PhD thesis

Rapid-growth firms in Norway: Characteristics of growth factors in benign and adverse environments.

By

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Abstract

The aim of this thesis is to provide new empirical knowledge about rapid-growth firms. Rapid-growth firms are defined as active firms with a growth in sales of at least 100 percent over a 4-year period, a turnover of at least NOK 1 million in the initial year, a positive operating profit over these years, and no negative growth of income in any year in the period. Even though rapid-growth firms are recognized as central actors in creating employment and growth and in restructuring industries, we have almost no systematic knowledge of these firms in the Norwegian context. By reviewing the research in this field and conducting my own research, this thesis will contribute to improving the theoretical understanding of organizational growth.

The present study consists of a literature review and three empirical articles. The aim of the review is to 1) identify which firms grow and the main factors underlying growth, 2) review the empirical studies of rapid-growth firms and their theoretical bases, 3) discuss the empirical and theoretical contributions of prior research, 4) address challenges and gaps in the literature, and 5) suggest how to respond to these challenges. The review identifies three main questions which will be analyzed in three research papers. Firstly, I identify a lack of systematic knowledge of the external dynamics of growth and the internal performance and characteristics of rapid-growth firms compared to the rest of the population of firms. The main question investigated in article 1 is: How is the industrial and regional distribution of Norwegian rapid-growth firms, their economic performance compared to the rest of the population of firms, general economic growth, and new firm formation? Secondly, there is a lack of knowledge about where rapid-growth firms acquire knowledge and information and which and how firm capabilities facilitate the acquisition of knowledge from external sources. The main question in article 2 is: Which rapid-growth firms acquire information and knowledge from different external sources and which firm-based resources and capabilities are important for accessing this information and knowledge? Thirdly, I identify a need for more research investigating the challenges and consequences for growth and which resources and capabilities developed during firms' growth are important for future development. The main question in article 3 is: How can resources and capabilities developed during a period of rapid growth explain the firms' later development, especially during a macroeconomic decline?

The review is based on empirical work investigating rapid growth along with theoretical contributions discussing growth. The findings from the review suggest that there is a lack of theoretical development in the field because 1) a consistent theory of rapid growth is missing, 2) there are opportunities to use, combine, and learn from more theoretical perspectives than what is customary in this field, and 3) the heterogeneity of growth measures used in the research makes comparisons between studies difficult.

The sample of rapid-growth firms used in the research includes firms active in the period of 2003–2006. A total of 3,595 firms comply with the criteria for "rapid-growth." The performances of these firms are compared to the total population of 94,473 firms in article 1. This study is based on publicly available data. The empirical basis for both articles 2 and 3 includes a survey combined with register data. The sample of rapid-growth firms in article 2 is 391 and 307 in article 3. The methods used in the articles are factor analysis, linear regression, and mediation analysis.

Article 1 suggests that rapid growth first and foremost is related to the cyclical development of the whole economy. There are possibilities for growth in all industries and regions and for firms of all ages and sizes. Rapid-growth firms are not typically innovative, but they use their resources more efficiently compared to the rest of the population of firms. The article challenges the view of growth as a result of technical innovations or specific attributes of the firm or its entrepreneur(s) and denotes the importance of business cycles and the demand side of the economy for growth. Article 2 suggests that different internal capabilities and competences facilitate the acquisition of knowledge from different external sources of knowledge and information. Learning from 1) close relations is associated with organizational capabilities, 2) informative sources, like publications and conferences, with networking capabilities, 3) public institutions (e.g., universities, R&D institutions, public agencies) with R&D capabilities based on experience, and 4) support networks (like suppliers and distributors) with managers' prior experience. The article contributes to a more nuanced understanding of the concept of firms' absorptive capacity. Article 3 suggests that the ability to continue a firm's growth stems from the interaction between internal processes and resources (like financial solidity and internal organizing), market dynamics and emergent niches, and the ability to take advantage of market opportunities. A mediating analysis further indicates how managerial experience, size, international expansion, institutional ownership, and an R&D focus are indirectly related to growth. Testing the variables during an economic crisis informs us of the robustness of these factors and which factors are important when the environment changes. Multiple theoretical perspectives are used. The results indicate that a

deterministic view of established firms being unable to respond to external changes is not supported, while the broader Penrosian perspective together with environmental dynamics seem to explain the data fairly well.

In general, this thesis contributes to a better understanding of what characterizes rapid growth firms and indicates some challenges and opportunities for this field of research. The thesis does not provide a new theory of rapid growth but rather takes the opportunity to combine and use different theoretical perspectives in the articles and argues for one main measure of growth in future studies.

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I will also take this opportunity to apologize to my family and friends. I have been absent, working on this seemingly never-ending dissertation. I promise to spend more time with you and be present, both in body and in mind, in the future. Thank you for all your support and concern, especially to my wife, Sidsel, and my children, Herman and Oliver. Finally, I wish to thank my parents, Gerd and Ingvald, for all their support through the years.

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Rapid-growth firms: exploring the role and location of entrepreneurial ventures.

In: Agglomeration, Clusters and Entrepreneurship: Studies in Regional Economic Development.

Eds: Karlsson, C., Johansson B., Stough, R.R.

Edward Elgar: Cheltenham; 159-198

Article 2

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Firm capabilities and external sources of knowledge: Which capabilities are important for which relations?

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Growth and decline in a changing macroeconomic environment: When rapid-growth firms met the financial crisis.

Chapter 1 Introduction

In the early 1990s, a group of firms which grew remarkably over a short period was identified. These firms were termed "gazelles" and were identified as the firms contributing to most of the employment growth in the U.S. economy (Birch and Medoff, 1994). The phenomenon of *rapid-growth firms* (RGFs)[1] soon caught the interest of policy makers in their quest for national economic development and job creation (OECD, 2002, 2006, 2010). Despite its importance to the economy, organizational growth is not well understood, partly because of the heterogeneity of firms and their growth patterns. The overall aim of this thesis is to provide new empirical knowledge about RGFs and improve the theoretical understanding of organizational growth by investigating a sample of rapidly growing firms from Norway.

This thesis is financed by the DEMOSREG[2] program under the Norwegian Research Council. The program is divided into several topics, one being "Regional innovation." My PhD project is part of this topic and is included in a larger project called "Regional growth, innovation, and learning."

Mature economies have traditionally based much of their development and innovation policy on formal education and scientific research and development (R&D). The development of local high-technology clusters is supported by the authorities with the intention to create local innovation systems with knowledge spillover effects and thereby competitive advantages. However, there may be other driving forces for growth that are less understood and focused upon. One phenomenon of growth was paid almost no attention at all in Norway at the time when the DEMOSREG program started[3]—the very few firms experiencing exceptional growth in a short time period: the RGFs.

RGFs are defined as firms which have achieved a minimum of 20 percent sales growth each year, over four years, from a base-year revenue of at least $100,000 (Birch, Haggerty and Parsons, 1995). These "gazelles" are contrasted with "mice" (small firms that remain small and only marginally contribute to employment growth) and "elephants" (large firms with more than 500 employees that have a large share of employment but generate few new jobs).

[1] Most research in this field use the terms gazelles, rapid-growth firms, or high-growth firms, but other labels are also used such as high-impact firms, fast-growth firms, high-performing firms, and hyper-growth firms, among others. I use the term rapid-growth firms in this thesis, shortened to RGFs.

[2] DEMOSREG is an acronym for what can be translated in English as: Democracy and Governance in a Regional Context. The program is financed by several Ministries of Norway, with an applied, policy-oriented profile. See: http://www.forskningsradet.no/prognett-demosreg/Home_Page/1224698086029

[3] The founding of the project "Regional growth, innovation and learning" was granted in 2006.

The work by Birch and colleagues clearly had implications for policy. The RGFs were identified as central drivers in generating new jobs and economic growth and as important instruments for restructuring local and national economies. RGFs are also popular topics in business news journals, and their growth is seen as an indicator of the firms' success (Fischer and Reuber, 2003). Because of these firms' probability of creating income and new jobs, they are also looked upon as the "dream firms" of regional policy. However, there has been almost no systematic knowledge of these firms in the Norwegian context.

The purpose of this thesis is to reduce this gap in the knowledge by first identifying the industrial and regional distribution of RGFs, comparing their economic performance to the rest of the population of firms, general economic growth, and new firm formation. Secondly, based on the interest of knowledge creation and spillover to generate competitive advantage, I ask which RGFs acquire information and knowledge from different external sources and which firm-based resources and capabilities are important for accessing this information. Thirdly, while macroeconomic growth might explain why some firms grow more than others and become RGFs, a macroeconomic crisis, like the recent financial crisis, presents a good opportunity to investigate whether the resources and capabilities they developed during their growth can explain their later development during a period of economic decline.

My research indicates that economic cycles and market dynamics are important explanations for organizational growth. Growth also has an element of luck and of "being in the right place at the right time." However, firms' internal capabilities and resources are important explanations for why some firms are able to "be in the right place," do the right things, and continue their growth. I find that a multitude of perspectives contribute to our understanding of rapid growth of firms. Furthermore, there is much to learn from combining elements from different theoretical perspectives to reach a better understanding of rapid growth. The opportunity to combine elements from different theoretical perspectives, particularly by linking internal and external dynamics, is one of the driving forces in my research.

Before I present the three papers, I will provide an overview of the theoretical perspectives used in this field of research, the main empirical results, and the methodological concerns. The outline of the thesis is as follows: In Chapter 2, the discussion of which firms grow and the main factors underlying their growth are briefly presented. The research on RGFs and their theoretical foundations are presented in Chapter 3. This review is summarized and discussed in Chapter 4. My empirical research will rest on the identification of gaps in the

research and theory. Methodological concerns are discussed in Chapter 5. Lastly, the papers are briefly presented and discussed in Chapter 6.

Chapter 2 Identification of growth firms

Different theories throughout history have attempted to identify which firms grow and the main factors underlying growth. Questions asked are whether growth is random and unpredictable or driven by specific factors in the environment or the firm, whether it is the small and young firms who create growth, etc. This debate indicates why RGFs are chosen as study-objects in this thesis. The economic literature on firm growth advocating for Gibrat's Law and random growth (Gibrat, 1931) stands in contrast to most strategic management and social science literature that assumes that firm growth is non-random (Moreno and Casillas, 2007; Parker, Storey and van Witteloostuijn, 2010). A central part of this debate (on both sides) addresses the influence of firm size and age on growth.

2.1 Is growth random and unpredictable?

Gibrat's law of proportionate effect states that the proportionate change in the size of a firm is independent of its initial size (i.e., the firms size and its growth rate are independent). In the following, articles supporting and rejecting growth as a random process are presented.

Geroski, Machin, and Walters (1997) argue that growth rates vary more or less randomly across firms and over time. As such, corporate growth is unpredictable. However, their data also indicate that firms' current period of high growth rates is a reasonable predictor of increases in long-term profitability. Coad *et al.* (2013) investigate the growth and survival of firms and state that growth is largely random and that performance is primarily a game of chance. However, they conclude that while growth rates appear to be close to random, survival is non-random and depends on the emerging growth paths of the firms. Resources enable new established businesses to survive. The more resources they have, the more likely it is that their business will survive and stay in the game. In other words, there is some support for the notion of growth as a random and unpredictable process. However, these researchers found that firms' growth might give better profitability and that the resources accumulated during their growth are a premise for later survival.

