acquisition growth is more likely in older and larger firms, and in mature industries". Thus it seems, relating to the issue addressed by the previous subchapter, smaller firms are likely to grow smoother than larger ones.

Furthermore, as Autio et al. (2007) remark, irregularities could often be explained by a serendipity: High growth might result, if the firm is simply in the right place at the right time. Naturally, the same applies to failures (Autio et al., 2007). Bad fortune may ruin the growth of a firm and even drive it to bankruptcy. Deschryvere (2008, p. 6) also describes firm growth as occurring due to "stochastic shocks", meaning "[a]lthough there are systemic factors at the firm and the industry levels that affect the process of firm growth", firm growth is characterized by certain level of randomness. These irregularities of growth over time have an effect on the measurability of firm growth, which is discussed further in the next subchapter.

2.5 Measuring firm growth

Due to the fact that firm growth itself is so heterogenous (Delmar et al., 2003, p. 190), measuring firm growth is not a simple task, and many things need to be taken into consideration. As discussed earlier in chapter 2.4, there is a multitude of ways a firm can grow. At least as many are there ways to measure the growth (Ahonen, 2006, p. 31). The multitudes of growth measures used in growth stud-

ies make it problematic for researchers to gain and compare results (Delmar et al., 2003). Varying practices in measuring and calculating growth affect model building and theory development in different ways. Delmar et al. (2003, p. 195) note, some scholars have found this an important issue, and nevertheless disagree to their suggestion that "research should strive towards one single way, or a limited number of ways, of calculating growth". According to the authors' estimation, it would be advantageous to make use of multiple measures in a single study. One of the main conclusions of Delmar's et al. (2003) study is that determining high-growth firms is highly dependent on the measure used, because the correlation was very low between different measures, and only few of the firms examined met more than one high-growth criterion.

There are many ways to measure success, though. For instance, Ala-Mutka (2006, p. 14) recognized and used 11 different indicators to define success in his study, which were turnover [sales] (annual growth rate), number of personnel (annual growth rate), organic growth, non-organic growth, profitability, planned goals, knowledge and technology, publicity (brand recognition), finance, customers and markets, and business processes and concepts. When taking a closer look at these indicators, one can realize some of them are likely easier to measure than the others. Information such as sales or number of personnel can be usually accessed by studying firms' profiles. Publicity, on the contrary, seems to be rather an intangible concept. Therefore, it is customary to divide firm performance measures into two distinct groups, the first consisting of *qualitative* and the second of *quantitative* indicators (Penrose, 1995; see also Ala-Mutka, 2005; Laukkanen, 2000). These measures are discussed further in the following two subchapters.

2.5.1 Quantitative measures

Of the quantitative measures, most important seem to be *sales*, *employment*, and *market share* (Gilbert et al., 2006, p. 929). In addition, Delmar et al. (2003) also list *assets*, *physical output*, and *profits* as possible growth indicators utilized in studies. In addition, Virtanen (1999) suggests firm growth could be measured as the growth of its market value. Above all, sales growth is widely considered to be

the most common growth indicator (Davidsson et al., 2005; Gilbert et al., 2006), especially for firms in the technology industry (Salonen, 1995). Although, Delmar et al. (2003) acknowledge an emerging consensus of sales being the most preferred measure, they consider employment to be more important in some cases.

Sales

According to Gilbert et al. (2006), sales growth is important in gaining information on changes in firm revenues. Revenues gained is a direct impact of how customers are increasingly accepting the firm's products and services (Gilbert et al., 2006). Sales is not a perfect growth measure for all purposes, though, e.g. because "sales are sensitive to inflation and currency exchange rates, while employment is not" (Delmar et al., 2003, p. 194). Furthermore, Delmar et al. (2003) argue, sales do not always lead the growth process. In order to measure sales growth, firm has to have a product or service it can offer (Gilbert et al., 2006). In some cases, especially in the high-tech industry, newly established firms might not have any product or service ready in the beginning (Gilbert et al., 2006), and thus, assets or employment are expected to grow before any sales will take place (Delmar et al., 2003). If this is the case, employment growth might be a more relevant growth indicator than sales (Delmar et al., 2003; Gilbert et al., 2006).

Employment

There are arguments that support employment for being "a much more direct indicator of organizational complexity than sales, and may be preferable if the focus of interest is on the managerial implications of growth" (Delmar et al., 2003, p. 194). Gilbert et al. (2006) argue, employment growth often occurs when a firm expands its operations, or when business is increased. A firm gains human capital from employment growth and is thus able to execute its objectives through it (Gilbert et al., 2006). According to Delmar et al. (2003), this is in line with the resource- and knowledge-based views on firms. As the Penrosean theory suggests, firms should be viewed as bundles of resources, such as employ-

ees. However, employment as a growth measure has its deficiencies. Delmar et al. (2003, p. 194) remark it being "affected by labor productivity increases, machine-for-man substitution, degree of integration, and other make-or-buy decisions", and noteworthily further stress the fact that "[a] firm can grow considerably in output and assets without any growth in employment". Additionally, firms often acquire human resources and know-how through networks (Hoang & Antoncic, 2003) without a visible effect on their employment growth statistics.

Market share

According to Gilbert et al. (2006), market share growth differs from sales and employment growth in being an external instead of an internal growth measure, and is partly dependent on the competition situation in the industry. Market share growth can be gained as a result of firm's own efforts or due to a withdrawal of a competitor. Anyhow, as well as sales growth, market share growth indicates the acceptance of the firm's products or services on the market to some extent. (Gilbert et al., 2006).

Other measures

Delmar et al. (2003) describe some deficiencies in other quantitative measures than sales and employment. According to the authors, market share and physical output are only comparable between firms within industry that have similar product ranges. Further, total asset value is an indicator that is "highly related to the capital intensity of the industry and sensitive to changes over time" (2003, p. 193). And finally, the relationship of profit to size is only visible when many firms are compared with each other or over long time periods for a single firm (Delmar et al., 2003).

Absolute vs. relative growth

The growth of a firm can be measured as an *absolute* or a *relative* value, according to Delmar et al. (2003). This is important when applying any measures related with size and growth, i.e. quantitative measures. To larger firms, absolute

measures usually indicate higher growth rates, and at the same time, smaller firms tend to accomplish better results when the growth is measured as relative (i.e. percentage) growth. When comparing results with other studies, it is vital to remember the implications of choice between relative and absolute growth measures. This issue seems to be often forgotten by researchers. (Delmar et al., 2003).

2.5.2 Qualitative measures

Qualitative measures are somewhat intangible and more complicated to utilize than quantitative measures. Laukkanen (2000, p. 15) points out that an organization grows if there is a positive change in its operations. Positive change can be easily spotted using common sense, but it could be difficult to compare the results gained by monitoring different firms. It is possible to make observations of a specific firm having positive change in its operations. The difficulty is in attempting to answer the question whether these changes were greater than what was observed in another firm.

For example, it could be argued that although software firm A's sales, profit or number of employees have not been increasing, the employees have learned a lot during any given period and are hence more knowledgeable than before, thus making the personnel even more valuable assets. Although, this type of qualitative growth exists, it is challenging to measure it with quantitative methods. Even more difficult is to compare results from different studies with each other because of differing measure definitions utilized.

3 GROWTH STAGE MODELS FROM SMALL SOFTWARE FIRM'S PERSPECTIVE

Multitudes of firm growth models developed by researchers exist in the literature. As described in chapter 2.2, one of the high-level differentiating factors among them are the varying approaches and paradigms. In this chapter, some growth stage models relevant to study of growth of small software firms are introduced.

3.1 Stage approach

Stage or life-cycle growth models recognize and describe certain stages in firm evolution process and possibly some success factors related to each stage. On one hand, an entrepreneur's ability to make strategically correct adjustments in each stage can have a tremendous effect on the growth possibilities of the business, and on the other hand, failures in facing and solving these strategically important challenges may prevent the growth completely (O'Gorman, 2001). Stage approach does not provide, however, precise answers to what exactly should a firm do in each stage in order to be successful. Life-cycle models are rather a description of how a *typical* firm's life cycle is generally expected to be manifested as transitions from one stage to another in a given industrial or other limiting context, if any.

A typical life-cycle model is unidimensional and includes a division of different firm evolutionary stages. There are generally four to five stages in one life-cycle model. Uni-dimensionality means that the growth is being viewed from a certain point of view. Therefore, the divisions are determined by the standpoints to firm growth. These standpoints include organization, management, product development, financing, and networks. Furthermore, there are also variation in the foci: for example, some of the models are intended to understand especially small firm (see e.g. Churchill & Lewis, 1983; Scott & Bruce, 1987; see also Storey, 1994), growth venture (see e.g. Rasila, 2004), or technology-based firm growth (see e.g. Autio, 1994; Kazanjian & Drazin, 1990; Yli-Renko & Autio, 1998). Division to seed, start-up, growth, and expansion or similar stages is a common

practice (see e.g. Ala-Mutka, 2006). Practical implications of life-cycle models include strategic forecasting of crisis birth, and as a tool for management in evaluating how to further develop the business activities at a certain growth stage (Laukkanen, 2000).

Life-cycle models have been studied intensively, and as a paradigm to researching firm growth, life-cycle models have faced plenty of criticism. Life-cycle models are typically inflexible; all organizations are expected to go through same or similar stages (e.g. Ala-Mutka, 2006; Kazanjian, 1988; Laukkanen, 2000; O'Gorman, 2001). As the study by Birley & Westhead (1990) points out, not every organization progresses systematically from one growth stage to another. Furthermore, practical application of a life-cycle model is difficult, because the boundary definitions of different growth stages are general and imprecise (Ala-Mutka, 2006; Kazanjian, 1988). Ahonen (2006) criticizes life-cycle models further for their inability to note all the changes in a firm's environment and its inner processes. Additionally, life-cycle models do not generally consider possible restructuring or rationalization of activities, growth through acquisitions, spin-offs, or internationalization (Laukkanen, 2000).

Although he considers them useful for conceptual simplification of multi-faceted firm growth, O'Gorman (2001) criticizes life-cycle models, because most of them do not support alternative development paths (skipping certain stages or differing stage order), or do not focus enough on early developmental stages. He also notes that life-cycle models do not always explain progressions from one stage to another, do not consider industry, technology or other situational factors, and measure growth only as changes in personnel or sales numbers (O'Gorman, 2001). Laukkanen (2000) also points out the general inability of life-cycle models to consider the effects of firm's environment or composition of financial markets.

Despite all the criticisms, the stage approach is very useful as a conceptualization tool and also for simplifying the complex subject on the growth of a firm. The stage approach has abled many scholars to model and study the firm growth phenomenon effectively as can been seen in the subchapters that follow.

3.2 Greiner's life-cycle model

Greiner (1972) introduces a well-known 5-stage life-cycle model, that illustrates firm growth from organizational perspective. Although the model is generally applicable to any organizations and thus not specifically intended for small software firms, it is a good starting point when introducing growth stage models in order to understand the firm growth process as stages. Additionally, the model is has received considerable notability in the scholarship and could also be considered seminal on the subject. The model has been referenced in many studies (see e.g. Ahonen, 2006; Ala-Mutka, 2005; Davidsson et al., 2005; Kontio et al., 2008), and in multiple cases used as a base for further model developments (see e.g. Autio, 1994; Churchill & Lewis, 1983; Kazanjian & Drazin, 1990; Scott & Bruce, 1987).

The model describes firm evolution through crises. Every growth stage (*evolution*) is characterized by a dominant management style and followed by a management crisis that forces the management of a firm to rethink and possibly alter its managerial strategy (*revolution*). The evolutionary stages (management styles) as seen in Figure 2, are:

1. growth through creativity
2. growth through direction
3. growth through delegation
4. growth through coordination
5. growth through collaboration.