Levratto, Tessier, and Zouikri (2010) do not agree that firm growth is a random process. They found that growth follows economic cycles, where some years are better "growth periods" than others. Further, large and old firms exhibit a lower growth rate than small and young firms. Finally, strategic firm decisions and geographic location can explain why some firms grow more than others. Similar arguments for the rejection of Gibrat's law

were earlier stated by Sutton (1997). Fritsch and Weyh (2006) tested Gibrat's law on 18 cohorts of start-ups founded from 1984 to 2002 in West Germany and rejected the law for all cohorts and all years. Hart and Oulton (1996) have also criticized the assumption in Gibrat's law. With the use of a large dataset from 1989–1993, they estimated that smaller firms (especially those with fewer than eight employees) grow more quickly and proportionately generate more jobs than larger firms. This held for size measured as employees, sales, and net assets. Almus (2002) found a statistical deviation from Gibrat's law from start-up firms in Germany: "The smaller the firms, the higher their growth potential" (p. 1504), measured as relative growth[4]. But, for larger, fast-growing firms, he found no deviation from the law. We can observe that researchers criticizing the randomness of growth use both macro explanations, like environmental dynamics, regional distribution, age, and size, and micro explanations, like management strategies.

2.2 Are small and young firms creating growth and employment?

In his early career, before he identified the "gazelles," David Birch (1979, 1987) studied the dynamics of business and employment and claimed that small firms were the central engines of job creation in the U.S. economy in the 1970s. Birch developed a dataset based on Dun and Bradstreet's database that enabled him to investigate the birth, death, and growth of firms in the U.S. economy. From his data from 1969 to 1976, he found that most jobs in the U.S. were created by firms with 20 employees or fewer (Birch, 1979). Later, he specified the impact of small firms with up to 100 employees in creating jobs: "two-thirds were created by firms with twenty or fewer employees, and about 80 percent were created by firms with 100 or fewer employees" (Birch, 1981, p. 7).

Birch suggested that "governments [should] establish a more favorable climate" for entrepreneurs through lower taxes and fewer and simpler regulations (Birch, 1981, p. 11). His research influenced researchers and policy makers to change focus from larger corporations to small and new firms. The OECD has provided several reports on the impact of small and medium sized enterprises (SMEs), referring to the work by Birch (e.g., OECD, 2002; Schreyer, 2000). Neumark, Zang, and Wall (2006, p. 79) found that "business establishment births and extensions of existing establishments are responsible for nearly all job creation." Several countries have introduced policies to support SMEs and have highlighted the

[4] The problem of measuring growth in terms of relative (percentage) or absolute growth is discussed in Chapter 5. It is easier for a small firm to have a high percentage growth than for a large firm. See, for example, Delmar (1997).

importance of these firms in generating jobs and economic development (Nightingale and Coad, 2014; Shane, 2009). Birch's work has also triggered a lot of research trying to verify (or disprove) whether small and new firms create most jobs.

Davis, Haltiwanger, and Schuh (1996) questioned the analyses by Birch and found that large firms and plants dominate the creation (and destruction) of jobs in the U.S. and offer better job security. Their argument is that the research on the impact of small and new businesses rests on misleading interpretations of the data. They warn about giving politicians advice favoring new and small firms. Others criticize the extent to which the empirical findings from the U.S. can be generalized to the rest of the world. Storey (1995) found structural differences between the U.S. and Europe. Europe is dominated by firms with 100 or fewer employees, while the U.S. is dominated by firms with more than 500 employees. Therefore, policy makers in Europe should pay more attention to the small business sector. This view is partly supported by Davidsson, Lindmark, and Olofsson (1998). Their research from Sweden indicates that it is the creation of new firms rather than "smallness" that is the most important factor in creating jobs.

Neumark *et al.* later provided an analysis of all firms in the U.S. They found that Birch's (and their) conclusions were still valid for the U.S. but less striking: "small firms and establishments create more jobs, although the difference is smaller than Birch originally suggested" (Neumark, Wall and Zhang, 2011, p. 27). However, they admit that they do not observe job creation and destruction within the same establishment. The lack of data on both job creation and destruction is an important argument in the critique against such analyses. In a review concerning small business growth, Dobbs and Hamilton (2007) found that longitudinal datasets are seldom used in research. The periods investigated in analyses of job creation are as low as one year and seldom over five. They advise researchers to examine growth over an extended period.

When analyzing the effect of employment growth only a couple of years after start-up, without controlling for the effect of closing down, the data are biased towards new firm formation. According to Nightingale and Coad (2014), most firms die within their first three years and then disappear from the dataset. They lose as many jobs as they gain. Consequently, new and small firms do not create most of the jobs. Small firms are also less productive, more volatile, give fewer benefits and training opportunities to employees, and have more work-related accidents than large firms. Generally, market exit occurs mainly in the smaller size classes (Caves, 1998). According to Jovanovic (1982), it is the inefficient firms which decline and fall; the efficient ones survive and grow.

Harrison (1994), using data from the U.S., Germany, Japan, and other OECD countries, argued that the largest business organizations continue to play a central role in the economy. These large firms still account for the great majority of jobs, pay the highest wages and benefits, control the finances, and dominate in terms of the adoption and implementation of new technology. Edmiston (2007, p. 91), analyzing the impact of small businesses in job creation and innovation, concluded that "Big-firm jobs are typically better jobs," in terms of both compensation and stability. Moreover, he found "no clear evidence that small businesses are more effective innovators." Lindič, Bavdaž, and Kovačič's (2012, p. 936) research indicates that large firms "have important advantages, such as pool of resources, capital, and market position." Young and small firms' limited resources and higher propensity to fail are known as the "liability of newness" (Stinchcombe, 1965) and the "liability of smallness" (Aldrich and Auster, 1986; Freeman, Carroll and Hannan, 1983). However, the study by Fritsch and Weyh (2006) of employment trajectories in 18 cohorts of start-ups revealed that the cohorts expand employment, but then the positive effect declines over time. Therefore, to obtain employment growth and replace declining firms, new firms are needed. But, of those who survive, only a few continue to grow. The liability of newness and smallness may hinder most firms' growth. At the same time, some new firms have success.

2.3 Are rapid-growth firms creating growth and employment?

The article "Why encouraging more people to become entrepreneurs is a bad public policy" by Shane (2009) clearly criticizes politics promoting entrepreneurship in terms of start-ups. He argues that typical entrepreneurs choose the businesses that are easiest to enter, not industries with strong growth potential. Further, the ones who respond to policy incentives and start businesses tend to be unemployed people, not the best entrepreneurs. Most of the start-ups do not create many jobs either because most firms die young or remain small. He estimates that "To get one business employing at least one person in ten years, we need 43 entrepreneurs to begin the process of starting a company" (Shane, 2009, p. 144). Nightingale and Coad (2014) also remark that we tend to forget the personal and social cost of market exit. It is exciting to start a new business, and self-employed people are happier than others. But, when you have to close down, and you lose your investment and savings, you are not so happy any more. The problem is that most entrepreneurs lack the ambition or capability to grow, and their firms have high failure rates. Therefore, they have a fairly marginal (and often negative) impact on the economy. Most entrepreneurs lack the ability to grow: "The key issue is growth, which is hard (not easy), rather than market entry, which is easy (not hard)"

(Nightingale and Coad, 2014, p. 132). If governments spend a lot of money supporting new and small firms, the outcome might be more unproductive entrepreneurship (Coad *et al.*, 2014). Therefore, policy should move away from glorifying entrepreneurship and encourage and focus on RGFs with growth ambitions and potential (Nightingale and Coad, 2014).

Researchers such as Mason and Brown (2013, p. 222) have identified which firms policy makers should focus on: "start-up support needs to be much better targeted towards high-potential new ventures." This argument is, however, also prevalent in Shane's article in which he argues that governments should "[s]top subsidizing the formation of the typical start-ups and focus on the subset of business with growth potential" (Shane, 2009, p. 145). While Birch (1979) first argued that small firms were the most important job creators in the economy, his later evidence indicates that most small firms do not grow and that a few rapidly growing firms (gazelles) are crucial for job creation and economic growth (Acs and Mueller, 2008; Acs, Parsons and Tracy, 2008; Birch and Medoff, 1994; Delmar, Davidsson and Gartner, 2003; Gallagher and Miller, 1991; Henrekson and Johansson, 2010; Littunen and Tohmo, 2003). Storey (1994) states that 4 percent of the fast-growing companies create about 50 percent of the employment in his sample. In a UK report, Anyadike-Danes *et al.* identify that from more than half to up to two-thirds of the total of new jobs are created by RGFs, depending on the time span investigated (Anyadike-Danes *et al.*, 2009). Research by Parker *et al.* (2010) indicates that Gibrat's law of random growth is valid for most firms, but not for a small number of RGFs able to develop dynamic strategies for continued growth. As a result, an interest in small firms per se has declined[5], and we are seeing an increasing interest in the factors explaining the prevalence of RGFs (Coad *et al.*, 2014) and how governments can promote such firms (Europe-Innova, 2006; OECD, 2002, 2006, 2010; Schreyer, 2000).

2.4 The heterogeneity of measures

Even though rapid growth appears to be an interesting phenomenon to investigate, we have to acknowledge the challenges of *measuring* such growth. The problem of measuring growth is discussed in article 1 (Bastesen and Vatne, 2014) and also later in Chapter 5. In this section, I want to present the problem of the heterogeneity of different growth measures in the literature.

Delmar (1997) raised an important debate about the heterogeneity of growth measures in the literature. This is problematic since it makes comparisons among studies very difficult.

[5] Measures of sales growth as relative growth (percentage change) favor small firms since they grow faster in relative terms. Therefore, small firms are still relevant within the research on RGFs.

In his review, he found that employment and turnover/sales were the two most used growth indicators, probably because they are easily available and objective measures. More subjective measures, like evaluation of market share or performance indexes, are problematic in terms of their validity and difficulty to control and are therefore not of interest in the following discussion[6]. Delmar (1997) further argues that there are different stages of the growth process, and changes in sales could lead to hiring more personnel, but not necessarily. A firm can realize sales growth without employing more people (Davidsson and Wiklund, 2000). The firm can meet increased demand through subcontracting or initiatives to improve productivity. For example, because Nike outsources its production, the firm can achieve high sales growth with a minimal increase in employment (Shepherd and Wiklund, 2009).

Weinzimmer, Nystrom, and Freeman (1998, p. 252) argue that "sales data may be more appropriate in studies including organizations from different industries." However, from the policy perspective, growth in employment is most relevant to many policy makers since it helps to reduce unemployment. However, "Growth in employment is seldom stated as a goal of business owners" (Dobbs and Hamilton, 2007, p. 312) (see also Davidsson, Achtenhagen and Naldi, 2005; Delmar, 1997).

There are of course possibilities to use multiple growth measures in analyses (Davidsson *et al.*, 2005; Davidsson and Wiklund, 2000; Delmar, 1997; Dobbs and Hamilton, 2007; Weinzimmer *et al.*, 1998). However, different growth measures actually measure different kinds of growth. Basically, the choice of which measure to use depends on what you want to measure, what implications and problems you want to investigate, and what the purpose of the study is. It is therefore important to clarify whether you are measuring absolute or relative growth, organic or acquisitive growth, and the time span of the study (Davidsson *et al.*, 2005; Davidsson and Wiklund, 2000; Delmar *et al.*, 2003). But, there are problems associated with some measures. For example, comparing shares of firms operating in different markets is problematic, the value of assets varies within the capital intensity of industries, physical output is difficult to compare across industries, and it is possible for a growing firm to be unprofitable (Davidsson *et al.*, 2005). I will also add that different laws, regulations, tax regimes, etc. in different countries make it difficult to compare financial outputs across studies and countries. Firms try to adapt their accounts according to the regime and institutions they are subject to in order to lower their taxes and exploit opportunities in the

[6] In several papers I observe that growth is measured based on questionnaires where the firm's managers are asked to self-evaluate their performance and growth without controlling for their performance and growth with accounting figures. Such research is not included in this thesis.

system. In this thesis, I *use only sales growth* as the growth measure. In Chapter 5, I will explain why I argue this is a better measure than growth in employment.

2.5 Summing up

Theory arguing for growth as a random an unpredictable process has received some support. As such, growth cannot solely be explained as a result of rational management processes or market dynamics. This perspective argues that while growth might be random, those firms that eventually are so lucky as to grow increase their profitability or develop valuable resources important for their later development. Those who disagree with this perspective point to research claiming that economic cycles and firm localization create opportunities for growth. Furthermore, they found that small and young firms, or firms with better management strategies, grow more. Research advocating for the impact of small and new firms is criticized for the quality of the data, where only job creation and short time series are included and not decline, bankruptcy, and job destruction over time. They argue that large and old firms are still as important as small and new firms. Later research claims that the most important contributors to job creation and economic growth are those few firms that manage to become "gazelle" firms. An important question to ask is therefore: "Why do these differences in organizational growth arise?" (Eisenhardt and Schoonhoven, 1990, p. 504). The preliminary discussion identifies luck, external dynamics, and internal dynamics as possible explanations for growth. In the next chapters, the theoretical basis of and empirical research on RGFs are presented and discussed.

Chapter 3 Research on rapid-growth firms

So far we have learned that most researchers within the management and organizational tradition reject the premise that growth is a totally random process. However, there is still a debate over whether start-ups and small firms are more important than large firms for economic development and job creation. A growing interest has emerged in the phenomenon of RGFs. Despite their impact on the economy, we have little systematic knowledge about them. In the following, I will systemize the theoretical basis and empirical research in this field[7]. The review is rather comprehensive, and the reason for this is twofold. First, there are few, if any, comprehensive and systematic reviews of the research on RGFs and the theories used in this field. Secondly, there is a need to inform the reader of and answer the following question: Is research on RGFs a distinct research tradition, or is it a fragmented line of research using different theoretical perspectives? In the next chapter, the findings are summarized and discussed.

3.1 The macro/micro perspective

There are several explanations for organizational growth. In general, we can divide them into an economic macro perspective and a firm-focused micro perspective. The *macro perspective* includes theories of economic cycles and market dynamics, industrial and regional distribution, age and size, and the influence of regulations and politics (institutional dynamics). The *micro perspective* focuses on firm characteristics and capabilities and includes firm strategies and competitive advantages, learning and knowledge creation, and the characteristics of entrepreneurs and managers.

The micro perspective has dominated the research on organizational growth. Storey (1994) identified early three factors which influence the probability of a firm to become an RGF: 1) characteristics of the entrepreneur, 2) firm characteristics, and 3) management strategies. Characteristics of the entrepreneur include personal traits and motivation for start-up. Characteristics of the firm focus on opportunities and constraints in the firm. Management strategies entail the owner's and manager's policies, strategies, and actions for developing the firm.

In its initial phase, the research on rapid growth paid less attention to the macro explanations for growth. Smallbone and Wyer (2000) later added influence of the external

[7] This is not a complete review. There are several reports and conference papers I have been unable to access.

environment to the framework by Storey. The literature at that time had mainly a firm-focused micro perspective, but they realized that there are some constraints and opportunities in the firm's external environment.

There are other categorizations of the growth literature as well. For example McKelvie and Wiklund (2010) place the literature into three categories: a) growth as an outcome (for predicting growth), b) the outcome, or consequences, of growth, and c) growth as a process explaining the internal processes in the firm while it grows. O'Gorman (2001), on the other hand, argues that there are two alternative theories explaining growth: a) the "strategic choice" and b) the "industry structure" explanation. "Strategic choice" argues that growth is a result of the strategic and structural choices made by the managers. Such choices may include a differentiated strategy, innovation, market expansion, etc. "Industry structure" explains growth in terms of environmental forces, where periods of high demand increase the chances of survival and growth. These models hold that growth is a function of environmental selection.

I would argue that the micro/macro perspective, or internal versus external/ environmental dimensions, is not unlike the dimensions mentioned by O'Gorman (2001). These dichotomies are useful distinctions for identifying the possible internal processes causing growth and decline, the external exposure implying constraints and opportunities, and the interplay between the internal and external elements. While paper 1 first and foremost searches for macro explanations of growth, papers 2 and 3 try to investigate the interplay between internal capabilities and external opportunities and constraints. In the following, I will sort the different perspectives I have come across in my literature review into the macro and micro perspectives. I am aware that some of these researchers are using explanations across both dimensions. Moreover, one could discuss whether specific perspectives should be placed in the macro or micro dimension.

3.2 Macro foundations of firm growth—Market dynamics and conditions

In this first part of the chapter, the focus is on the macro foundations for firm growth, especially market, industrial, and locational dynamics and age and size. I will first very briefly present the most central theoretical basis for the research. The theoretical discussion of age and size was presented earlier in Chapter two and will not be repeated here. Thereafter, I will present the actual research on RGFs within these traditions.

Organizational ecology has, according to Carroll (1984), three different levels of analysis. I will present the two that are used in the research of RGFs: the organizational level

and population level. The organizational level uses a developmental approach to study evolution. It involves demographic events and life-cycle processes across organizations. This has a focus on organizations' structural change over time based on environmental and internal pressures and constraints. I will present the empirical research regarding the developmental approach at the end of section 3.12.

The population level seeks to explain the factors affecting which organizations are born or die in a population of existing organizations. Organizations within a population can choose to focus on different niches or particular resources or skills to enter and survive the competition in the market. For example, a specialist, with new solutions or technology, can try to outperform generalists within a niche or change the domain and be a first-mover in this new market. The existing organizations have advantages that may hinder new entrants or reduce their survival rate, like first-mover advantages, scale economies, access to resources, heavy advertising, and capabilities of innovation and collaboration. Hannan and Freeman (1977) argue that the mechanism of change is natural selection governed by competition and environmental constraints. Over time, firms unable to update their skills and competence, or unable to adapt their structure to fit the changes in the environment, are selected out and will die. New organizations emerge and survive if they are able to take a position in a niche.

Evolutionary economics criticizes organizational ecology for eschewing simple premises of economic behavior, such as "intended profit-maximization and the need to cover costs to keep a firm's coalition together" (Caves, 1998, p. 1947). According to Jovanovic (1982), those firms who survive and grow have learned how to be more efficient than others (lower production cost). These firms find and exploit the maximum of equilibrium (the consumer and producer surplus). Firms grow by reinvesting their earnings. In the competition with other firms, a firm can develop competitive advantage by cost-reduction, innovations, or imitating best practice within the industry (Nelson and Winter, 1982). However, Hopenhayn (1992) claims that entry and exit is not only part of the adjustment to a steady state. Comparable firms can face different cost structures, taxes, and policy regulations based on local conditions.

The industry perspective emphasizes the significance of competitive positioning, where industrial factors are the primary determinants of firm performance. Growth is primarily a function of membership in an industry with favorable characteristics. Firms within industries develop and create barriers to entry to defend their existing competitive position as well as to seek new competitive advantage (Porter, 1980).

The literature within economic geography has traditionally focused on the importance of agglomeration economies and more recently on the importance of regional innovation systems and the local character of learning processes. Arguments for developing regional innovation systems are based on observations of successful agglomerations and industrial districts as well as on theoretical insight about the development and diffusion of complex knowledge. Economic cluster theories view economic regions as spaces for firms to specialize, compete, interact, and develop divisions of labor between actors to generate competitive advantage and thereby growth (Dicken and Malmberg, 2001; Porter, 2000).

In the following, the research on RGFs from a macro-perspective is presented. The findings are summarized and discussed in the next chapter.

3.3 Economic cycles and market dynamics

3.3.1 Population ecology

When investigating the growth of firms in West and East Germany after the reunification, Almus (2002, p. 1498) hypothesized that this event "offered a window of opportunity that may have favored fast growth in specific economic sectors." In East Germany, they experienced a "construction boom" and a huge demand for services after the reunification. Firms in construction, transport and communication, and business-related services, active in the early 1990s in East Germany, had a higher probability of rapid growth. In Almus's view, this supports the niche hypothesis.

Bos and Stam (2014) investigated to what extent RGFs are the drivers of the growth of industries. They found that an increase in the prevalence of RGFs in and industry has a positive effect of the subsequent growth of the industry. They found no evidence of the inverse causal relationship: an increase in industry growth on the prevalence of RGFs. In their view, RGFs "seem to be early movers with respect to the recognition and realization of industry-specific growth opportunities" (Bos and Stam, 2014, p. 164), especially for new niches enabled by new technologies or by new regulations.

In analyzing RGFs in Russia, Iudanov (2007) argues that RGFs play a central role in changing the structure of an industry by identifying and taking market niches with potential that are not occupied by others. These RGFs are fast in imitating successful pioneers in these niches. New "clusters" of firms lead to intensified rivalry and act as a driver for innovation within the niche. If firms underestimate the importance of improvements, they are soon squeezed out of the market. Some firms also find new linkages between sectors, opening up for broader markets and synergies between the firms. Iudanov (2007) argues that these RGFs

are signaling evolutionary changes in the Russian economy. Based on his research, he claims that the founder of RGFs "consciously search for a promising market niche, assess the resources needed to occupy it successfully," and actively carry out their plan (Iudanov, 2007, p. 20). These are most of all new entrants exploiting either technological and/or market opportunities. Existing firms can also change their strategy and actions and reshape their position. This involves a dramatic change for the organization and a shift in a firm's evolution (Miller and Friesen, 1984; Moreno and Casillas, 2007; Tushman and Romanelli, 1985).

In their study of Slovenian gazelles, Lindič *et al.* (2012) found that RGFs have neither more nor fewer competitors than other firms. Most RGFs are found in low-tech industries, but they are present in almost all industries. Very few are engaged in technology innovation or patents but find innovative ways to serve the customers. A strategy focusing on the costumers' need and on creating value for them is called a "blue ocean" strategy (Kim and Mauborgne, 2004). This is contrasted with the "red ocean" strategy of Porter and others, a strategy aiming to beat the competition. Moreover, RGFs are not necessarily creating a market, but they are quick to develop and exploit markets. As such, they create an uncontested market space, giving them a temporary monopoly power which creates an opportunity to grow more quickly.

Eckhardt and Shane (2011) found that a change in the technical intensity of an industry, measured as an increase in the employment of scientists and engineers, is positively associated with an increase in the number of RGFs. Technological changes may undermine incumbent firms' developed routines and structures (Nelson and Winter, 1982) and alter the market segments favoring new solutions (Hannan and Freeman, 1984). Technological advances create opportunities, especially for young, flexible firms, to challenge the established firms' routines, products, and services.

3.3.2 Market strategy and first-mover advantage

Research based on the population ecology perspective focuses on market dynamics: the effects of technological changes, consumer preferences, and new entrants in the market—that is, why firms are able to enter a market and others are squeezed out of the market. The research presented in the following takes the firm as the point of departure. It could therefore be discussed later, during the business strategy section. However, the following articles mainly discuss how firms position themselves in the market based on market dynamics. I therefore argue that it is at least as meaningful to present this perspective here.