Only the first three phases are considered belonging to the scope of this study and are thus next described in further detail.

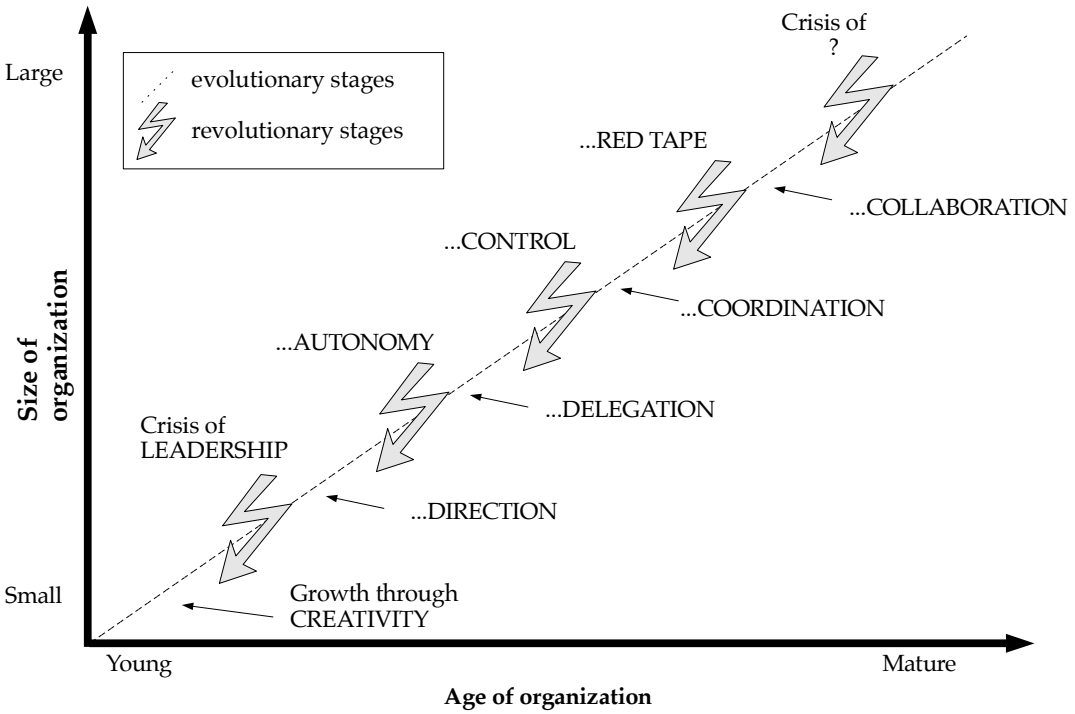


Figure 2: Greiner's (1972) organizational life-cycle model

The creativity phase is the birth stage of the firm. The emphasis is on product and market creation. This phase is further characterized by informal and frequent communication among employees, long hours of work rewarded by modest salaries and promises of ownership benefits, and rapid reactions to customer needs. The crisis of leadership occurs, when the management becomes too busy dealing with increased number of employees and other tasks caused by the growth, and a difficult decision by the founders might have to be made of hiring a business manager. (Greiner, 1972, pp. 41-42).

According to Greiner (1972), the direction phase is characterized by functional organization structure, specialized job descriptions, accounting systems, newly adopted incentives, budgets, and working standards, increased formalities in communication, and management hierarchies. The autonomy crisis occurs when current direction techniques "become inappropriate for controlling a larger, more diverse and complex organization". The lower-level managers "feel torn between following procedures and taking initiative of their own". Most firms move to more effective delegation in order to solve this crisis and move to the next growth phase, although some employees might feel disappointed and

leave for good. As the firm is growing larger, the delegation phase is characterized by decentralized organization structure, profit centers and bonuses as motivators, and greater psychic distance of top management. (Greiner, 1972, p. 42).

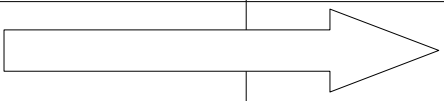
3.3 Kazanjian & Drazin's growth model for new technology ventures

Kazanjian (1988) starts to develop a growth model that would be more suitable for technology-based firms. A similar approach to Greiner's (1972) is utilized (see chapter 3.2) and the general hypothesis is that a technology-based firm's growth stage can be determined based on the dominant problems being faced in the organization at present. Kazanjian (1988, p. 262) splits a technology-based firm's life into four stages:

1. Conception and development
2. Commercialization
3. Growth
4. Stability.

Kazanjian & Drazin (1989, 1990) continue together to further define the growth model and also to test it empirically. The authors finalize a growth model that describes the most dominant and common management problems of each growth stage. Many scholars reference this model in their growth of a firm studies (see e.g. Ahonen, 2006; Ala-Mutka, 2005; see e.g. Davidsson et al., 2005; Gilbert et al., 2006; Mutanen & Rönkkö, 2008). Ala-Mutka (2005, p. 56) interprets and visualizes the model in a form that can bee seen in Table 4.

Table 4: Kazanjian & Drazin's (1990) growth model for new technology-based ventures as interpreted by Ala-Mutka (2005, p. 56)

	1. Conception and development	2. Commercialization	3. Growth	4. Stability
Problems for organizational decision	Invent, develop and build prototype Sell the concept Define business idea	Develop production Acquire facilities Plan functions Redefine design Acquire talent	Avoid shakeout Balance profits and growth	Maintain dominant niche position Develop second generation of products Balance bureaucratic and innovative tasks
People	Generalist Technologists Non-professional Part-timers			Specialists Bureaucrats Professionals Career employees
Structure	Informal Market reliant Group centered	Formalized Centralized Functional	Formalized Decentralized Planning and budgeting	Formalized Decentralized Profit center
Rewards	Equity for new Many opportunities Informal setting			Stable and secure Compensation Career development
Planning process	Informal Centralized Undifferentiated Short time horizon Integrated			Formal Decentralized Specialized Multiple horizons Integrated

According to Gilbert et al. (2006, p. 936), Kazanjian & Drazin's (1990) study is rare in the field of new firm research in that it specializes in organizational structures and systems by focusing "on the impact of functional specialization and decision making on sales growth outcomes". The authors further note, when a firm is small its organizational structure is centralized but the operations size may not allow functional specialization to large enough extent. Growth of a firm causes a need for specific functional expertise in order to manage its new roles. As firms move through the different stages (conception and development, commercialization, growth, stability), their decision making becomes inevitably more decentralized, and the entrepreneur is faced with a challenge of maintaining the level of control and flexibility that enables continuous sales growth. (Gilbert et al., 2006).

The model has two restrictions: (1) it is applicable only to "technology based new ventures that market a physical product (i.e., no services)"; and (2) "it ex-

plains only internally generated growth, not growth by acquisition or merger" (Kazanjian & Drazin, 1990, p. 140).

3.4 McHugh's growth model for early stage software firms

McHugh (1999) proposes a growth model for early stage software firms. The author argues that a software firm, in its early stage, moves typically "through a sequence of preliminary growth stages" as seen in Figure 3 below (1999, p. xxi).

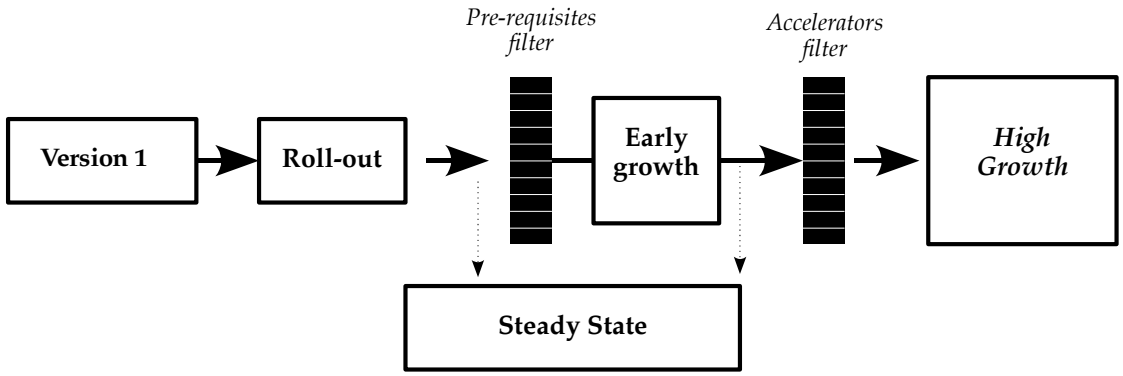


Figure 3: Early software growth profile (McHugh, 1999, p. xxi)

The first stage, *Version 1*, stands for the birth of the software firm and getting the first version of its first product completed and ready to be shipped as soon as possible. The danger here lies in getting diverted and staying too long in the development cycle with no revenues and sunk costs due to the start-up. After securing some initial reference sites and thus preventing credibility gaps, the number of customers starts to increase and the revenues begin to flow. The software firm can move into a new phase. (McHugh, 1999).

The *Roll-out* stage marks the phase when the software firm starts a movement to a broader market. The strategic choice of a business model plays a significant role by the end of this stage; but before it can be made, business model key components – lead generation, sales fulfillment and software implementation – have to be addressed by learning from first customer experiences. (McHugh, 1999).

Hiring more and specialized staff such as salespersons and introducing new management structures is customary in the Roll-out phase. Some breakthrough deals might considerably boost the growth momentum due to gained higher credibility and visibility levels. Some firms could be out of the Roll-out stage within months, but "often it is a gradual process of building a customer base until the company reaches a point where it is viable and established". The firm's future is then "determined by how it passes through the first imaginary growth filter". Firms without enough ambitions and other growth restrictions always fall into the *Steady State*. (McHugh, 1999, p. xxiii).

In Steady State, software firm continues to grow steadily and keeps hiring new personnel occasionally. The firm's survival is not threatened, nor is its growth to become significant. According to McHugh (1999, p. xxiv), there are four *pre-requisites for success*, of which none should contain weaknesses in order to move forward to the *Early growth*:

- **Ambitions** to grow the business dramatically.
- A strong **Product** offering.
- An effective **Management** team.
- Access to sufficient **Funding** to support growth.

Some software firms might enter a higher growth period for a short period, but then drop back to the Steady State, and according to McHugh (1999), Steady State is actually the phase where most software vendors are situated. "A high growth phase, with all the pain and risk involved, is neither appropriate nor desirable for a large number of companies" (McHugh, 1999, p. xxiv).

McHugh (1999, pp. xxv-xxvi) argues further, in order for the software firm to successfully break into the *High Growth* phase, it needs to pass the following *success accelerators*:

- A winning **Business Model,** which almost invariably requires partnerships and possibly the use of indirect channels[...]
- A clear **Export Strategy**. Undoubtedly the catalyst for kicking off a high growth phase is the decision to go after export markets in a serious way[...]

Firms are then able to maintain their high growth via organic growth or through acquisitions. Organic growth is less risky, more manageable, but slower (McHugh, 1999).

3.5 Suitability and applicability of growth models

The introduced growth models offer a decent view to what growth stage models have to offer for modeling growth of a small software firms. The lack of suitable growth models specifically intended for software firms is evident in the present scholarship, and thus, different approaches have to be combined in order to establish a coherent view on the subject. Some of the management challenges introduced by the introduced growth models are highly applicable in the further stages of the present study, when software industry specific challenges are sought.

In the following chapter, the software industry is discussed in extensive detail, in order to understand the context these growth models are about to be applied to.