RGFs, as a group, are considered to be strongly market oriented, and they have a distinct growth ambition (OECD, 2002, 2010). According to Smallbone *et al.* (1995), RGFs have, to a higher degree than others, an active product and market development strategy. They identify new markets for existing products or develop new products for existing customers and evolve from their established core activity to a more complex business. These firms focus more on product differentiation and markets, with cost control as a necessary, but not sufficient condition for growth. Research by Cunneen and Meredith (2007) found that what distinguishes RGFs from other firms is that they compete more aggressively in the marketplace.

Feeser and Willard (1990) found that the entrepreneurs in RGFs have a more stable product and market focus than the entrepreneurs of low-growth firms. They are more internationally oriented and derive more revenue from foreign markets. On the other hand, they found no support for the assumptions that RGFs are market pioneers and have a first-mover advantage or that they are more acquisitive than low-growth firms. They use different theories as arguments for their hypotheses, like Rumelt's (1974) study of diversification and Lieberman and Montgomery's (1988) paper "First mover advantages." Feeser and Willard (1990) investigate only the computing industry (ISIC 3573), and it is therefore difficult to generalize their results. Mason and Brown (2010) identify Scottish RGFs as being UK as well as globally oriented—only a minority sell exclusively within their local market. Because of their global market orientation, RGFs are weakly locally embedded.

When rapid-growth entrepreneurial firms were asked about their strategy, 55 percent of the firms responded that their dominant strategic approach is that of a first-mover (Ireland and Hitt, 1997), unlike the results of the study by Feeser and Willard (1990). However, the analyses by Ireland and Hitt (1997) showed that firms using a low-cost producer strategy or a high-quality strategy are positively related to economic performance (return on sales). On the other hand, a time-based (speed, pioneers) strategy is not significantly related to good performance. Their sample represents a variety of industries but had only 118 respondents. Similarly, Mascarenhas *et al.* (2002) identified five different strategies (product proliferation, mass market development, increasing value to customers, distribution innovation, and acquisition and consolidation) used by RGFs and argued that these strategies arise from different sources of market disequilibrium: "Disequilibrium is caused by rapid changes in technology, products, expectations, and managerial assumptions", competitor's resistance to change, or unexploited opportunities (Mascarenhas *et al.*, 2002, p. 329). Their performance is traced to being an early mover in their market. Using the Miles and Snow (1978) strategic

typology, O'Regan *et al.* (2006) identified RGFs as prospectors (oriented towards opportunities) and other firms as more likely defenders. RGFs are also more likely to use e-commerce that other firms. Finally, the RGFs report to a larger degree that they are operating in a more turbulent environment than other firms.

3.4 Industrial and locational distribution

3.4.1 Industry characteristics

When investigating the failure, survival, and growth of start-ups, Cooper, Gimeno-Gascon, and Woo (1994) found that the probability of high growth is lowest in the retail and personal service sectors. They argue that start-up barriers are lower in these sectors and may therefore be characterized by more intense competition. Lyons (1995, p. 396), on the other hand, found that rapid-growth is not confined to the expanding sector of the economy: "non-high-technology manufacturing and retail/wholesale sectors generated substantial numbers of new rapidly growing firms." Both studies analyze firms in the U.S. Similarly, Malizia and Winders's (1999) research indicates that most RGFs are in industries with low entry barriers, such as eating and drinking places. Further, most of the firms exploit local limited markets. Almus (2002) did not find any evidence that firms in the technology-intensive and knowledge-based sectors possess a higher probability of fast growth than firms in other sectors. Similar results are reported by Acs, Parsons, and Tracy (2008) and Europe-Innova (2006)[8].

3.4.2 Geographical/locational characteristics

Developing new markets does not necessarily involve geographic market extension, but firms located in remote areas, with limited local market opportunities, are most active in extending their markets geographically (Smallbone *et al.*, 1995). Similarly, Skuras *et al.* (2005) found that the majority of RGFs in remote areas in southern Europe export the largest part of their value production outside the local area. Moreover, the manufacturing sector is more likely than others to export its products (Smallbone *et al.*, 1995). In a paper from the same research project, North and Smallbone (1995) found that the firms in remote rural areas achieve better employment performance than those in outer metropolitan areas, and those in London show the poorest performance. The better performance in rural areas is not because of their age or size. Similar results are reported by Almus (2002) in Germany: firms in rural areas experience

[8] The Europe-Innova report is written by Werner Hölzl. I use other articles by Hölzl in this dissertation as well.

more rapid growth than firms in agglomerations. Based on their study, North and Smallbone (1995) argue that London firms are more active in using labor flexibility through externalizing their production and diversifying their activities. This is due to more labor constraints, more competitive markets, and greater opportunities for externalization. Moreover, firms in remote areas are less concerned with improving their labor productivity than firms in inner London.

In an analysis of the changing geography of new "Inc. 500"[9] companies from 1982–1992, Lyons (1995) expected to find the largest concentration of RGFs among the second-tier cities that generated the most growth during the 1980s. The largest centers, like New York, were expected to have higher initial start-up costs. However, the firms' position in the urban hierarchy is not an indication of rapid-growth; the concentration of new rapidly growing firms in individual cities varies widely. Moreover, firms located in rural areas "were able to achieve rapid growth without the aid of localization economies or other agglomerative advantages," which are found in more central areas (Lyons, 1995, p. 396). Last, his analyses show that the new RGFs "within the high-technology manufacturing sectors were extremely limited geographically." They are restricted to a few high-tech centers/clusters like Los Angeles and San Francisco. In contrast to Lyons (1995) Acs and Mueller (2008) found that most RGFs in the U.S are located in larger cities like Los Angeles, Chicago, New York City, and Washington D.C., cities with high-standard universities and research facilities. They refer to Florida (2002), who claimed that these regions are characterized by a higher share of employment in the creative and service classes. They further claim that these areas exhibit a highly competitive environment, and this creates a favorable climate for rapid growth.

When analyzing the geographical distribution of RGFs in the Netherlands, Stam (2005) found no clear general spatial patterns of RGFs, even though they are slightly under-represented in remote rural areas. When controlling for industry, he identified that high-tech manufacturing firms concentrate in rural areas, while KIBS (knowledge intensive business service sector) concentrate in highly urbanized areas. The research indicates a spatial distribution of industries and RGFs, creating special conditions for the diffusion of knowledge. "In regions where there are large numbers of KIBS there are even more gazelles in this sector than you would expect" (Stam, 2005, p. 126). As such, there are possible "sector-specific spatial requirements for the formation and growth of new firms." Policy makers should therefore take the sector-specific spatial requirement into account to stimulate RGFs regionally.

[9] The Inc. 500 list is an annual list of the 500 fastest-growing private companies in the United States, published in the Inc. magazine. See www.inc.com.

In Hölzl's (2009) analysis of R&D behavior of RGFs in 16 European countries, he found that R&D is more important for high growth in countries closer to the technological frontier. In these countries, opportunities are primarily related to innovation. In catch-up countries, further away from the technological frontier, opportunities are more related to adoption of known solutions. Because of the distance to the technological frontier, "high-growth strategies are dependent on the economic environment of firms, i.e. on the relative comparative advantage" (Hölzl, 2009, p. 62). Based on the idea of "absorptive capacity" put forward by Cohen and Levinthal (1990), Hölzl argues that firms with a low R&D intensity are less able to take advantage of research externalities and the potential spillover pool that is generated by other firms' R&D. Nevertheless, it has been difficult for researchers to find a direct relationship between R&D activity, such as having R&D staff or expenditures, and firm growth.

3.5 Age and size

Are RGFs mostly small and young? In trying to find the gazelle DNA, Sims and O'Regan (2006) uncovered that most RGFs are less than 15 years old, demonstrate a high financial performance (gross profit per employee), are privately owned, and are managed by their owners (who are less than 50 years of age). In a report by Schreyer he claimed that there is a larger share of young firms among RGFs (Schreyer, 2000). A similar statement is present in the report by Europe-Innova (2006). On the other hand, Lopez-Garcia and Puente (2012) found that new (young) firms do not have a higher probability of becoming RGFs than older ones. Acs *et al.* (2008) found that RGFs are relatively old, on average 25 years old and therefore typically not start-up firms. Furthermore, these firms come in all sizes. In the study by Smallbone, Leigh, and North (1995, p. 47), the results showed that "age was not a characteristic which distinguished high growth firms from other firms in the study." About 20 percent of the RGFs in their sample were founded before 1950, and they concluded that even very mature firms have more potential for growth than is often recognized. Moreover, the firms' growth trajectories are often a discontinuous process and change over time. They also found that the firms which achieved high growth also varied in size but that there are some sectorial variations.

In the sample by Moreno and Casillas (2007), they identified RGFs as being smaller but not younger or older than a "normal" firm. While they investigated only Spain, Hölzl (2009) found that smaller firms grow faster than larger firms in all 16 EU states he

investigated. In their study of Slovenian gazelles, Lindič, Bavdaž, and Kovačič (2012) found that companies in all sizes create rapid-growth but that RGFs, on average, are larger than the average of all firms.

3.6 Micro foundations of firm growth—Firm characteristics and capabilities

In this section the focus is the firm: its characteristics, capabilities, resources, networks, and challenges. The most central theoretical traditions used within this research are presented first. Then the empirical research of rapid-growth firms is discussed. There are two exceptions: theory concerning economic resources and performance and the organizational challenges of growth are presented as short introductions later.

3.6.1 Characteristics of the founders, managers, and "entrepreneurs"

This dimension focuses on the traits of the entrepreneurs and managers, the cognitive processes within the firm, and what the entrepreneurs or managers do (Gartner, 1988). The characteristics of the entrepreneur include personal traits, motivation for start-up, and concepts like "growth attitude" and "entrepreneurial orientation" (Lumpkin and Dess, 1996; Wiklund, Patzelt and Shepherd, 2009). The psychological perspective of personal traits and cognitive processes have faded away from the discussion lately (Grégoire *et al.*, 2006).

A problem in the research on rapid growth is that few of the articles clearly state which theoretical roots they use in their research. The empirical research on RGFs before 2000 was almost exclusively descriptive, with minimal use of theoretical explanations and almost no theoretical development. This is probably because the field was in its early stages of discovery, and it was of public interest to get a description of who these firms are. Some of the articles refer only vaguely to the entrepreneurship literature or the rapid-growth phenomenon.

The most important theoretical origins of the entrepreneurship literature can be traced to Joseph Schumpeter and Edith Penrose. Schumpeter (1934) was interested in the economic development of capitalist society and argued that economic development (growth) is stimulated by innovation. Schumpeter (1934), and later Baumol (1968), belong to the German tradition, where they argue that the entrepreneur creates disequilibrium and instability by introducing innovations ("creative destruction"). Penrose focused on the growth process in established firms and argued that "[g]rowth is governed by a creative and dynamic interaction between a firm's productive resources and its market opportunities" (Penrose, 1960, p.1). In her view, growth is limited by a firm's "productive opportunity," "which comprises all of the

productive possibilities that its 'entrepreneurs' see and can take advantage of" (Penrose, 1959, p. 28). The field of entrepreneurship is very fragmented and lacks a consistent set of defined concepts and assumptions (Gartner, 1988; Grégoire *et al.*, 2006; Henrekson, 2005; Landström, Harirchi and Åström, 2012; Reynolds *et al.*, 2005; Shane and Venkataraman, 2000; Wennekers and Thurik, 1999; Wiklund *et al.*, 2009). This will be discussed in more detail later. For now, only some of the traditions most frequently used in the research will be presented.