4 SOFTWARE INDUSTRY

For some it might actually be "surprising to realize that the history of software runs back 50 years—a half century of development that most of us assume is a modern-day phenomenon" (Hoch et al., 2000, p. 259). Indeed, in around 60 years, software has become part of our everyday life, and a key enabler of most other industries (Ali-Yrkkö & Martikainen, 2008; Hoch et al., 2000):

> Software tasks today range from controlling nuclear power plants, recognizing customer purchasing patterns, enabling stock trading, and running banking systems all the way to running cell phone systems and exploring for oil (Hoch et al., 2000, p. 6).

Furthermore, the software industry is valuable for firm growth research because many findings made inside it may be highly applicable to other high technology industries as well. As Nambisan (2002, p. 146) points out, "[s]everal of the growth-related management challenges faced by software firms need to be addressed by other high technology firms too". In all, "other industries are becoming increasingly knowledge driven and thus more similar in their management problems to the software industry" (Hoch et al., 2000, pp. 13, 250).

Software industry has some characteristics which differentiate it from other industries and which in turn cause special challenges. Software industry can be considered both on a global and a regional scale. The first subchapter describes the present state of the Finnish software industry. In chapter 4.2, a closer look is taken at the segmentation of the IT market and how the software industry is situated inside it. It is followed by chapter 4.3, wherein different ways of making revenues with software business, i.e. business models, are discussed. Next, some special characteristics of the industry on general scale are contemplated in chapter 4.4. Finally, in chapter 4.5, some of the challenges caused by different characteristics of the industry are examined.

4.1 Finnish software industry

During the last ten years in Finland, the GDP share of the IT industry has doubled, being currently approximately two percent (Ali-Yrkkö & Martikainen,

2008). According to the authors, there were around 8000 IT firms[7] in Finland in 2006 that employed altogether over 46000 people, which corresponds to three percent of the whole workforce of the Finnish corporate sector. The Growth Forum's report supports these findings, and according to it, there were over 8500 IT firms in Finland in 2007 (Kontio et al., 2008).

According to Ali-Yrkkö & Martikainen (2008), software firms represent around two thirds of the IT industry in Finland, which results in around 33000 employees altogether. The authors further note, around 70 % of those work in SMEs. However, as Figure 4 illustrates, the concept of software industry is not unambiguous. Companies like Nokia, who also develop software, do not actually belong to the software industry according to Statistics Finland's categorizations (Ali-Yrkkö & Martikainen, 2008; see also Tyrväinen, Warsta, & Seppänen, 2004), and are hence not taken into consideration in the aforementioned figures. Another view on this matter is to divide software development into *primary* and *secondary industries*, where the primary industry sector constitutes of the actual software firms and the secondary of the rest where software is developed as well (Tyrväinen et al., 2004).

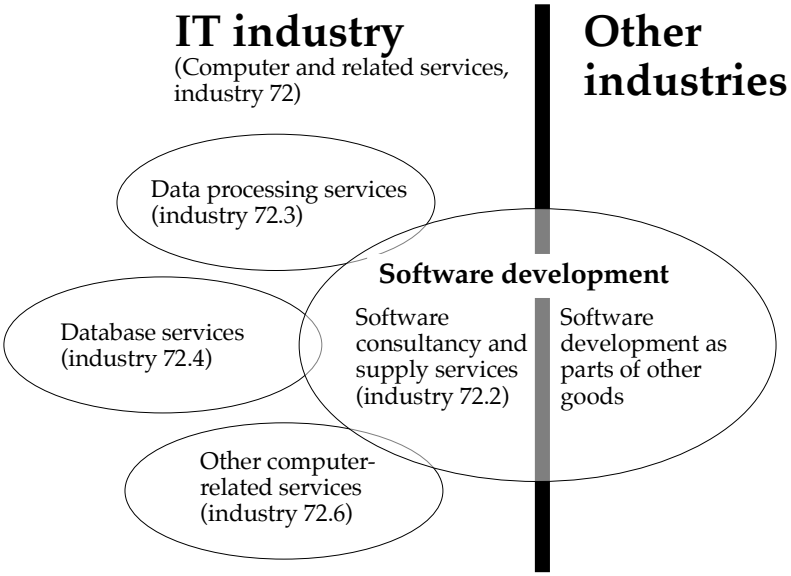


Figure 4: Software is developed both inside the IT industry and other industries (Ali-Yrkkö & Martikainen, 2008, p. 3; Statistics Finland, n.d.)

7 All the firms whose sales come mostly from activities related to computer data processing (industry code 72). (see Ali-Yrkkö & Martikainen, 2008, p. 2)

According to observations made by Ali-Yrkkö & Martikainen (2008), especially the middle-sized software firms (30-70 employees) in Finland suffer from lower productivity[8] and profitability than average, and their productivity growth rates have additionally been lower than what has been observed in other size classes. It is also argued by the authors, the profitability of a software firm starts to rise again when the number of employees approaches 100. The authors further remark, that during the last five years, of the 50 fastest growing firms in Finland slightly over one fourth have been software companies. (Ali-Yrkkö & Martikainen, 2008).

4.2 Segmented market

According to Hoch et al. (2000), the IT market can be divided into four segments: *hardware products*, *hardware maintenance services*, *software products and services,* and *processing services and Internet services*. The segment of software products and services, which is in the scope of this study, consists of *embedded software (including services)*, *professional software services*, and *software products*. Software product business takes place on two distinct market segments, namely *enterprise solutions*, and *packaged mass-market software*. (Hoch et al., 2000, p. 27). Services business and product business segments are illustrated in Figure 5.

8 The productivity is calculated by relating a firm's value added to either its staff expenses or to the number of personnel (Ali-Yrkkö & Martikainen, 2008, p. 7)

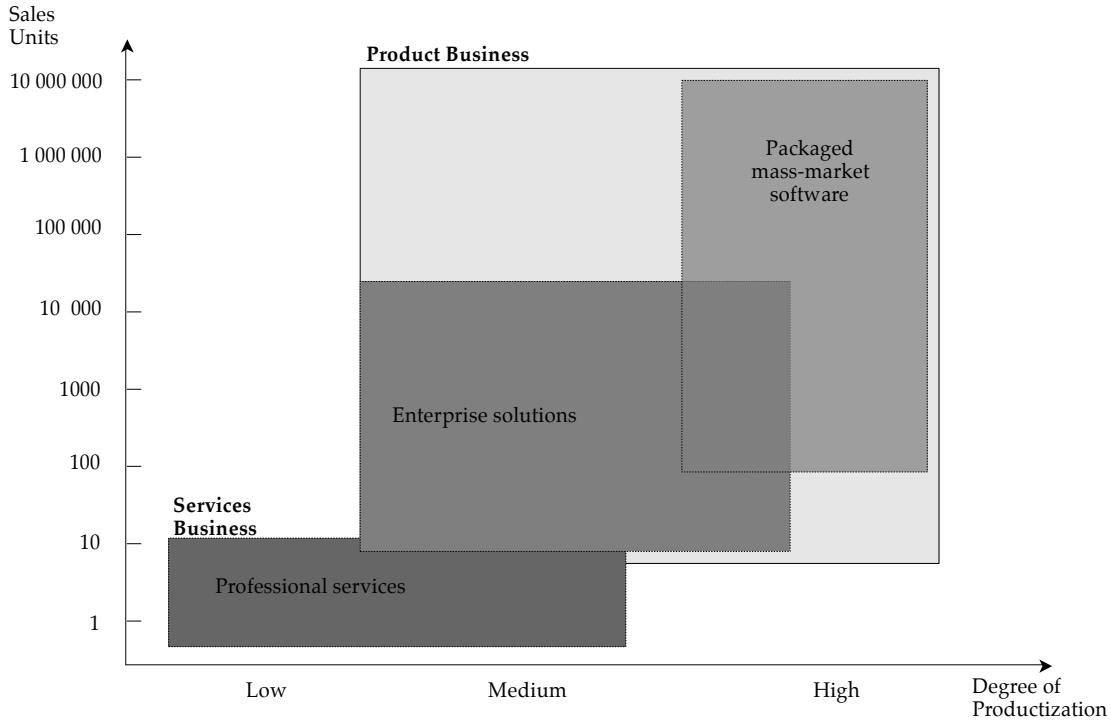


Figure 5: Degree of productization and unit volume in the three market segments (McKinsey, n.d. in Hoch et al., 2000, p. 34)

Although this classification might seem strict, in reality it might be difficult to distinguish between product and services business in some cases, as the boundary between these two is becoming increasingly fainter "with more and more firms successfully straddling the two sectors" (Nambisan, 2002, p. 146).

Table 5 lists some differences between the two businesses. Hoch et al. (2000, p. 46) argue, one of the differentiating factors between the two segments is the effects of marginal costs: for professional services firms they are almost constant while in case of product businesses the marginal costs approach zero. Furthermore, the market structure is in general more fragmented in the professional services segment. Professional services firms are additionally acting on more regional scale, especially in the early stages, whereas product businesses are more inclined to seek global growth. Moreover, professional services firms are more likely to deal with customers in one-to-one basis, whereas software product firms tend to deal with one-to-many relations as well. Additionally, firms offering professional services are likely more interested in their capacity utilization rate than market share, which is more important for software product firms. Human resources, software development, strategy, and marketing and sales are

all important management areas for both, but the level of relevance varies. (Hoch et al., 2000, p. 46).

Table 5: Dynamics of software product versus professional services business (Global McKinsey software survey, n.d. in Hoch et al., 2000, p. 46)

	Professional Services	**Product Business**
Marginal costs	Almost constant	Almost zero
Market structure	Highly fragmented	Drive towards high concentration
Regional appearance	Mainly regional, with increasing tendency to globalization	Highly globalized
Customer relationship	One to one	One to few, one to many
Most important number to watch	Capacity utilization rate	Market share (installed base)
Relevance of management areas	1. Human resources 2. Software development 3. Marketing and Sales 4. Strategy	1. Strategy 2. Marketing and Sales 3. Human resources 4. Software development

4.3 Software business models

According to Rönkkö & Mutanen (2008, p. 16), division of software firms into the two categories described in the previous subchapter "provides only a very rough classification of Finnish software firms". Based on survey data and statistical methods, the authors developed a categorization of software firm business models[9] as seen in Table 6.

9 "Firm's business model can be defined as *a configuration of organizational factors that describes how the activities of the firm and its business network are configured at a certain point in time to produce value to the customer, and how this value is appropriated.* In other words, a business model describes *what a firm does and how it makes profit."* (Rönkkö & Mutanen, 2008, p. 16).

Table 6: Description of business models (Rönkkö & Mutanen, 2008, p. 16)

Main category	Cluster name	Description
Product-centric	Packaged product with content	Standardized products with extensive content part
	Solutions	Customized products with extensive consulting and infrastructure services
	Standardized product	Standardized products
	Software as a Service	Customized products with infrastructure services
Service/OSS-based[10]	Product oriented OSS	Open source based models with emphasis on product sales
	Service oriented OSS	Open source based models with emphasis on software development services
	SW development services	Services based on software development or supporting service
	Consulting services	Services based on technical and business consulting, without an emphasis on software development
Reseller	Reseller	Based on the sales of third party products with services

4.4 Special characteristics of the industry

Software industry differs in many sense from other industries. Nambisan (2002, p. 146) described it being "characterized by a high rate of product and process innovation, high knowledge intensity, rapidly shrinking product and technology life cycles, global market, intense competition, and highly dispersed value chains". Indeed, fast product and process innovation is one of the main characteristics that differentiate software industry from the rest (Hoch et al., 2000; Nambisan, 2002). In addition, other researchers have pointed out such characteristics as low entry barriers (Ali-Yrkkö & Martikainen, 2008; Hoch et al., 2000) and labor-intensity (Hoch et al., 2000).

According to Nambisan (2002, p. 146), compared to other high technology industries, firms in the software industry have "perhaps the most dispersed value chains". This happens because "conceptualization, design, development, and marketing of a product" are sometimes conducted in different countries (Nambisan, 2002, p. 146). Mainly because of the Internet and its applications,

10 OSS stands for open source software.

global market and cooperation are indeed the dominant characteristics of the industry.

One other peculiar characteristic of the software industry is its low entry barriers (Ali-Yrkkö & Martikainen, 2008). This means it is relatively easy for anyone with some technical competence to start a software firm. As Ali-Yrkkö & Martikainen (2008) note, a small-scale firm can often be established just to experiment with a business idea without high investments or risks related to them. This is especially true in case of www and Internet applications as the investments needed for development hardware are low. Indeed, the dynamics of the IT industry as a whole are such that lots of new firms are established, cessation rates being at the same time higher than in any other industry. (Ali-Yrkkö & Martikainen, 2008). Furthermore, as Hoch et al. (2000) argue, many can start a software firm, but very few can run it, most never make it to the *IPO*[11], and many that do, fail later. The reason for failing and/or not trying to grow the firm may in many cases be the lack of willingness to do it, as discussed earlier.

Interestingly, low entry barriers is in fact one possible cause for the intense competition in the industry (Hoch et al., 2000). Indeed, both Hoch et al. (2000) and Nambisan (2002) agree that software industry is characterized by intense competition, and that there is always a threat for new competition.

Although software products and software services business sectors share many of the characteristics discussed above, "many aspects are different—including […] cost structure, demand volume, competition intensity, geographic presence, and relationship management" (Hoch et al., 2000, p. 38). Some of these differences are discussed in the subchapters that follow.

4.4.1 Professional services business

Labor intensity or "emphasis on people", as Hoch et al. (2000) put it, is especially important characteristic of professional services firms. According to the

11 IPO stands for initial public offering.

authors, managing people affects the success of professional services companies the most:

> Because of the scarcity of talent, managing people is crucial in the software industry. In professional services firms, this is even more the case because they involve people who not only develop software but who also go out and sell *themselves*—their competence, their ability to get the project done on time and on budget. (Hoch et al., 2000, p. 242).

In addition to "people management", the authors argue that human resources assignment is the second most important management area for professional services firms, in which a constant battle is fought between "spending time on future business and reputation building" in long-term versus "ensuring full capacity utilization" in short-term (Hoch et al., 2000, pp. 243-244).

4.4.2 Software product business

According to Hoch et al. (2000), pure software product business is additionally characterized by low variable costs, meaning virtually all the cost of developing software is fixed in the design and implementation of it. This leads to a situation where many copies of the product must be sold in order to cover fixed costs. Therefore, domestic markets are often too small for these types of software firms, and they have a need to seek more sales globally. (Hoch et al., 2000). However, as Hietala, Kontio, Jokinen, & Pyysiainen (2004, p. 3) note, especially in the field of enterprise solutions, there exists a need for customization of the product in order to integrate it to the customer's information systems, which limit the number of customers "to hundreds or thousands" because "[i]nstallation projects take typically months or even years, instead of minutes or hours required by mass-market products".

4.5 Industry specific growth challenges

Where software industry and its special characteristics were discussed in the previous subchapters, this chapter has a focus on describing the growth barriers and key management challenges that are caused by the special characteristics of the industry.

One of the major barriers to growth in the software industry is the low number of available professionals, which in turn makes software managers' work more challenging (Hoch et al., 2000). The effect of this barrier varies, of course, depending on the country, area, industry sector, etc. At least major software countries such as USA and India have been long suffering severely from workforce shortages (Hoch et al., 2000). According to the authors, the reasons for the lack of talent range from increasing demand, i.e. fast growth of the industry, the personal interests of the young towards the industry, and (global) competition between firms. The following example illustrates some of the reasons behind the situation in the late 1990s in India:

> One reason is the enormous growth of the $3 billion Indian software industry, which multiplied its size 50 times in the past 10 years and is still expanding at 50 percent annually. The other reason is the number of Indian developers lured away to Silicon Valley—more than 15,000 every year. (Hoch et al., 2000, pp. 68-69).

As a result of workgroup efforts by Growth Forum 08 several software firm growth challenges were identified and prioritized in the context of Finnish software industry (Kontio et al., 2008). The challenges are grouped to industrial, national and global challenges. The most important industrial challenges include sales and marketing, small firm size, low knowledge level of the market and customers, and difficulty of forming a growth strategy. The most important national challenges are non-supportive climate towards entrepreneurship, small size of capital market, low level of willingness to take risks, and low ability to take risks. (Kontio et al., 2008, p. 24).

According to research conducted by Harju (2008, p. 29) there are four challenges for small Finnish software companies that rise above the others:

1. Funding / Financing
2. How to get the right people to the company
3. Competition
4. Rapidly changing technologies.

“How to get the right people to the company” is related to the topic of “low number of available professionals” discussed in the previous section. High knowledge intensity and labor-intensity of the industry cause individuals to become the most important assets for a software firm, and one of the most import-

ant challenges for managers at the same time. Harju's (2008) notion of competition being one of the biggest challenges is also supported by the earlier discussions of the characteristics of the industry.

Nambisan (2002), citing Hoch et al. (2000), also points out, as there is an increasing amount of firms acting in both, the classification of service and product sectors has become fainter. Indeed, according to Hoch et al. (2000), it might prove to be very challenging to manage software products and services simultaneously.

Alajoutsijärvi, Mannermaa, & Tikkanen (2000) attempt to identify the most important marketing challenges for small software firms. The authors argue that the most critical challenge for the management is in balancing between entering new business domains, which require differing business logic (e.g. moving from services business towards product business) and maintaining the traditional business operations. (Alajoutsijärvi et al., 2000).

The most important possible challenges for small Finnish software firms found in the literature are summarized in Table 7. All challenges related to internationalization are excluded being out of the study scope.

Table 7: Possible growth challenges and barriers for small Finnish software firms

Management area	**Challenges / Barriers**	**Reference(s)**
Human resources	Recruiting	(Harju, 2008)
	Workforce shortages	(Hoch, 2000)
	Human resource management	(Hoch, 2000)
Marketing and Sales	Low knowledge of the market and customers	(Kontio, 2008)
	Low sales and marketing skills	(Kontio, 2008)
	Managing different business logics	(Alajoutsijärvi et al., 2000)
Personal	Motivation	(Wiklund et al., 2003)
Strategy	Competition	(Harju, 2008; Nambisan, 2002)
	Funding / Financing	(Harju, 2008; Kontio, 2008)
	Forming a growth strategy	(Kontio, 2008)
	Simultaneous management of product and services businesses	(Hoch, 2000)
	Risk taking willingness / ability	(Kontio, 2008)
Technology	Rapidly changing technologies	(Harju, 2008; Nambisan, 2002)
Networking	Small firm size	(Kontio, 2008)
Environment	Non-supportive climate towards entrepreneurship	(Kontio, 2008)

5 EMPIRICAL RESEARCH SETTINGS

In this chapter it is explained how the empirical research was designed, conducted, and how the resulting data was analyzed.

5.1 Research objectives and scope

The objectives of this empirical research were set to

- *list* growth challenges small Finnish software firms are facing;
- *determine* what kind of challenges are typical or dominant on certain growth stages;
- *detect* possible causalities between challenges and the firm growth stages;
- *learn* from entrepreneurs' and executives' attitudes, opinions and views on growth.

The scope of the research follows the same scope set for cases firms already defined in chapter 1.2.

5.2 Research strategy and methods

The strategy selected for the empirical research part of this study is *explanatory multiple-case study*, mostly because "case studies are a preferred strategy when ´how´ or ´why´ questions are being posed, when the investigator has little control over the events, and when the focus is on a contemporary phenomenon within some real-life context" (Yin, 2003, p. 1), and further, because "most multiple-case designs are likely to be stronger than single-case designs" (Yin, 2003, p. 19).

"[C]ase studies can be based on any mix of quantitative and qualitative evidence" (Yin, 2003, p. 15). The present research also combines both, as it follows primarily qualitative research methods, some quantitative methods are used as well. The qualitative part consists of four thematic interviews and their analyses, as well as of some information collected from the case firm web sites. Thematic interview is conducted as a semi-structured discussion with no detailed questions; the interview is guided only by pre-defined themes (Hirsjärvi & Hurme, 2000). The quantitative data comes from the conducted question-

naire, the purpose of which was to collect some data prior to interviews that does not necessarily require interview as a method.

Case study as a research strategy has faced some criticisms. It has been accused for the lack of rigor, and offering little basis for scientific generalization (Yin, 2003). Yin answers these criticisms by arguing that the lack of rigor in some studies may have been caused by the nonexistence of specific guidelines to follow when doing case studies, and that in some cases, case study research might have been confused with case study teaching where "case study materials may be deliberately altered to demonstrate a particular point more effectively" (Yin, 2003, p. 10). About generalization he states:

> [C]ase studies, like experiments, are generalizable to theoretical propositions and not to populations or universes[...] the case study, like the experiment, does not represent a ´sample,´ [sic] and in doing a case study, your goal will be to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization) (Yin, 2003, p. 10).

Thus, in the present study, the goal is not to arrive at statistically generalizable results, but rather to investigate whether the theories are supported by the real-life phenomenon, i.e. the case firms.

5.3 Selection of the case firms and interviewees

The case firms were selected by first sending e-mail randomly to some organizations that seemed to fulfill the criteria set earlier in the scope of this study (see chapter 1.2). To determine whether a specific firm was growth-oriented, using various sources available publicly online[12], the growth rates of the firms were studied. Five e-mails were sent all together. After two positive replies to the e-mails, of the remaining non-responsive three firms, two representatives were reached by phone, who both eventually agreed to take part in the research.

There were two requirements for the interviewees. The first requirement for an interviewee was that the person would have been working for the case firm the majority of the firm's history, preferably from the beginning. The second requirement was the interviewee's executive position in the firm. A person who is

12 The source for this information is not published in this paper, in order to ensure the privacy of the case firms.

or has been a member of the management team was highly preferred. These requirements were set in order to maximize the gathering of most reliable and meaningful data (see Table 8 for interviewee information).

5.4 Data collection procedure and execution

The following subchapters explain the practical execution of the data collection procedure, i.e. how the questionnaire and the interviews were conducted and what kind of methods were used.

5.4.1 Communication with the case firms

Every case firm was contacted at least once prior to the interview and after the initial contact either by phone or e-mail. All the interviewees were given a brief explanation of the nature of the empirical research and the nature of the study in general. The time and date for the interview was agreed upon, and the interviewees were given verbal instructions to fill the questionnaire (see following chapter).

Both the questionnaire and the interviews were conducted in Finnish. The reasoning behind this was that forcing the case firm representatives to give answers in other than their native language could affect the results in limiting the quality and the quantity of the output.

5.4.2 Questionnaire

A brief questionnaire was sent to all the interviewees couple of days before the actual interview in electronic form (see APPENDIX II). The main purpose of the questionnaire was to collect some demographic data of the interviewee and the case firm respectively. The secondary purpose of the questionnaire was an attempt to position the case firm roughly on a certain growth stage based on the dominant problems observed in the firm by the interviewee, which was based on Kazanjian's growth model (see chapter 3.3).