One tradition views the entrepreneur as an innovator. Within this line of research, part of the focus is on the creative element of combining resources in a new way, and the entrepreneur is here seen as an opportunity creator (Landström, 2005). In this view, the entrepreneur initiates growth and change and concentrates on opportunities rather than resources (Thurik, Wennekers and Uhlaner, 2002). The Austrian tradition (Kirzner, 1973) focuses on "entrepreneurial alertness," which is identifying and exploiting unperceived profit-making opportunities based on imperfections in the market. The possibility to discover opportunities in a market can be regarded as a disequilibrium approach (Shane and Venkataraman, 2000). The opportunities in the market generate possibilities for firms to take out higher profit than others. Higher profit leads to economic growth, other actors in the market will discover this and imitate, and the market will change.

3.6.2 The resource-based view

Penrose (1959) has inspired researchers to identify causes and mechanisms for growth and change and to acknowledge that growth is a process where the internal history, the resources and capabilities, and the industrial environment are important explanatory mechanisms. The resource-based view (RBV) builds on Penrose's work and assumes that firms can be seen as bundles of heterogeneous resources. Some of these are difficult to imitate and thereby represent potential sources of competitive advantage. Firm growth results from internally developed capabilities and resources transformed into competitive advantages (Wernerfelt, 1984). "Capabilities" here mean internal attributes that enable a firm to coordinate and exploit all its resources (Stalk, Evans and Shulman, 1992). According to the RBV, firms exhibiting high growth rates have resources and capabilities that confer competitive advantages that help them grow faster than their competitors (Wernerfelt, 1984; Wernerfelt and Montgomery, 1988). The RBV is further discussed in papers 2 and 3.

3.6.3 Innovation and learning

Central parts of this research have their roots in Schumpeter's argument that economic growth is stimulated by innovation. At its core, innovation includes the concept of "newness" (Fagerberg, 2005; Gopalakrishnan and Damanpour, 1997; Gupta, Tesluk and Taylor, 2007). Schumpeter (1934, pp. 65-66) linked innovation to "new combinations" of resources, and development is "the carrying out of new combinations"[10]. Within the research, the most common innovations discussed are product vs. process, radical vs. incremental, and technical vs. administrative innovation (Gopalakrishnan and Damanpour, 1997).

At its core, innovation is about producing new knowledge or combining existing knowledge in new ways (Edquist, 2005). A prerequisite to developing new or combining existing knowledge is the ability to learn and exchange knowledge within and between organizations. Organizations are often dependent of external sources of knowledge and information in their innovation process. The firm's ability to identify and recognize external information, assimilate it, and utilize it for commercial purposes is defined as a firm's absorptive capacity (Cohen and Levinthal, 1990). As such, innovation can be seen as an interactive learning process (Lundvall, 1992). Innovation is not a linear process but rather a learning process involving several interactions and feedback in the creation of new knowledge (Kline and Rosenberg, 1986). The literature focusing on interaction, learning, and innovation argues that these processes are important for firms' ability to compete and grow.

3.6.4 Network theory and social capital

The phrase "social network" refers to a set of actors and the ties among them. Some parts of social science treat individuals as independent and autonomous and focus on the actors and their attributes. In network analysis, the actors and their actions are treated as embedded, and the ties between actors can be viewed as channels for the transfer of resources (Burt, 1992). These structures of ties, and lack of ties, provide the actors with both opportunities and restrictions. The network of relations constitutes valuable resources. Each actor has different resources, and, connected together with others, the actors can share those resources if they are willing to. This potential is often termed "social capital."

At the organizational level, social capital can be seen as resources embedded in social relations that can be used to attain goals (Lin, 1999, 2000). In other words, when firms' contacts contribute to their goals, these social contacts are their social capital (Burt, 1992).

[10] Including 1) the introduction of a new good, 2) the introduction of a new method of production, 3) the opening of a new market, 4) the conquest of a new source of supply, and 5) the carrying out of the new organization.

The value of the concept of social capital lies in identifying the function of social structure as resources actors can use to achieve their interests (Coleman, 1988). In analyzing the mobilization of resources in the oil industry, Greve and Salaff (2001) illustrated that resources are basically mobilized at an individual level through social networks. The relationship between the actors does not necessarily form tight interconnections. Granovetter (1973) distinguished between acquaintances (weak ties) and close friends (strong ties) in his social analysis at the individual level.

As the firms evolve, their resource needs might change, and so might their networks—from more identity-based networks in early stages to more calculative, intentional networks during growth (Hite and Hesterly, 2001). It should also be mentioned that interorganizational relationships have potential disadvantages like "organizational disruptions, loss of proprietary information or trade secrets, or damage to a firm's reputation if the wrong partner is chosen" (Barringer and Harrison, 2000, p. 396).

Network and social capital can be placed perfectly well in the macro explanations. However, the research on RGFs has mainly a firm perspective: Managing such relations is an organizational challenge. The main purpose of the firm is to acquire resources through their relations, especially knowledge and information. To utilize this information and knowledge, they need the capacity to absorb the information and to learn from it.

In the following, the empirical research focusing on these dimensions is presented.

3.7 Founder and start-up characteristics

Cooper *et al.* (1994) argued that population ecology has examined only firms that have survived and not the firms' initial resources, asking if or why some start-up firms have different prospects for success. In the research focusing on founder and start-up characteristics, I identify four main variables that the studies investigate: education, experience, teams, and motivation.

Cooper *et al.* (1994) found that education (their human capital variable) relates positively to performance. Both Almus's (2002) and Barringer *et al.'s* (2005) analyses support the idea that human capital (entrepreneurs/owners with higher education) increases the chances of experiencing fast growth. The analyses by Chandler and Jansen (1992) suggested that having a bachelor's degree in business is related to firm profitability.

For management know-how (work experience, management experience, use of advisors, and partners), only the number of partners is significantly linked to high growth in the analyses by Cooper *et al.* (1994). In a study on the characteristics and experience of

entrepreneurs who establish high- and low-growth high-tech firms, Feeser and Willard (1990) found, unlike Cooper *et al.* (1994), that those who experience rapid-growth more often are closely related—in regard to product, market, and technology—to their founders' previous employment. Chandler and Jansen (1992) found, as did Feeser and Willard (1990), that the founders of RGFs take advantage of opportunities in a domain they are familiar with (business similarity of previous employment, not task similarity). Business similarity (industry know-how) is also a significant determinant of both survival and high growth in the analyses by Cooper *et al.* (1994). Barringer *et al.* (2005, p. 678) further found that prior experience in the same or closely related industry "provides a founder with critical knowledge plus the advantage of access to a network of contacts that can help a firm to overcome the liabilities of newness." Similar results were reported in an analysis by Littunen and Niittykangas (2010): work experience, expert help at start-up, and external networks are positively related to growth in the first years.

According to Feeser and Willard (1990), RGFs are more likely to be started by larger teams. Their study sample consisted of 134 companies from five types of businesses in Utah. The limited number of respondents, the limited area, and the use of a self-evaluating method might imply some methodological biases. Almus (2002) found no evidence in his research that a larger founding team led to a higher probability of becoming an RGF. When comparing RGFs with slower-growing firms, Barringer *et al.* (2005) found no difference for start-up teams, either.

Finally, the study by Littunen and Virtanen (2009) indicated that the motives of the entrepreneurs differentiate between RGFs and others. The growth entrepreneurs are opportunity (pull) driven, whereas the others are driven to establish a firm by the threat of unemployment, actual unemployment, or internal motives or values. According to Smallbone *et al.* (1995) one characteristic that distinguishes the best performing firms from other firms is the owner's and manager's strong commitment and motivation to grow.

3.8 The managerial capacity challenge

RGFs are more likely to increase the number of managers, to hire professional managers (in terms of managerial experience or formal management training), and to use external advice and consultancy (Smallbone *et al.*, 1995). As a consequence, RGFs focus significantly more on developing functional internal organizational structures and changes in the division of management responsibility. Delegating responsibility is needed to have more time available to

focus on planning and strategic functions. Penrose (1959) discussed these challenges as a managerial capacity challenge to the implementation of ideas and changes in the organization.

The managerial capacity problem is also the topic of the qualitative research by Barringer, Jones, and Lewis (1998). They identified that RGFs form alliances to share resources and reduce costs, use cash incentives to reduce resources spent on control and get employees to work harder, and create some sort of "employee empowerment" (delegation and responsibility) which enables employees to perform more efficiently. Further, they develop a strong "growth-oriented" culture and stress the development of close customer contacts.

This study was later followed up by a study comparing normal and slow-growth firms with RGFs (Barringer and Jones, 2004) and validated the previous results in regard to the use of alliances and cash incentives. The authors identified four solutions to lessen the managerial capacity problem. The first is the socialization of new managers. Initiatives such as a clear mission statement and a culture of communication and training should accelerate the socialization process. Secondly, both financial and non-financial incentives (awards, mentor programs, etc.) are used to motivate managers to prioritize growth. The third problem is adverse selection: find the right employees and integrate them into the firm. Suggested solutions are the active use of networks to identify job candidates and financial incentives. The final problem is moral hazard (the propensity to shirk or avoid work), and financial incentives such as profit sharing, stock options, and performance bonuses can be used to a higher degree by rapid-growth firms.

3.9 Business strategy

3.9.1 Planning processes

Shuman, Shaw, and Sussman (1985) found that RGFs adopt some form of planning process, primarily short run and operationally oriented, and this planning process becomes more formal and structured when companies grow. O'Gorman, Bourke, and Murray (2005) compared managerial activities in 10 small high-growth manufacturing companies with the study of managerial activities in large firms by Mintzberg (1973). They found that mangers in small RGFs rely more on informal communication channels and spend a large proportion of their time on operational issues. They advise managers in larger organizations to adopt the more informal, "hands-on" approach—in their view, a typical advantage of smallness. While Shuman *et al.* used the 1983 "Inc. 500" list, Baker, Addams, and Davis (1993) performed a similar study of the 1989 "Inc. 500" companies. Their findings suggest that the majority of RGFs create written business plans used for guiding company operations, measuring

performance, and establishing incentives. The research by Cunneen and Meredith (2007) indicated that RGFs do not solely focus on detailed planning but rather tend to include broader strategic planning activities. RGFs have paid less attention to managing uncertainty, and they gather and process information more quickly and intuitively.

Ginn and Sexton (1990, p. 315) used the MBTI personality assessment tool to analyze whether "differences in psychological preferences exist among founders of businesses that reflect a propensity for or against a strategic planning process." They determined that founders of RGFs significantly differ in their psychological preferences from those of founders of slow-growth firms. Founders of RGFs prefer an intuitive approach when gathering information and a planned and organized approach to draw conclusions. The analysis does not support the hypotheses that the founders of RGFs prefer logical and objective methods for reaching conclusions.