The questionnaire was also supposed to make time spent with the interviewees more efficient as it would hence be possible to proceed straight to the theme interview questions. In reality, it turned out that some time had to be spent with some of the respondents filling the questionnaire before the actual interview could begin. The reasons for this were mainly that the respondents had not have enough time to fill the questionnaires in advance, or they had had some difficulties interpreting some of the questions. These problems could have been avoided by sending the questionnaires in earlier and testing the questionnaire more thoroughly beforehand.

5.4.3 Thematic interviews

Time reserved for every interview was 90 minutes, which seemed to meet well the requirements set by the number of themes to discuss. The interviewees were explained that although a pre-constructed theme list exists (see APPENDIX I), the idea would be to discuss of any challenges related to software firm growth in any order. Although there were some questions prepared, not every interviewee was asked the same questions. The purpose of the questions was to open up the discussion of possible challenges and act as a tool to keep the discussion going all the time. Interviewees were asked for a permission to record the interview. Eventually, all the interviewees granted a permission, and thus, all the interviews were digitally recorded. Table 8 summarizes the interview and interviewee information.

Table 8: Interview and interviewee information

Interviewee name	**Interview date**	**Interview duration in minutes**	**Interviewee's position in the firm**	**Interviewee in the firm since (firm founded)**
Interviewee A	March 26th, 2009	71	Sales Director, Owner (25 %)	2001 (1995)
Interviewee B	April 1st, 2009	40	Technology Director, Owner (~20 %)	1997 (1997)
Interviewee C	April 2nd, 2009	76	Product Manager, Owner (18,7 %)	1987 (1987)
Interviewee D	April, 20th, 2009	42	CEO, Owner (Largest single share)	2005 (2005)

5.5 Data analysis, and reliability and validity issues

After the interview transcribing process, the contents of the transcriptions were analyzed theme by theme. Only the written content was included in the analysis and taken into consideration, i.e. the tone of voice or other similar verbal or non-verbal factors were ignored. The questionnaire data was transcribed into a table for more efficient comparison. All the obtained data was used throughout the analysis in a comparative and reflective manner.

Reliability, in context of interviews, is the extent to which the interviews would yield consistent results when repeated (Hirsjärvi & Hurme, 2000). Although the interviewees were made perfectly clear all the data would be confidential and anonymous, hence making the case firms practically unidentifiable, there might exist some incentives for them to provide a too positivistic, or even partial, view of the firm, thus causing the data to be less reliable. For instance, it is easy to imagine an interviewee seeing an interview as a possibility to do networking and to promote the firm at the same time. All in all, the interviewer is a student who is possibly seeking a job in the near future.

There might be multitudes of factors that affect the resulting data, ranging from the interviewer's personal skills to differing external conditions. Anyhow, "differences between two research executions does not have to be considered weakness of the method, but rather as a result of changed situations" (Hirsjärvi & Hurme, 2000, p. 186). The executed interviews have yielded the results that are being analyzed in this paper. If and when the conditions change, it is natural that the results might change to some extent if the interviews were to be executed again.

The questionnaire could have been prepared better, as it turned out, especially the last five questions (see APPENDIX II, questions 19-23) were difficult to understand for the interviewees. The first error was, that in Kazanjian's growth model, some typical management problems for technology-intensive firms are listed by growth stage of the firm, and hence, the interviewees did not recognize all of these problems as their own. Although, this was expected, the questions could have been formed or explained in a better way. The second error was

probably to utilize such a dated growth model in the first place: it was developed almost two decades ago and – it goes without saying – some of the concepts used in the model might not be applicable in today's software business environment. It is also questionable whether the model is completely suitable for software firms in the place. Third and final error could have been caused by interpretations of the phrases and concepts used by the original authors. There might be misinterpretations caused due to the fact the model was interpreted and also translated into Finnish by another researchers.

6 FINDINGS AND ANALYSIS

In this chapter the resulting data from the empirical research is analyzed. The descriptions of the case firms are presented in the first chapter (see chapter 6.1). The subsequent chapter 6.2 contains in-depth analytical discussion based on the empirical data, and presents some of the main findings of the research. Chapter 6.3 both presents a growth challenge model for small Finnish software firms and acts as a summary for the findings of this study.

6.1 Descriptions of the case firms

The next four subchapters briefly describe some history and facts and figures of the case firms. The descriptions are based on information gained from the interviews, questionnaires, and the firms' own websites. Chapter 6.1.5 summarizes the most important facts and figures of the case firms.

6.1.1 Alpha

Alpha has a relatively long history in the IT-sector as it was founded in 1995. Alpha provides its customers electronic commerce, hosting, and security services and products. Its customers are mainly other businesses. Alpha is a product-centric software firm with service orientation. Standardized products form the core of its product business. Alpha's products are customized to some extent for many customers which often causes a need for project work.

Today Alpha employs about 13 employees and is growing steadily both employment and sales wise. Within the past one year Alpha has employed two new employees. In 2008 Alpha's sales totaled 1,4 M€ and it made a profit of 0,4 M€. From the previous year sales growth was 10 %, and profit growth 55 %. Alpha's growth has been steady for years, as its total sales growth between 2003 and 2007 has been around 298 %.

Alpha's strategy has been to grow profitably and without taking too high risks. Alpha has been able to sustain its growth through internal financing. There are

no external owners involved. Alpha's growth has been mainly organic. One micro-sized firm with one employee was acquired in 2003, though. Alpha operates primarily in the same city where it was founded in Finland, although a smaller office has been established in another city. Alpha has not yet internationalized any of its activities.

6.1.2 Beta

Beta was founded in 1997 and is still completely owned by its original founders who all have executive positions in the firm. Beta's core business is to offer software solutions and services. Beta also sells software licenses and offers some customer support services for solutions that are based on specific technologies. Beta's customers are mainly other businesses. Today Beta has dozens of customers. The number of Beta's customers has increased to some extent during one year.

Today Beta's personnel consists of 69 professionals, and should thus be considered an SME. The employment growth in last couple of years has been rapid. Beta has hired around 10 new employees in one year. The 50 person milestone was reached around two years ago. In 2007 Beta's sales were 4,2 M€ and it made 1 M€ in profit. Although Beta's sales went down by 25 %, its profit stayed approximately on the same level when compared to the previous year (2006). Notwithstanding the drop in 2007, Beta's sales have risen by 191 % between 2003 and 2007. In 2008 Beta's sales rose to 4,7 M€ which resulted in around 12 % growth.

Beta has grown through internal financing without need for external financing which has also been its strategy and goal. Beta has received some funding from supportive government programs, though. Beta's growth has been organic, as they have not made any acquisitions. Beta operates mainly in one Finnish city where it was founded. Beta has not internationalized any of its operations, although it has some large firms as customers that are internationally active.

6.1.3 Gamma

Gamma has the longest history of all the case firms, as it was founded in 1987. Gamma specializes in offering highly specialized IT services for other businesses in Finland inside an industry sector of which it has been able to capture a market share of around 80 %. Today Gamma is still mainly owned by its personnel (around 67 %) of which the CEO has around a 26 percentage point share. The rest is owned by one customer (around 9 %) and other external investors with a total of around 24 % share. Gamma employed a total of 53 persons in 2008. Employment had increased by 5 persons from the previous year, which meant that Gamma crossed the boundary between small and medium-sized firms.

Although there are external owners, Gamma has been able to grow mainly through internal financing. Although it has never been very active in seeking subsidies, Gamma has received some funding from governmental support programs. Internal financing has been Gamma's strategy and goal from the beginning. The goal for Gamma has never been to grow aggressively, quite the contrary, reasonable and profitable growth has been the primary objective. Gamma's growth has been organic, as there have been no acquisitions.

Gamma's sales have been growing steadily at least during the last six years. Total sales growth between 2003 and 2007 was around 172 %. In 2008 Gamma's sales were around 8,7 M€, which meant a 17 % increase from the previous year. Profit made in 2008 was around 2,4 M€, which resulted in a 30 % growth from the previous year.

Gamma operates in two different cities in Finland and has also established an office in China. Although Gamma's revenues come still completely from Finland, Chinese markets and possibilities offered by them are under investigation.

6.1.4 Delta

Delta is the youngest of the case firms, as it was founded in 2005. Delta is a service-oriented software firm offering its customers, from wide range of indus-

tries, software development projects specializing in various techniques. Delta is still privately owned, thus no external owners are involved. The CEO and founder of Delta holds the largest share of all six owners.

Despite its young age, Delta has been able to achieve good growth rates both relative to sales and profit. In 2008, Delta's sales were around 2 M€. Sales growth was 44 % when compared to the previous year. The profit for year 2008 after taxes was 151 000 €, the profit growth rate settling down to approximately 50 %. In addition to sales and profit, Delta has been growing steadily its employment rates, as well as its customer base. At the time of the writing, Delta employs 26 professionals. The number of employees has increased by five persons during the last year. The number of Delta's customers, which are all other businesses, is about 35. During the last year, Delta has been able to secure ten new customers. The growth of Delta has been funded mainly by internal financing. The first two years were aided by funds from a national business incubation program, though.

All the operations of Delta still take place in the city it was founded. Delta has no planned internationalization aspirations for the near future, as there seems to be still plenty of room to grow in the Finnish markets.

6.1.5 Summary

Table 9 summarizes the most important facts and figures of the case firms. The contents of the table are based on the questionnaire result data. The case firms present rather a heterogenous sample of small Finnish software firms: there are both younger and more experienced firms; smaller and larger firms; and software product and professional services firms. This can been seen mainly as an advantage for the study because of a better coverage of the industry. The firms that have recently passed the 50-person milestone and become SMEs (Beta and Gamma) are important for the study, because they have experience of the small-firm life cycle as a whole. All the case firms are Limited Liability Companies (LLC) and have achieved good growth rates either in employment or in sales.

Table 9: Facts and figures of the case firms

Firm name*	Alpha	Beta	Gamma	Delta
Company form	LLC	LLC	LLC	LLC
Year of foundation	1995	1997	1987	2005
Employees	13	69	53	26
[change in one year]	[+2]	[~+10]	[+5]	[+5]
Sales (M€)	1,4	4,2†	8,7	2,07
[change from last year]	[+10 %]	[~-20 %]	[+16,8 %]	[+44 %]
Profit (M€)	0,4	1,0†	2,4	0,151
[change from last year]	[+55 %]	[~+0 %]	[+30 %]	[~+50 %]
Number of customers	~2000	dozens	16	35
[change in one year]	[+150]	some growth	[+0]	[+10]
Software business segment / market segment**	Products / Enterprise solutions	Services / Professional services	Services / Professional services	Services / Professional services
Main business model***	Standardized product	SW development services	SW development services	SW development services

6.2 Interview analysis

The interviews were analyzed by utilizing thematic analysis principles (see Aronson, 1994). The theme list for the interviews included motivation and risk taking capabilities, management, education, resources, strategy, sales and marketing, taxation, industry and market, networking, and internationalization (see APPENDIX I). Although the analysis was executed by following theme-by-

* The names are changed in order to ensure the privacy of the actual firms.

† Year 2007

** See chapter 4.2 for software business market segment definitions.

*** Note: A general business model category that best describes the case firm's actual business model(s). See chapter 4.3 for software business model categories and discussion.

theme transcriptions, the following subchapters present the most important findings depicted from the interview data, and do not thus follow the same structure as the interview theme list. All the citations have been translated to English from the Finnish transcript.

6.2.1 Motivation

As Mutanen & Rönkkö (2008) pointed out, growth of a firm occurs when motivation and opportunity exist, and also when adequate strategies and resources are utilized. Motivation of the entrepreneur or the management of the firm is thus a key factor that the existence and the growth of a firm is dependent on; the firm would likely cease to exist, if no-one would not have motivation to keep it alive.

The source for motivation in general

Interviewee A thinks that the motivation for growing a firm is something that "has to exist naturally in those people in the core of the business" and "cannot come from anywhere else". Interviewee B also states that motivation comes from the fact that "the business just has to be done" and that it could also come "from the need to develop own activities and responsibilities". "Growth is the only way to success... and at least the Management Team has to have the motivation to demand growth and to thrive for it[...] otherwise the firm will be locked in place" (Interviewee C). Being a micro (under 10 persons) firm is in itself a great motivation to grow bigger, because the cooperation with potential customers might be quite a big challenge at that point. The challenges in cooperation are results of customers being afraid to cooperate with a firm that is too small in size and that does not yet have enough delivery capability. Larger projects mean better profitability. In order to win these larger projects, the firm needs to be larger itself. Being a bigger in size also reduces the risk of total failure and the future is more secured. (Interviewee D). Furthermore, Interviewee B notes, that the firm might begin to look less interesting for its employees if it is not growing. In such a case, "it could be that the employees reach the end of their career development and go to work elsewhere" (Interviewee B). Addition-

ally, slow growth might have a negative effect on customer relations as well. “Customers want of course that their partners, who deliver various solutions, also make progress and enhance their own operations” (Interviewee B). Money and higher income were also mentioned as possible sources for motivation.

> Of course it's not the only motivator and not necessarily even a realistic expectation – but there's always that chance, that the firm, for one reason or another, starts to progress better (Interviewee B).

Other traits also play a significant role in the long run, and as the following illustration highlights, even though motivation is needed it might not always be enough:

> If a person who underlines and appreciates ease and comfort is thrown to manage a firm really motivated for 20 years onward, the result is analogous to a situation where a person who is not able to learn how to sing – even with help of a singing instructor – takes part in a singing contest. (Interviewee A).

The effect of growth of the firm on personal motivation

The question of effect of growth of the firm on motivation seems to gather differing opinions, as others see it as a clear catalyst for more motivation (Interviewee D), while others argue that even though growth gives some boost to it, motivation would exist even without growth per se (Interviewee A). Interviewee D sees the growth as a self-feeding process, because growth brings tougher challenges. “The bigger the firm, tougher the challenges, higher the motivation” (Interviewee D). Furthermore, Interviewee B sees growth as a motivator through changing executive job descriptions due to company development. Apparently, it is also possible that certain growth could actually reduce motivation to grow further in certain market situations, as has happened in the case of Gamma. Gamma has been able to capture 80 % market share, which has forced them to seek growth in new ways and also to consider internationalization as an option (Interviewee C). Interviewee A also points out the importance of rationality in growth when discussing the motivating effects: “A firm can grow in relation to sales or in relation to profit or grow reasonably in relation to both – our way has been to take care of profitability all the time and not to go headfirst with only growth in relation to sales and employment”. To summarize, the effect of growth of the firm on entrepreneurs' and managers' personal motivation

seems to be highly situation dependent and is also a question of personality traits: different persons in multitudes of situations find their motivation from various things. One growth challenge that all the case firms have in common is that they need to find the motivation one way or another.

Worthwhileness to grow a software business in Finland

A positive consensus of opinions about growing a software business in Finland exists among all the interviewees. Although it might depend on the firm's core business (Interviewee A; Interviewee B) and the markets (Interviewee C), the growth of Finnish IT industry and software business sector in general makes it a no-brainer at the moment as "the demand exists for larger and more larger firms" (Interviewee B). Another supporting fact is, that none of the case firms have internationalized any of their profit making operations. Although it is argued that profitability levels could be better by outsourcing some operations to so called cheap labor countries, assuring the quality seems to be more important (Interviewee A; Interviewee D). When considering the attitudes towards worthwhileness to grow a software business in Finland, it has to be taken into consideration though, that all the case firms have been successful in their businesses, and hence the opinions are expected to be positive.

6.2.2 Willingness vs. capability to take risks

> [L]imited growth is not always associated with an inability to grow but may actually be reflective of a limited desire of the entrepreneur to grow the firm (Gilbert et al., 2006, p. 929).

Willingness and the capability to take risks are cornerstones of successfully and rapidly growing businesses, but seldom go hand in hand. The entrepreneur or the management team might have a desire to grow the firm more rapidly, but certain factors seem to limit their willingness to take too high risks (see chapter 2.3.2).

Taking risks

Although all the case firms have had a history of constant growth, a consensus seems to exist among the interviewees of the fact that it would have been possible to grow faster if more aggressive growth strategy would have been utilized. Some of the interviewees thought that they have probably been even too cautious and have been unwilling to take unnecessarily high risks (Interviewee A; Interviewee C; Interviewee D). Interviewee D summarizes the most important reason for keeping the risk level as low as possible:

> We employ fathers and mothers of 26 families. We don't want to cause this highly professional team to lose their jobs by taking too high risks. We prefer moderate risk over rabid risk taking. (Interviewee D).

This argument seems to be in line with the results from the study by Wiklund et al. (2003), wherein well-being of employees was listed as the number one reason for small business managers to avoid taking too high risks and even affecting their willingness to grow the firm. Willingness to take risks and risk taking capability do not always go hand in hand.

> From time to time you would fancy taking little bit bigger risks, but then again, when you consider the current state of the firm and whether it is possible to endanger it[...] maybe that has had a small decreasing effect on [my] risk taking capability. (Interviewee D).

Coherent vision and goals among the management team

Interviewees were asked about challenges faced in trying to find a coherent vision and goals especially dealing with growth strategy among the management team. Different backgrounds and viewpoints among the team are seen as a challenge, but in the end, the differences turn into strengths as the discussion forces others to think matters from others' viewpoints (Interviewee A; Interviewee D). “Growth requires always work. If the management team does not have motivation and willingness to do that required work, it [the firm] won't grow” (Interviewee B).

6.2.3 Human resources

> Everything depends on individuals (Interviewee C).

As discussed earlier in chapter 4.4, software industry operations are very labor-intensive; costs come mainly from labor. Therefore, it was not surprising all the interviewees see personnel as the most important resource for a software firm. According to Hoch et al. (2000), human resources is the most important managerial challenge for professional software service firms, and is also important for software product firms, as seen in Table 5. The data gathered from the interviews support this observation, as all the interviewees see both managing existing and acquiring new human resources as major challenges.

Human resource acquisition

Because of the high knowledge-intensity of the software industry, software firms are constantly seeking for most knowledgeable and skilled professionals. Alas, therein lies a dilemma, as there are not many experts available. Hence, many of the available persons lack work experience and have often just recently finished their studies. Indeed, Interviewee A believes recruiting top persons to be the top constant resource challenge for Alpha "now and in the future". Additionally, Gamma has struggled to some extent with filling managerial positions (Interviewee C). This might be due to the specific requirements set by the highly specialized industry sector Gamma is operating in. Although – especially due to these kinds of requirements – it would be preferred to find managers from inside the firm, it seems technical experts seldom have what it takes to become someone in a leading position (Interviewee C). Delta has faced similar challenges (Interviewee D), as well as Beta:

> [...]the biggest bottleneck seems to be in filling those positions requiring most responsibility. In our case, for those kind of basic programming tasks resources are to be found moderately easily. Finding project, customer relationship, or sales managers is notably tougher. (Interviewee B).

Furthermore, due to the high level of knowledge-intensity, it might take months until a new employee in a software firm can actually start productive work. This phenomenon causes challenges in recruiting: "The timeframe between

realization that there is a need to recruit, the decision to recruit, and the point where a person starts productive work is surprisingly long" (Interviewee D). This leads to a situation where a software firm prefers people that are willing to commit themselves in the long run (Interviewee C), which makes the recruiting process even more challenging.

Human resource management

Both Interviewee C and Interviewee D see managing human resources as a major general managerial challenge. Employees are individuals and have to be treated accordingly, differing somewhat from person to person (Interviewee C). There are varying personalities as employees in an expert company who have to be both managed and respected as professionals and specialists at the same time (Interviewee D). Interviewee B sees managing a software firm especially challenging due to the fact that many new employees are recruited straight from school, as there are not many experts available in the industry. Seeking to integrate the new employees to the firm's culture in one hand and making attempts to adjust the current culture to the new employees in the other causes managerial challenges (Interviewee B). According to Interviewee A, there is a challenge in steering technically oriented employees' interests into doing rational work tasks instead of constantly trying out and familiarizing themselves with new technologies. Interviewee A also believes this is a challenge especially related to employees with low work experience who have recently finished their studies. Furthermore, Interviewee D believes that the biggest challenge for firms doing project work is setting optimal working load for all employees:

> From time to time there is a situation where, when a project is finished, it might take a few weeks before a new project starts. And then oftentimes it happens that several projects start simultaneously – and in that case we lack work force. [...] As a rule, at the moment we are in a situation where we have a bit too few employees all the time, and people have to do work quite a lot. (Interviewee D).

The effect of growth on human resource acquisition and management

According to the interviewees, the growth of a firm seems to have multiple effects on human resource acquisition and management. Firstly, a growing firm is

more interesting for new and existing employees (Interviewee B; Interviewee D) and thus aids the recruitment process. One reason for this could be that a bigger and growing firm offers both its employees and management a wider range of responsibilities and tasks to choose from (Interviewee B; Interviewee C). “Some people don't even want to work in a smaller firm” (Interviewee B). Secondly, the firm becomes strategically more stable as it is no more dependent on single individuals (Interviewee C). Thirdly, a growing firm forces new organization structure (Interviewee D). Although, this causes unavoidable challenges for management (see chapter 3.2), the resulting organization structure likely allows personnel more options for specializing.

6.2.4 Competition

Competition is tough, and competition has become tougher (Interviewee D).

Both Interviewee C and Interviewee D see competition as becoming more radical and a tougher challenge than before. EU has forced certain public administration operating in some industries to put out their projects to tender, which, according to Interviewee C, has had an impact on Gamma's business by causing deal closing to become more challenging. Interviewee D believes it is the economic recession that has partially caused competition to become tougher. This happens because “big players have lost lots of customers, and thus have hungrily begun to seek new customers, which then has caused the competition to become tougher” (Interviewee D). Furthermore, Interviewee B sees competition for young software businesses especially challenging because of the abstract nature of products and services offered. Selling ideas is challenging in general and “some competitors might use it in a wrong way in competition by promising too much too cheaply, and when then customer has already committed to the project only then the truth starts to reveal” (Interviewee B). Additionally, some actors especially in software product business might start to compete solely with price, which might distort competition and cause bad situation for all the competing firms (Interviewee A).

Although all the interviewees agree competition causes some challenges to management, it does not seem to have that enormous effect on all of the case firms. Gamma differs from the rest in that it has secured a 80 % market share which obviously makes competition seem less dangerous. Interviewee C also stressed they have successfully done cooperation projects with their competitors after the actual competitive bidding.

In all, the overall impression from the interview analysis leans toward supporting the theory what comes to competition in the software industry. Especially younger software firms in services business (Delta) see competition as being tough.

6.2.5 Sales and marketing

Sales and marketing was an interview topic that resulted in a wide range of views and opinions. Both Interviewee A and Interviewee D mentioned the difficulty of recruiting good salespersons. This is in line with the topic of human resources already discussed in earlier findings.

Selling something that is not tangible is a challenge for firms offering software developmental services (Interviewee B). Especially, when a firm is small, it is more difficult to sell ideas when there are no references or successful customer cases to tell about (Interviewee B; Interviewee D).