3.9.2 Marketing strategy

Several studies highlight the RGFs' customer focus and deeper level of customer knowledge as an explanation for their high growth (Barringer *et al.*, 2005; Holm and Poulfelt, 2002). According to Hultman and Hills (2001), these firms' priority is to make the customers satisfied and improve customer value so the customers will return and thereby increase sales. To do so, firms have to be close to the customers, know their needs, and adapt quickly to changes in customers preferences. It is more important to build long-term personal relations with customers than implement formal marketing, and few of the RGFs in their study had developed written marketing plans or used market analyses. Actually, marketing plans and goals may reduce the focus on customers and their changing needs and preferences. If plans are formalized, the firm often follows the plan rather than the customer. Instead, the RGFs typically find market information through continuous interaction with their markets. These firms use referrals and networks to a higher degree than do slow-growth firms. We find a similar customer focus in the research on small e-commerce "baby gazelles" by Feindt, Jeffcoate, and Chappel (2002). Personal contact with customers is more important than branding.

Even though close relations with customers may be a good strategy, it is not necessarily the only strategy. O'Gorman (2001) investigated two "cash-and carry" wholesale companies which both grew rapidly during the 1970s and early 1980s. They found that the one growing at a faster rate later had a more active strategic approach for growth and development. This firm focused on better management and invested in expansion, stock

control, and marketing. Their strategy resulted in more sales, giving them higher purchasing power and better margins. Having the same point of departure, the two firms' choices of strategy resulted in different growth-paths. The "cash-and-carry" firm that relied only on close customer contact and "word-of-mouth" performed worse than the other who invested in marketing.

3.9.3 Product strategy and innovation

According to Smallbone *et al.* (1995), RGFs are not more (or less) innovative, in terms of technical product innovation, than other firms. However, they are more likely to introduce new technology and change their production process, but their adjustments are mostly customer driven, not capital- or technology-driven. Similar arguments were set forth in a report by Europe-Innova (2006). RGFs are more innovative than the average firm but not necessarily innovative in introducing new products or processes. Research by O'Regan *et al.* (2006) indicated that innovation, measured as new products or processes, does not distinguish RGFs from other firms. An innovation strategy might also be industry-specific. In the e-commerce business (Feindt *et al.*, 2002), the RGFs continuously try to develop new products and stay ahead of the market. However, they expand by extending and adding related products and services to their already offered products and do not create entirely new products or services.

An earlier OECD report stated that RGFs are more R&D intensive than other firms and that growth is closely related to a company's ability to innovate (OECD, 2002), while a later report found a correlation between innovative activities and rapid-growth, although the direction of causality was not elucidated (OECD, 2010). As such, we can observe problems of both measuring innovation and identifying its cause and effect.

3.10 External resources and network strategy

3.10.1 The scope of external relations

Several papers and reports highlight the fact that firms do not operate in isolation. In particular, RGFs' integration into networks of alliances and partnerships with other firms, service providers, and institutions appears to be one of their outstanding characteristics (OECD, 2002). These networks facilitate the distribution of financial and human capital as well as information about markets, products, and technology. Littunen and Virtanen (2009) found that close interplay with external personal networks increases the odds of becoming a growth business.

Jarillo (1989) followed the Schumpeter tradition of the entrepreneur as the opportunity creator and analyzed RGFs' use of external resources in their pursuit of growth. External resources are measured as the ratio of sales over assets. The argument is that a high ratio of sales over assets indicates a structure with "less integration" because the firm subcontracts more functions and thereby uses more external resources. His analysis confirms that the fastest growing firms make more use of external resources than the average firm, especially for small firms, and those firms using the most external resources also grow above their industry average.

Zhao and Aram (1995) used sociological network theories when describing their concept of networking, measured by the concepts of "range" (total number of contacts) and "intensity" (amount of resources exchanged and the frequency of contacts). In their case study on six young Chinese firms, the RGFs had both greater range and more intense networking, regardless of stage of firm development, than low-growth firms. They argued that networking helps young firms gain access to important resources from outside. Access to resources is also used as an argument to form alliances, but in such closer relations firms can also utilize their partners' employees and share financial burdens when cooperating (Barringer *et al.*, 1998).

3.10.2 Developing important external relations

In a qualitative analysis of three small globally oriented RGFs, Freeman, Edwards, and Schroder (2006) showed that firms face several constraints when internationalizing. These constraints are poor access to economies of scale, lack of financial and knowledge resources, and aversion to risk-taking. They overcome these constraints by engaging in collaborative partnerships. Partnerships with larger foreign firms provide market knowledge and the sharing of the financial burden. These firms' business networks are derived from personal networks developed over time. Their competitive advantage and strategy include unique technology as a source of competitive advantage and a growth strategy through partnership and alliances.

In analyzing RGFs in the Munich IT cluster and how these firms grow through the use of external relations, Lechner and Dowling (2003) found that for most firms, external relationships are important for growth, and the number of close partnerships increases with the company's stage of development. Further, the firm's most important relations are characterized by relationships developed over a long time period and close spatial proximity. The regional embeddedness of the firms' network enhances the sharing of resources. These firms use different types of networks (the relational mix) that are important for their development: reputational networks; coopetition networks; marketing networks; and

knowledge, technology, and innovation networks. Supply networks are not considered the most important. On the contrary, Beekman and Robinson (2004) found that firms tend to maintain or expand their relationships with a core of critical suppliers when they grow rapidly. They argue that firms can save time and opportunity cost through close relationships with their suppliers and that the suppliers can help young firms overcome the liability of newness.

Lechner and Dowling's (2003) analysis further indicated that knowledge creation is dependent on strong ties, while knowledge acquisition is dependent on weak ties. Consequently, since knowledge creation is important for product and service development, the authors argued that weak-tie networking and non-redundant ties are important but that the transformation of these ties into strong ties is crucial for value exploitation. Since young firms face the liability of newness, they need to build on their initial social networks and develop them into closer collaboration based on business logic. Freeman *et al.* (2006) argued that personal networks are developed over time. Furthermore, Feindt *et al.* (2002) showed that personal contact with customers is important when the firm is young. However, as these firms grow, partnerships with other actors become more important in supporting the expansion of the business. They found that the basis for collaborating with external partners is achieving well-developed internal systems and control of external and internal processes. Social networks can be time-consuming, and there is a trade-off if one should cut old ties and develop new ones (hopefully important for the development of the business), or be stuck in redundant ties. Lechner and Dowling (2003) therefore recommend a mix of both social and business logic when a firm discusses their network strategy.

3.10.3 Organizational learning

In an analysis of machinery manufacturers and business service firms, Sadler-Smith, Spicer, and Chaston (2001) investigated whether organizational learning behaviors distinguish RGFs from their slower-growing counterparts. They distinguished between a passive or active learning orientation. An active learning orientation is positively associated with growth within the manufacturing industry but is not significantly related to business service firms. The active learning related to high growth in manufacturing is characterized by free information flow, challenging existing routines and procedures, and the promotion of risk-taking and experimentation. The authors discussed whether business service firms inherently have a greater capability for flexibility and adaptability, whereas many firms within manufacturing are "locked-in" by technology and processes.

3.11 Economic resources and performance

3.11.1 Ownership

Berle and Means (1932) were some of the first to discuss firm growth and whether firm performance is dependent on the distribution of ownership. They raised a debate about the possibilities for moral hazard arising from the separation of ownership and control and pointed to potential conflicts of interest between shareholders and managers without ownership interest in the firm. Jensen and Meckling (1976) argued that the value of the firm becomes greater the greater the proportion of shares that is owned by insiders—that is, the shareholders who manage the firm. McConnell and Servaes (1990) found a curvilinear relationship, where insider ownership is positively related to corporate value up to 40–50 percent before it slopes downward. Institutional ownership reinforces the positive effect of insider ownership on corporate value. An institutional owner has greater expertise and can monitor managers more efficiently, and then institutional investors and managers find themselves in a conflict of interest as they might find it mutually advantageous to cooperate (Pound, 1988). Thomsen and Pedersen (2000) found a curvilinear relationship related to value, but not for sales growth. Their research indicates that firms owned by families or other companies prioritize sales growth, whereas institutional investors have a preference for shareholder values and diversification. Later, McConnell and Servaes (1995) found that corporate value is negatively correlated with leverage for high-growth firms, whereas the opposite is true for low-growth firms.

A couple of reports found that there is a higher representation of firms partly or wholly owned by others[11] among RGFs than in normal firms (OECD, 2002; Schreyer, 2000). The picture is not clear-cut, though. Sims and O'Regan (2006, p. 952) found that most RGFs "are privately owned as well as managed by their owners."[12] However, in another analysis of manufacturing firms, O'Regan *et al.* (2006) identified that RGFs to a less degree were managed by owners and were more likely to be part of a larger group (parents or holding companies). They argued that this supports the arguments by Salancik and Pfeffer (1980) that ownership is a "source of power," a safety valve, and a driver of strategic direction, reducing risky decisions.

[11] They distinguish "independent firms" from those "partly or wholly owned by others." Remark also that the similarities of these reports indicate that Schreyer is one of the authors of the OECD 2002 report as well.

[12] They do not explain the alternative, but my interpretation is that privately owned means independent firms, not those "owned by others."

3.11.2 Debt and the underinvestment problem

Berle and Means (1932) further gave rise to a number of empirical and theoretical inquiries about what enables or keeps managers from seeking firm growth at the expense of profitability and whether we can assume firms to be profit maximizers. External debt is one of the factors mentioned in the agency theory that tends to hinder managers from building large firms at the expense of the profit for the owners (for a review of agency theories see Eisenhardt, 1989). Myers (1977) demonstrated that "too much" debt reduces the managers likelihood of investing in a positive value project, a phenomenon labeled the "underinvestment" problem of debt financing. Firms encountering high-growth opportunities can resolve this problem and be able to exploit these opportunities by restructuring and reducing their leverage and debt maturity.

The research by Heyman, Deloof, and Ooghe (2008) revealed that RGFs and more profitable firms have a lower debt ratio than others. The underinvestment problem is resolved by lowering leverage but not by reducing debt maturity. Similar results from the research by Dang (2011) seem to validate this. He states that RGFs reduce their debt to reduce the risk of being exposed to underinvestment incentives. However, "firms with valuable growth opportunities control the underinvestment problem by reducing leverage but not by shortening the maturity of their debt" (Dang, 2011, p. 250). In their analysis, Littunen and Virtanen (2009) found that new RGFs to a greater extent than ordinary firms use external funding (loans and public funding) as financing. When investigating firms which experienced a tremendous growth before they went bankrupt or experienced a dramatic fall in market value, Probst and Raisch (2005) found that several of these firms had an excessive acquisition strategy financed by higher debt. It was difficult to repay their huge debt burden when facing a recession, and even more difficult to finance new growth opportunities.

Myers and Majluf (1984) argue that for investing in growth, internal funding is the preferred source, followed by debt, and lastly equity. It is risky to use equity to invest for growth. The research indicates that RGFs can expect to have problems in financing their growth (Phelps, Adams and Bessant, 2007) and that self-financing and loans are the most common way of obtaining finance (Moore, 1994). RGFs seems to have lower levels of solvency and more problems with their liquidity than non-RGFs (Moreno and Casillas, 2007). According to Cooper *et al.* (1994), the level of capitalization contributes to survival and growth. Growth may demand strong financing. With capital, you can buy time, help, resources, etc. However, according to the OECD (2010), the financing of both growth and

innovative activities appears to be country-specific, and cross-country comparisons and definitive conclusions may be difficult.

3.11.3 Profitability

From the perspective of the owners, and also managers, one should expect that profitability is more important than growth in sales. According to Markman and Gartner (2002), one perspective assumes that firm growth is a precursor for competitive advantage and profitability. The other perspective views rapid growth as a major challenge for the organization, reducing its ability to generate profit. In their study, they found that rapid growth is not associated with profit growth but that young firms are more likely to increase their profitability than older firms.