Alpha as the only software product company of the case firms focuses on sales instead of marketing: “We do extremely little marketing” (Interviewee A). When asked about software industry specific challenges, Interviewee A concludes, “sales is just sales after all... no matter whether copy paper or Internet-applications are sold”, although it is agreed – also by Interviewee B and Interviewee C – that technically oriented personnel usually lack sales and marketing skills. Interviewee C further stresses the fact that IT companies usually start with only IT experts, and thus the skill level in sales and marketing is typically low. Nevertheless, the personnel of a firm do marketing every time they face the customers (Interviewee C).

Interestingly, Interviewee D sees no challenges in sales at all: “Finnish software companies do little sales, and they do it badly, so it is easy to manage”, but confesses building the right sales strategy having been quite a challenge, although they have been successful in it.

To summarize, sales seems to be a challenge especially for younger software firms in services business sector when there are yet no references nor sales oriented personnel in the firm.

6.2.6 Evolving organization

> The starting phase is very different: in small organization everybody knows everything. Later, when the number of personnel gets closer to 7-10 persons, differing management activities have to be already taken into use. (Interviewee D).

According to Interviewee B, at the beginning stages of the firm life cycle, everyone has to do everything. Specialization starts to become more important at later stages. Indeed, there is a challenge in specialization and the ability to delegate responsibility. When a firm grows, management has to develop as well; there needs to be more roles and division of responsibilities. (Interviewee B).

Additionally, according to Interviewee C, when an organization develops, management activities become more prevailing and start consuming relatively more resources. “When the number of personnel was 20 [...] it [management] was really informal; responsibilities were not clear and the structure of the organization was such that the CEO was basically responsible of all the operations” (Interviewee C). This responsibility concentration on the CEO can be still clearly seen in the case of Delta, which is roughly the half of the size of Gamma when using number of personnel as a measure. According to Interviewee D, the CEO is still responsible of much of the sales operations at Delta. Furthermore, all the personnel in responsible positions have other functional roles in addition to their managerial duties. This creates a challenge for the development of firm operations in general, because the management is tied to other, non-managerial duties. (Interviewee D).

Based on the questionnaire (see APPENDIX II, questions 19-23), an attempt in the empirical part of the study was to position the case firms roughly on the Kazanjian & Drazin's (1990) life-cycle model, both in order to test the applicability of the model and to gain knowledge of the current dominant problems and theoretical growth stage positions of the firms. The results can be seen in Table 10.

Of the case companies, Gamma is clearly the closest candidate to belong into the Stability stage, although its structure is still rather centralized. This is not surprising as the history of the company dates back to 1987, and as it has already secured a 80 % market share and has already started to seek growth from foreign markets. The rest of the case firms fall mostly to either into the Commercialization or into the Growth stage, although the firms at least want see their structures and planning processes being rather informal. The question of the rewarding systems divides the smaller and larger firms quite clearly to the opposite ends, which is not a surprise: the larger companies are likely more career-oriented. People section of the model is problematic because naturally none of the firms want to see their employees as non-professionals. Only the notion of “bureaucrats” seems to divide the smaller firms from the larger ones. In all, although the model gives some idea of the dominant problems in the case firms and provides a satisfactory framework for comparing their organizational evolutions, it is clearly not very well suited for software firms, especially for firms operating in the professional services segment.

Table 10: Case firm positioning on the Kazanjian & Drazin's (1990) growth model

	1. Conception and development	2. Commercialization	3. Growth	4. Stability
Problems for organizational decision	Invent, develop and build prototype Sell the concept Define business idea **Beta**	Develop production Acquire facilities Plan functions Redefine design Acquire talent **(Alpha, Delta)**[13]	Avoid shakeout Balance profits and growth **Gamma**
People	Generalist Technologists Non-professional Part-timers		**(Alpha, Delta)**[14]	Specialists Bureaucrats Professionals Career employees **Beta, Gamma**
Structure	Informal Market reliant Group centered **Beta, Delta**	Formalized Centralized Functional **Alpha**[15]**, Gamma**	Formalized Decentralized Planning and budgeting	Formalized Decentralized Profit center
Rewards	Equity for new Many opportunities Informal setting **Alpha, Delta**		Stable and secure Compensation Career development **Beta, Gamma**
Planning process	Informal Centralized Undifferentiated Short time horizon Integrated **Beta**		**Delta**[16]	**Alpha**[17]	Formal Decentralized Specialized Multiple horizons Integrated **Gamma**

13 Without 'Avoid shakeout'

14 Without 'Bureaucrats'

15 Also 'Market reliant' and 'Profit center'

16 'Informal', 'Centralized', 'Specialized', 'Multiple horizons'

17 'Centralized'

6.3 Growth challenge model for small Finnish software firms

The following typical growth challenges for small Finnish software firms are suggested based on the literature and empirical research:

Table 11: Small software firm growth challenge model

Growth stage **Number of personnel**	**Typical growth challenges for software firms**	**Typical general growth challenges**
Seed 0	• Acquiring the first customer(s) • Software development	• Business concept • Finding the team • Funding / Financing • Risk taking
Start-up ≤ 2	• First project / product • Sunk costs	• Funding / Financing • Risk taking
Early growth 3-10	• First project / product • Sales / New customers • Sunk costs • Recruiting personnel • Personnel management	• Growth strategy • Risk taking • Evolving organization
Growth 11-20	• Sales / New customers • Competition • Recruiting personnel • Personnel management	• Profitability • Evolving organization
High growth 21-50	• New products / new innovations • Competition • Recruiting personnel • Personnel management • Internationalization	• Motivation • Evolving organization

The model is divided into five life cycle stages leading to situation where the firm is no longer small in size: *seed*, *start-up*, *early growth*, *growth*, and *high growth*. The model considers both special challenges related to software firms as well as general challenges related to all small firms. Many of the challenges, especially the ones relating to human resources are present on many stages. This implicates the huge importance of human resources for software firms.

The seed stage starts when the firm is not even founded yet. Challenges related to this stage include refining the business concept, finding a suitable team, and gathering capital. Especially service business firms might find it challenging to acquire the first customer without any references or history of previous projects.

Indeed, finding the first customer is such a growth boundary, that the firm will probably never move to the next stage if one is not found. Software product firms might move to the next stage and start the business without a ready product, and thus without customers.

For software firms, the start-up stage will still most likely evolve around acquiring or dealing with the first project or product. Sales for software product firms and customer acquisition for professional services firms are vital in order to start covering sunk costs and make the business operations profitable. Software product companies might still rely on developing their product(s) and hence might not have acquired any customers yet.

The early growth stage for software product companies means ready product(s) and some materialized sales for the most of firms. The biggest challenges for them are likely related to sales, software development, and human resource acquisition and management. Firms offering software services are likely struggling with acquiring new customers and/or projects after the initial one(s). A lot is depending on the success of the first project, and the future of the company lies in closing new deals. Human resources are also vital for software services firms, and thus, one of the major challenges for them is acquiring skilled personnel, and keeping the existing ones in the company as well.

The early growth stage often marks a point where a software firm needs to start making decisions about the growth strategy they are going to utilize. Whether aggressive or moderate growth is sought, depends most likely on the market situation but also on the willingness and ability of the owners to take risks. It seems Finnish software firms typically decide to grow moderately driven by the market and start securing their profitability and covering sunk costs. Too reckless risk taking is avoided and considered unethical.

The growth stage is a big milestone for a software firm as it has managed to grow beyond 10 employees. The organizational structure starts to take new forms and it might be challenging for the owners to share responsibility. Human resources remain most likely as the major challenges for software companies, although recruiting might become even more challenging because more

specialized work force such as project managers and sales representatives are needed. Competition might become a new big challenge for software companies in this stage if the firm is competing on a narrow market segment.

The final growth stage is called high growth. Mostly same challenges remain as in the previous stage, but they can become more intense. Although it is true that acquiring new customers and employees might be easier than before, because of the references and experience the firm has touted, organizational changes and increasing need for specialized workforce pose new challenges. The growing number of employees makes managing personnel and their skills even more challenging than before.

On high growth stage, competition might become more severe, again, depending on the market segment or the industry sector the firm is operating in. Although in some market segments, there might be plenty of room to grow domestically, some software firms might be forced to plan internationalization of some of its operations in the near future possibly caused by the relatively small Finnish market size. Coming up with new innovations and products might prove challenging, and some setbacks are most likely to occur.

7 SUMMARY AND CONCLUSIONS

The objectives of this study were set to merge knowledge of growth of a firm theories by reviewing relevant literature from small Finnish software firms' perspective, and to determine as many of the most important growth challenges and barriers for growth-oriented Finnish software firms as possible. The research problem of this study was thus set to: *How and why are growth challenges manifested on different life-cycle stages of a small and growth-oriented Finnish software firm?* The research problem was further divided into the following research questions:

1. What is commonly understood in relevant scholarship of growth of a firm, and how it is researched?
2. How and why does a small and growth-oriented Finnish software firm face growth challenges and barriers on different stages of its life cycle?

The first research question is mostly covered by chapters 2 and 3, wherein various topics, such as firm growth theory, firm growth drivers, and firm growth measurement, related to firm growth theories and research are discussed. The second research question is covered mainly by chapters 4 and 6. The dynamics of the software industry both from global and domestic viewpoints are explained in chapter 4. One obvious finding was that the software industry has many special characteristics compared to other industries, which may cause challenges for software firm growth. These theories were empirically tested as described in chapter 5, and the results are analyzed in chapter 6. The growth challenge model, introduced in chapter 6.3, can be seen as a summary of the study results as a whole as it directly addresses the research problem.

After reviewing various software firm growth and related studies and testing them empirically, it is clear software firms are facing some specific growth challenges, and that many of those challenges are caused by the specific characteristics of the industry. However, it should be noted, some challenges might be caused by national level differences among industries.

The primary contribution of this study is the suggested growth challenge model. The model combines both theoretical and empirical evidence into a sensible form. Additionally, it offers a new viewpoint to software firm growth through

challenges in a way that has never previously been suggested in the scholarship. It might be argued, though, the model is vague and does not offer prioritized challenges, and that it is based mostly on qualitative analysis from too a concise sample. Indeed, the model is loose and does leave room for interpretative observations. Nevertheless, the model offers one viewpoint to software firm growth challenges and should provide a good starting point for any scholars interested in the subject.

The secondary contributions are related to empirically testing some of the theories related to software firm growth challenges and either supporting them or falsifying them. The theoretical implications are further discussed in chapter 7.1. Additionally, after combining the theory and empirical data, through an analysis some practical implications could be drawn that can be helpful e.g. for any entrepreneur-managers interested in the subject (see chapter 7.2). Although the results of this study should not be considered generalizable to any extent due to the qualitative methods utilized, they are important in weakening or strengthening the existing understanding on the subject.

7.1 Theoretical findings and implications

One important theoretical finding of this study is that the theory on managing human resources being the most important managerial challenge for software firms in services business is strongly supported empirically in case of small Finnish software firms. This finding is not surprising, however, as some of the major differentiating characteristics of the software industry are its high level of knowledge- and labor-intensity. This finding implicates the current theories on software firm growth challenges seem to be mainly in line with the actual managerial challenges in the Finnish software industry.

Some growth stage models describe the evolving organizational structure of a firm. In order to determine theoretical growth stages of the case firms, the Kazanjian & Drazin's (1990) growth stage model, introduced in chapter 3.3, was utilized in the empirical part of this study. The case firms have varying history in their organizational evolution and could be partly positioned on the different

stages of the model. There were some difficulties adapting the model to small Finnish software firms' organizational development, which implicates a need for a model more suitable for describing the life cycles and challenges of small Finnish software firms.

7.2 Practical findings and implications

One interesting finding is that financing or acquiring capital had never really been that big a challenge for the case firms, even though they all had grown reasonably fast. All the case firms have been able to sustain their growth through internal financing, and thus, there have not been any external investors involved. It should be noted, however, this does not necessarily implicate small software firms in Finland would not have problems with acquiring growth financing. The fact that the case firms have not had challenges in financing merely implicates one of the possible reasons why they have been so successful in the first place.

The findings from the interview analysis further implicate a tendency of competition becoming tougher in the Finnish software industry. The current situation of the general economy seems to be the root cause for this development. It is not completely clear, however, whether this is due to competition actually becoming more radical per se, or actually due to the growth the case firms have achieved and thus having found themselves fighting for a bigger market share than before. Anyhow, depending highly on the market positioning of a firm, competition – especially for younger software firms – seems to be tough and cause many challenges, in sales for instance.

Sales, especially for younger software firms, causes many challenges. For software firms in professional services segment, this is mainly due to the tangible nature of the offered services. Selling ideas is extremely difficult without any references to previous success stories. Additionally, software firms in general are founded by technically oriented teams that lack the needed experience in sales and marketing activities. Hence, an implication can be drawn to some extent of the fact that if the founding team of a software firm has both technically

and business oriented people the future growth of the firm looks more promising when compared to a software firm managed only by technically or business oriented people.

Risk taking is often a popular topic when discussing firm growth. Although undoubtedly any entrepreneur to establish a new firm has to take personal financial risks to some extent, it seems that this fact is too often overemphasized. The findings from the interviews seem to implicate that businesses are often lead to steady growth without taking high financial risks at all. Further, the theory of low willingness to take risks is also empirically supported by this study to a large extent; entrepreneur-managers are very concerned of the well-being of their employees and do not thus want to risk it all. Whether or not this is typical behavior for Finnish software entrepreneurs would naturally require a study of its own. In the end, the empirical data analysis of this study leans toward implicating that even the most successful Finnish software entrepreneurs are not adept risk-takers.

7.3 Suggestions for further study

Including the present study, growth of a firm research often focuses on studying the successful cases and the high achievers, neglecting the ones who did not achieve anything but loss and went into bankruptcy. Although admittedly a lot can be learned from the success stories, there would most certainly be something interesting to gain from the failures, especially in the context of Finnish software firms. One would assume the real show-stopper challenges to be quite clear for those who have experienced them the hard way. Especially the possible challenges for acquiring growth financing in Finland should be studied more extensively in case of small software firms.

Another suggestion is to test the growth challenge model introduced in this study with a larger sample of Finnish software firms. Alternatively, a weak test of the introduced model with the present case firms could be carried out in order to finalize the construction started in this study, as suggested by Kasanen, Lukka, & Siitonen (1991).

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APPENDIX

APPENDIX I

Theme list used in the interviews:

- Motivation and risk taking capabilities (motivaatio ja riskinottokyky)
- Management (johtaminen)
- Education (koulutus)
- Resources (resurssit)
- Strategy (strategia)
- Sales and marketing (myynti ja markkinoini)
- Taxation (verotus)
- Industry and market (toimiala ja markkina)
- Networking (verkottuminen)
- Internationalization (kansainvälistyminen)
- The near future (lähitulevaisuus)

APPENDIX II

The original questionnaire was in Finnish. English translations have been added to brackets.

Vastaaja [Respondent]:

1. Vastaajan nimi ja toimenkuva yrityksessä [Respondent's name and position in the firm]
2. Onko vastaaja ollut yrityksen toiminnassa mukana alusta asti. Jos ei, mistä vuodesta alkaen? [Has the respondent been involved in the firm's activities from the beginning. If not, since what year?]
3. Vastaajan koulutus (mahd. tutkinto, käydyt kurssit) [Respondent's educational background (possible degree, courses taken)]
4. Onko vastaajalla omistusta yrityksestä? Jos kyllä, kuinka suuri osuus? [Does the respondent have ownership over the firm? If so, with how large share?]
5. Onko vastaajalla omistusta muista yrityksistä? [Does the respondent have ownership over other firms?]

Yritys (The firm):

1. Yhtiömuoto [Company form]
2. Perustamisvuosi ja -kuukausi [Founding year and month]
3. Omistussuhteet [Ownership ratios]
4. Edellisvuoden liikevaihto [Last year's sales]
5. Edellisvuoden liikevoitto/-tappio [Last year's profit/loss]
6. Liikevaihdon prosentuaalinen muutos kun verrataan edellistä vuotta sitä edeltäneeseen vuoteen? [Relative change of sales when comparing last year to the year before?]
7. Liikevoiton/-tappion prosentuaalinen muutos kun verrataan edellistä vuotta sitä edeltäneeseen vuoteen? [Profit/loss relative change when compared last year to the year before?]
8. Henkilöstön määrä tällä hetkellä, ml. yrityksen johtoryhmä [Number of employees at the moment, including management team]
9. Kuinka henkilöstön määrä on kehittynyt viimeisen vuoden aikana? (+/- henkilöä) [How has the number of employees developed in the course of one year? (+/- persons)]
10. Ovatko yrityksen asiakkaat pääasiassa [Are the firm's customers mostly]
    - 10.1. kuluttajia [consumers]
    - 10.2. muita yrityksiä [other businesses]
11. Asiakkaiden määrä keskimäärin [number of customers on the average]
12. Kuinka asiakkaiden määrä on kehittynyt viimeisen vuoden aikana? (+/- asiakasta) [How has the number of customers developed in the course of one year (+/- customers)]
13. Mikä tai mitkä seuraavista kuvaa(vat) parhaiten yrityksen ydinliiketoimintaa: [Which of the following best describes the firm's core business:]

13.1.ohjelmistopalvelut tai avoimen lähdekoodin ohjelmistot (service/OSS-based) --> vastaa myös 14 [software services or open source software (service/OSS-based) --> also answer 14]

13.2.ohjelmistotuotteet (product-centric) --> vastaa myös 15 [software products (product-centric) --> also answer 15]

13.3.sulautetut ohjelmistot (embedded software)

13.4.ohjelmistojen jälleenmyynti (software reseller)

14.Mikä seuraavista kuvaa parhaiten yrityksen palvelu- tai avoimen lähdekoodin liiketoimintamallia? [Which of the following best describes the firm's service or open source business model?]

14.1.Tuotekeskeiset avoimen lähdekoodin ohjelmistot (Avoimeen lähdekoodiin perustuvat liiketoimintamallit, joissa korostuvat tuotteiden myynti) [Product-centric open source software (Business models based on open source in which product sales is emphasized)]

14.2.Palvelukeskeiset avoimen lähdekoodin ohjelmistot (Avoimeen lähdekoodiin perustuvat liiketoimintamallit, joissa korostuvat tuotekehityspalvelut) [Service oriented open source software (Business models based on open source in which product development services are emphasized)]

14.3.Ohjelmistokehityspalvelut (Ohjelmistokehitykseen tai ohjelmiston ylläpitoon/tukeen pohjautuvat palvelut) [Software development services (Services based on software development or software maintenance/support services)]

14.4.Konsultointipalvelut (Tekninen tai liiketoiminnallinen konsultointipalvelu, ilman erityistä korostusta ohjelmistokehitykseen) [Consulting services (Technical or business consulting without special emphasis on software development)]

15.Mikä seuraavista kuvaa parhaiten yrityksen tuoteliiketoimintamallia? [Which of the following best describes the firm's product business model?]

15.1.Paketoidut tuotteet, joissa sisältöä (Standardoidut tuotteet, joissa laajasti muuta kuin varsinaista ohjelmistotuotesisältöä, esim. geodata, kuvat/videot, uutiset, jne.) [Packaged products with content (Standardized products that include other than actual software product content to large extent, e.g geo data, images/videos, news, etc.)]

15.2.Ratkaisut (Räätälöidyt tuotteet, joihin sisältyy laajasti konsultointi ja infrastruktuuripalveluja) [Solutions (Customized products that include consulting and infrastructure services to large extent)]

15.3.Standardoidut tuotteet [Standardized products]

15.4."Software as a Service" (Räätälöidyt tuotteet, joihin sisältyy infrastruktuuripalveluja) ["Software as a Service" (Customized products that include infrastructure services)]

16.Onko yritys ostettu toisen yrityksen toimesta? Jos kyllä, milloin ja minkä yrityksen toimesta? [Has the firm been acquired by another firm? If yes, when and by which firm?]

17.Onko yritys ostanut muita yrityksiä? Jos kyllä, milloin ja minkä kokoisia (henkilöstömäärä)? [Has the firm' acquired other businesses? If yes, when and what size businesses (number of employees)?]

18.Onko yritys fuusioitunut toisen yrityksen kanssa? Jos kyllä, milloin ja minkä yrityksen kanssa? [Has the firm merged with another firm? If yes, when and with which firm?]

19.Mikä seuraavista kuvaa parhaiten organisaation päätöksentekoa tällä hetkellä? [Which of the following best describes organization's decision making at the moment?]

19.1.teknologian ja prototyypin kehittely, konseptin myynti, liikeidean määrittely [development of technology and prototype, selling concept, definition of business idea]

19.2.tuotannon kehittely, laitteiden ja toimitilojen hankinta, toimintojen suunnittelu, asiakkaiden löytäminen, kykyjen hankinta [development of production, acquisition of equipment and premises, design of operations, finding customers, procuration of experts]

19.3.pörssikriisien välttäminen, oikean kasvuvauhdin ylläpitäminen, voittojen ja kasvun tasapainottaminen [avoiding stock stagnation, maintenance of optimal growth speed, balancing of profit and growth]

19.4.hallitsevan markkinaraon säilyttäminen, toinen tuotesukupolvi, hallinnollisten ja innovatiivisten toimintojen tasapainottaminen [maintaining dominant market niche, second product generation, balancing of administrative and innovative operations]

20.Kumpi seuraavista kuvaa paremmin yrityksen henkilöstöä tällä hetkellä? [Which of the following best describes the firm's staff at the moment?]

20.1."yleismiehet", teknokraatit, "aloittelijat", osa-aikaiset [“generalists”, technocrats, “novices”, part-timers]

20.2.asiantuntijat (spesialistit), byrokraatit, "ammattilaiset", vakituiset [specialists, bureaucrats, “professionals”, regulars]

21.Mikä seuraavista kuvaa parhaiten yrityksen organisaatiorakennetta tällä hetkellä? [Which of the following best describes the firm's organizational structure at the moment?]

21.1.vapaamuotoinen, markkina-orientoitunut, ryhmäkeskeinen [informal, market-oriented, team centric]

21.2.muodollinen, keskitetty, toiminnallinen [formal, centralized, functional]

21.3.muodollinen, hajautunut, suunnittelu ja budjetointi [formal, decentralized, planning and budgeting]

21.4.muodollinen, hajautunut, "voittokeskeinen" [formal, decentralized, “profit-oriented”]

22.Kumpi seuraavista kuvaa paremmin yrityksen palkkiojärjestelmää tällä hetkellä? [Which of the following best describes the firm's compensation plans at the moment?]

22.1.Muutamia osakkaita, paljon mahdollisuuksia, vapaamuotoinen työympäristö [A few shareholders, plenty of opportunities, informal working environment]

22.2.korvaus, urakehitys, vakaa, turvallinen [compensation, career development, stable, secure]

23.Kumpi seuraavista kuvaa paremmin yrityksen suunnitteluprosessia tällä hetkellä? [Which of the following best describes the firm's planning process at the moment?]

23.1.vapaamuotoinen, keskitetty, erikoistumaton, lyhytjännitteinen [informal, centralized, non-specialized, short term]

23.2.muodollinen, hajautettu, erikoistunut, pitkän ajan strategiat [formal, decentralized, specialized, long term strategies]