In the debate over whether firms are growing profitable or profitability causes growth, the study by Davidsson et al. (2009) showed that for SMEs, high profitability is more likely than low profitability to foster high growth. Firms with low levels of profitability are less likely to achieve high growth. Their data do not support the assumption that firms are "growing profitable." They use return on assets (ROA; net income/total assets) as a measure of profitability. ROA also indicates the capital intensity of the company, which depends on the industry. This means that companies that require large investments in general will have lower ROA. One should therefore be cautious of using this measure when comparing industries and control for whether there are profitability effects both relative to industry and size. They argue that their results can be explained in light of the RBV. Profitability before growth is an indication of "having built a resource-based competitive advantage" (Davidsson *et al.*, 2009, p. 389). Building competitive advantage may first constrain growth before it enables the firm to achieve high growth rates.

3.12 Organizational challenges of growth

Different theories highlight the force of history in explaining growth and decline. One popular stream of research is life cycle theories. Such theories search for general laws predetermining choices and actions in deterministic stages. Stage models (e.g., Greiner, 1998) are popular descriptions which are easy to follow, but there is no agreement upon the number of stages in the models and what the stages consist of (Stubbart and Smalley, 1999). These models often use biological metaphors in describing organizations as developing through different stages of their "life," such as birth, youth, maturity, and death and are accused of viewing growth as a linear and deterministic process. Penrose (1959), among others, has criticized those theories.

Because humans have free will and are social and intelligent, such theories miss the complexities and uncertainties of organizational processes. Several researchers (e.g. Phelps *et al.*, 2007) also question whether such life cycle or stage models are appropriate in analysis of organizational growth. Such models have problems explaining complex processes in dynamic and unpredictable environments (Mintzberg, Raisinghani and Theoret, 1976; Nutt, 1984).

Still, these models, combined with other theories, can explain certain organizational challenges related to growth and decline. In discussing decline after "earlier spectacular and continuous growth," Whetten (1987, p. 346) found that managers tend to get a "dysfunctional over-confident mind set" based on their success. Child and Kieser (1981) claimed that growth is a basis for security. It has a kind of self-energizing effect. They further argue that it is not growth per se that causes problems for growth firms, but rather poor management. One likely consequence of growth is a need for structural change in the organization, like more use of formal systems and procedures.

3.12.1 The consequences of growing

According to the OECD (2010), rapid growth represents an exceptional event and a transitory phase in the life of an enterprise. Rapid growth can be a disruptive event for a small firm because of the sudden pressure on managerial, financial, and technical resources. Such events are periods of intense change. "They can be exciting (providing opportunities for promotion, etc.) but also periods of stress, flux, and uncertainty" (Coad *et al.*, 2014, p. 106). Further, we do not know much about which aspects "are important for sustaining high-growth over longer periods"(Coad *et al.*, 2014, p. 107). According to Acs *et al.* (2008), most firms remain in business four years after their period of rapid growth, and only about three percent dies. Moreover, they found that larger firms are more likely than small firms to continue their rapid growth for more than one period, but they do not discuss the reasons for why these larger firms continue to grow.

In their descriptive analysis, Hambrick and Crozier (1985) argue that some RGFs develop a sense of infallibility based on their successful growth. This makes it difficult to respond to changes and continue their growth. They further found that the rapid growth put the organization under great strain as a social organism. Often these firms need to hire more employees, and if the staffing process is not taken seriously, it may weaken the decision-making process and culture, creating turmoil—and key employees can burn out and leave.

Probst and Raisch (2005) asked why some of the most successful companies suddenly crash and identified four characteristics of their failure: 1) excessive growth, 2) uncontrolled

change, 3) autocratic leadership, and 4) excessive success culture. These firms experience market constraints on growth and thus turn to acquisitions to maintain their growth, resulting in difficulties in integration and a more complex organization. In order to finance their growth, especially acquisitive growth, the companies borrow outside capital. Even a small recession can make it difficult to repay their huge debt burden. These changes, both huge growth and acquisitions, create managerial challenges. The organization faces increased complexity, which is difficult for managers to coordinate and control. Autocratic leadership—characterized by a charismatic and self-confident top executive with too much power, pursuing aggressive and visionary goals, and with no room for critique—was recognized as a sure road to catastrophe. Furthermore, a highly competitive company culture and reward systems with bonus payments and opportunities for promotion can be detrimental to trust within the firm. A lack of trust hinders openness in communication and affects job satisfaction and the organizational climate and thereby contributes to lower organizational performance. Lastly, successful organizations like Kodak and Xerox had a strong resistance to change, with leaders blocking any attempt at changes. In these firms, an old-fashioned mindset and bureaucratic organization hindered innovation. As a result, their outdated products and processes led to their failure (Probst and Raisch, 2005). In theory, this is often referred to as structural and cultural inertia.

In a case analysis of two RGFs, Nicholls-Nixon (2005) postulated that in the phase of growth and change there is a gap between the demands of the firm and the internal structures and systems in place to manage its activities. To ensure order while also retaining the flexibility of the firm, she advocates that managers develop structures to allow self-organizing behavior to emerge. This includes developing a clear sense of the firm's business logic to guide individual actions; creating information systems to capture, share, and interpret information; emphasizing building relations within the firm and with external stakeholders to access expertise and resources; minimizing the potential for disruptive organizational politics; and adopting a leadership style that focuses on facilitating rather than directing or controlling the growth process.

In their study, Parker *et al.* (2010) found that having a single dominant product or service increases the chances of RGFs to survive after their period of growth. Following this, firms should be sticking to their specialization strategy since a product diversification strategy tends to be counter-productive in the long run. RGFs that develop new products after their rapid growth are less likely to survive, reflecting the risks associated with new product development. In addition, moving into foreign markets (a geographical diversification

strategy) with a dominant product reduces the likelihood of survival over time. Firms that invest in marketing or sales departments while growing are more likely to grow or be bought later rather than liquidated. Such investments might be investments for growth. Interestingly, most firm-related variables are insignificant determinants for future growth. As such, past successes do not necessarily serve as a guide to future success. According to contingency theory, growth has to be examined related to the firm's specific situation and environment. Strategic changes, new knowledge, and changes in management and firms' networks can be viewed as important situational factors for a firm as well as important explanations for the dynamisms of growth (Littunen and Virtanen, 2009). Littunen and Niittykangas (2010) observed that the use of external networks has a positive effect during the rapid-growth period but that internal networks are more important later. Contrary to Parker *et al.* (2010), they found that firms developing new products have significantly higher growth in their later period.

3.13 Concluding remarks

My review of this research will be summarized and discussed in the next chapter. Some preliminary conclusions of the review so far are as follows: New markets and growing demand are important explanations for growth. Firms which grow seem to take a central position in this window of opportunity and pay special attention to customer needs. There is potential for growth in every industry and location as well as for firms of different ages and sizes. The research on firm characteristics and capabilities is mostly inconclusive. The importance of previous experience and higher education seems to be consistent across studies of founder and start-up characteristics. Commitment to growth and customer focus are frequent explanations for growth. RGFs have and make more use of external relations in pursuit of access to resources. Finally, for most firms, rapid growth presents an organizational challenge. Even though there are some conflicting results, the review indicates that both external and internal dynamics contribute to explaining rapid growth. Few discuss the element of luck.

In the introduction to this chapter, I asked whether research on rapid-growth firms is one distinct stream of research or whether it is fragmented. Based on my review, I suggest that the literature focusing on rapid growth is not composed of a distinctive set of theories building on each other but rather is more of a fragmented and complex field using arguments from very different theoretical traditions. Moreover, the theoretical traditions in themselves

are highly fragmented and complex. Further, it is evident that the different theoretical traditions partly disagree on what growth is and what causes growth.

Chapter 4 Discussion

In this chapter, I will first briefly comment upon the development of the research on the rapid growth of firms. Secondly, I will summarize the studies on rapid growth based on my review from the previous chapters. Then, I will briefly discuss what the different theoretical perspectives contribute to our understanding of rapid growth. Fourthly, I will discuss the possibilities for combining different theories when explaining growth and decline. Fifthly, I will describe how this study contributes to filling some of the empirical and theoretical gaps identified in the review. Lastly, I will briefly discuss why policy makers will face difficulties in promoting RGFs.

4.1 The development of the field

This field is young and in an early stage. The first articles on the phenomenon of rapid growth may be traced to the publishing of the Inc. 500 list from 1982 (see footnote 9). However, the research first started to develop from the mid-1990s based on the work of Birch and colleagues, as explained in Chapter 2. Such new fields often develop evolutionary over time (Weick, 1989). Therefore, we might not be surprised to find that the research started quite descriptively, asking which firms grow and what characterizes firms that grow. Questions in terms of who, where, and when are temporal and contextual factors, those in terms of what and how describe, and those in terms of why explain (Whetten, 1989). There were fewer "why" questions asked in the beginning, but this question emerges more frequently now.

I argue that, in general, this field revolves around the phenomenon of rapid growth, including both organizational growth and decline. In Chapter 3, I concluded that the research is fragmented and that one central explanation for this is that very different theoretical viewpoints are found in the literature. As a consequence, this field has no collective theoretical development. The phenomenon itself is evidently of interest for many theoretical traditions and is accordingly investigated from different angles. This development will most likely continue, and the phenomenon will probably also be discussed with use of theories not used thus far. For example, I am surprised that I do not find any empirical papers investigating how institutional dynamics influence the rapid growth of firms. Moreover, within the different theoretical traditions, there are possibilities to include the broader elements of theory. For example, there are, to my knowledge, no articles[13] discussing the

[13] Deschryvere (2008) presents the concept in his report but does not use or discuss it related to the results.

concept of "carrying capacity" related to rapid growth and decline in a specific population (Hannan and Freeman, 1977). This concept argues that when a population's density increases, death rates typically increase and birth rates decrease.

A complete discussion of all future opportunities for empirical and theoretical developments in this field is too comprehensive for this dissertation. In the following, I will summarize the studies based on the reviews from Chapters 2 and 3 and will briefly discuss what the different theoretical perspectives contribute to our understanding of rapid growth.

4.2 Summarizing the studies

The different studies on rapid growth presented in the previous chapters can be divided into three main categories based on their main focus. The first category comprises studies trying to identify which firms grow quickly. The second category includes studies identifying the internal and external drivers of growth. The last category comprises studies identifying the internal and external consequences for growth. Such a categorization is, of course, an oversimplification of all the research presented, but my intention is to sort out what I consider are the central themes in this research field thus far. Several studies overlap these categories; for example, some present general descriptions of RGFs as well as identify the drivers and/or consequences of growth. In the following, I will summarize the results from the research on RGFs according to this categorization.

4.2.1 Identifying rapid-growth firms

Particularly the early studies tried to identify which firms grow rapidly, and they often used an applied approach to understand what RGFs do. The intention was to identify firms' characteristics and inform managers about the practices of these firms. For example, Shuman *et al.* (1985, p. 53) stated that the objective of their study was to "identify the strategic planning practices" of RGFs. Jarillo (1989, p. 134) focused on "*what* entrepreneurs do." Baker *et al.* (1993, p. 82) asked questions like "Do successful companies document strategic planning processes with written business plans?" The research concerning planning processes is very inconclusive. There are probably different strategy processes in firms depending on where they are in their development process, which industry and market they belong to, etc. These articles do not present theories or discuss the theoretical implications of their analyses. The main emphasis is to identify which firms grow fast and describe them.

From the literature review, we can probably conclude that RGFs are not more innovative than slower-growing firms in the sense of creating new products or processes,

although they are more eager to please the customers by improving and adjusting their products and services. A problematic aspect in regard to studies of innovation is reflected in the multitude of approaches to define, measure, and conceptualize innovation (Adams, Bessant and Phelps, 2006; Gopalakrishnan and Damanpour, 1997). R&D expenditure and patents are the most common indicators of innovative activities used in the studies, even though these measures are criticized as being unsuitable for examining the relationship between innovation and growth, especially for young and small firms (Eckhardt and Shane, 2011). Other measures in addition to R&D expenditure and patents should therefore be investigated.

In general, it is difficult to identify which firms grow fast based on a list of common characteristics. Rapid growth is the result of a mix of factors and cannot be ascribed to only one reason (OECD, 2010). There is no agreement upon whether RGFs are typically younger, smaller, older, or larger than other firms (see, for example, Acs *et al.*, 2008; Henrekson and Johansson, 2010; Mason and Brown, 2010). Important explanations for the mixed results we find in research can be the differences in the measurement of growth and which industries that are investigated. I will discuss measurement problems later.

However, because of the way rapid growth is most often measured, the majority of firms achieving status as an RGF are small and medium-sized enterprises (SMEs). They are found in most regions and industrial sectors, and they serve a variety of markets. As discussed in Chapter 2, they are identified as central drivers in generating new jobs and economic growth and in restructuring economies and markets (e.g., Birch *et al.*, 1995; Birch and Medoff, 1994; Delmar *et al.*, 2003; Henrekson and Johansson, 2010).

The research on both industrial and locational distribution asks whether there are better growth conditions in certain industries or geographical localizations, but the results are inconclusive. These inconclusive results call for more research regarding industry and locational dimensions. One possible problem is that several studies investigate only one or two broad categories of industries: manufacturing and/or services. However, it seems there is the potential for growth in every industry and location, and one industry or location does not necessarily have a higher probability of rapid growth than another. This is consistent with several reports (Acs *et al.*, 2008; Anyadike-Danes *et al.*, 2009; OECD, 2002).

Still, we know surprisingly little about RGFs' industrial and regional distribution and the firms' economic performance compared to the rest of the population of firms. Also, there is a lack of knowledge on how the general economic growth in a country is related to new firm formation and the distribution of RGFs. In general, I will argue that we have less

systematic knowledge on RGFs than one would expect based on the growing interest in the phenomenon of rapid growth.

4.2.2 Internal and external drivers of growth

The second tradition comprises studies investigating possible drivers of growth. These studies range from micro to macro explanations.

While the research is inconclusive as to whether RGFs are more likely to be founded by larger teams, it does suggest that managers' education, previous experience, and motivation to grow are important in terms of whether firms will achieve high growth or not. However, the research indicates that those variables may not necessarily be directly related to performance yet can be an underlying cause. The research should therefore also investigate whether variables such as education and experience are indirectly related to growth.

The research concerning ownership and growth discusses whether ownership influences the rate of growth. Institutional owners can be seen both as a mechanism of monitoring and controlling firms and as a valuable support for resources and knowledge. In a similar way, debt can be used by owners as a tool to hinder managers from focusing on growth instead of on profit for the owners. The problem is that high debt can make it difficult to invest in growth opportunities, and RGFs often have problems financing their growth. Profit is usually more important for firms and owners than growth, and the research indicates that high profitability is more likely to foster later growth. Register data are typically used in these studies. It is possible, but often difficult, to determine the ownership structure in a firm through the use of register data. The research should therefore try to supplement with data from other sources to improve this measure. Moreover, few, if any, studies on RGFs test all three variables (ownership, debt, and profitability).

Many authors emphasize that most RGFs are dependent on close customer relations for their growth, and several expect that the best form of marketing is customers' feedback to other potential customers (i.e., "word of mouth"). This strategy is not necessarily the only and best marketing strategy for all firms in all situations. Studies on marketing strategies controlling for industry, the firms stage in development, and so forth seem to be lacking.

The empirical research identifies two main strategies a firm can use to overcome the managerial capacity challenge. The first is focusing on internal organizing: develop functional internal structures and delegate responsibility to leave more time for the management to focus on strategic functions. The second is forming inter-organizational relationships in order to share resources and reduce costs. This includes the sharing of administrative resources and

reducing the need for hiring new employees. However, we know that cooperation with external partners is an organizational challenge (Day, 1995). Therefore, one possibility not exploited in the research on RGFs is to combine these two perspectives and investigate whether firms that focus on developing efficient internal structures are more able to utilize inter-organizational relationships.

Some of the research on external networks describes what characterizes the scope of RGFs' networks and partnerships. This research indicates that RGFs, to a higher degree than other firms, have extended relations to several external actors (e.g., Littunen and Virtanen, 2009; OECD, 2002). A variety of relations appear to be important for RGFs, with the exception of policy makers and governmental institutions. The research further asks how these firms' networks and partnerships are helping them overcome the difficulties of growth. Such network relations provide the firms with the resources and information important for their growth. A more formalized partnership is a useful strategy for sharing resources and risk. The development of relations, from weak ties and personally oriented relations to more calculative partnerships developed over time, is described. As the relations expand, the challenge is to juggle all the relations, activate new ones, and not become stuck in redundant ties. The research indicates that the cultivation of external relations is an organizational challenge. Even though studies on RGFs identify a variety of important external relations, there is a lack of studies identifying which types of RGFs use and relate to which relations. One type of external relation may well be important for one type of firm, but not the other.

The studies concerning market strategy (e.g. Feeser and Willard, 1990; Ireland and Hitt, 1997; Mascarenhas *et al.*, 2002) reveal several different strategies, where some argue that RGFs are typically first-movers in the market and others do not. Some point at low-cost or high-quality strategies, and some touch upon strategies involving foreign markets. I have identified a lack of studies asking which firm capabilities and resources are related to which strategies. Firms' strategic responses to the changes in demand and technology are identified as explanations for their growth. Some studies indicate that RGFs are more likely to operate in turbulent and dynamic environments.

The empirical articles inspired by the population ecology literature (e.g., Almus, 2002; Eckhardt and Shane, 2011; Iudanov, 2007) ask how dynamics in the market can explain growth. They find that important explanations for firm growth, especially for new entrants, include new markets or sudden growing demand, which open up new market niches with growth potential. The firms who manage to grow are not necessarily the first entrants, but they establish themselves in the new niche very quickly. They imitate successful entrants and

are often focused on creating value for customers more than on being technologically advanced innovators. Technical changes, or other changes in demands, may alter the industry, and flexible firms with the capability to adapt early and utilize the new technology or demands will challenge the established firms. However, success in a market is a driver of intensified rivalry, and firms need to improve to survive the competition. In summary, factors such as changing demand and technological changes can explain why new niches arise, and market rivalry can explain the conditions allowing firms to grow and what constrains growth. However, studies of rapid growth in general seldom measure the market dynamics that firms operate in.

4.2.3 Internal and external consequences of growth

We observe a growing interest in the challenges related to growth and what happens after the event of rapid growth. Different studies disagree on whether firms are growing profitable or whether profitable firms are more likely to achieve rapid growth, but the research indicates that the likelihood of later survival for RGFs is greater the more resources they have accumulated during their growth. Most firms seem to survive, but certain firms are trapped by their success, feeling invulnerable, and not able to respond to changes and new challenges. These firms might have either autocratic or very weak leadership. Firms often experience an increased complexity and pressure on the organization when they grow rapidly. Different authors recommend different forms of reorganization, like decentralization, but acknowledge that in a more complex organization there is a need for order and predictability as well as flexibility. The recipe for their past success is not necessarily their best guidance for future success. In the papers reviewed, there were conflicting results regarding whether firms should try different diversification strategies or other strategies to continue their growth (e.g., Littunen and Niittykangas, 2010; Parker *et al.*, 2010). In general, there is a need for more research investigating the challenges and consequences of growth, which resources and capabilities developed during growth are important for future development, etc.

4.3 Theoretical contributions

Since most studies within this field are descriptive and empirical, the theoretical contributions mainly support, reject, or nuance existing theoretical models. The phenomenon of rapid growth does not have its own theory but rather uses a multitude of theories as explanations. In the following, I first discuss the possible theoretical impacts of the research on rapid growth in general, then identify a few specific theoretical contributions, and then discuss future

potential theoretical developments. Most studies have, of course, contributed to our understanding of growth, but a complete discussion of all the contributions is beyond the scope of this dissertation. Therefore, only a few examples are briefly presented.

Before discussing the theoretical contributions, I will start with a clarification of one of the central theoretical perspectives used in the research into rapid growth. I have identified entrepreneurship as one problematic perspective. This was one of the initial perspectives used in the research concerning rapid-growth and is still one of the most prominent perspectives used. Several of the leading journals interested in rapid growth have this as the journal's core perspective on the phenomenon. The problem is that the concept of entrepreneurship is used and interpreted very differently, and in my view it confuses more than develops the research and theories used in this field. The entrepreneurship perspective is toned down in this thesis, even though it is a central perspective in this field. I briefly discuss the entrepreneurship perspective and concept in Appendix C. My conclusion is that entrepreneurship should be defined as the process of starting a new business, with the entrepreneur as the founder of the firm. Because of the ambiguity of the contribution of this perspective, I will not discuss the possible theoretical developments of entrepreneurship as a theory.

Especially the early contributions from Birch (1979), but also later research on RGFs, have inspired theorists to shift attention from large firms to include the importance of small and young firms. For example, Feeser and Willard (1990, p. 96) argue that "strategic management research has frequently focused on more mature firms in more mature industries," while strategy is important for all firms and the research should therefore focus on small and young firms as well. Hultman and Hills (2001) claimed that marketing theory and research have traditionally focused on old, large bureaucratic organizations while neglecting the dynamic changes in business, especially related to RGFs and smaller, more flexible organizations. Such successful and flexible firms question the very nature of traditional marketing. Smaller firms are less formalized, have done little planning and marketing research, and focus more on personal relationships and referrals. Therefore, traditional marketing theories do not hold for the entire population of firms.

Earlier theories of growth stressed that growth is essential for organizations (Penrose, 1959) and tried to identify the mechanisms of growth. Later research, however, has claimed that growth that is too rapid presents an organizational challenge (Hambrick and Crozier, 1985). To overcome the managerial capacity problem, firms need to build a strong organization capable of handling increased levels of sales (Barringer *et al.*, 1998). The research has started to identify an optimal balance of growth, rate of change, leadership style,

and organizational culture as important (Probst and Raisch, 2005). Probst and Raisch argue that firms should have a warning system indicating when the organization is overheating and act to stabilize the growth and the organization. Similarly, Nicholls-Nixon (2005) identified systems of information sharing, the building of external relationships, and leadership directed at facilitating the growth process (more than directing or controlling) as mechanisms aimed at handling the challenges of growth.

The research further suggests that theories explaining growth need to be more dynamic and evolutionary since firms develop during their growth process. For example, Lechner and Dowling (2003) find that different kinds of relations are important at different stages of the development of the firm. The founders' social networks are important in the beginning, then reputation networks and cooperating with competitors come to the forefront, and finally more rational networks based on business logic become important as the firm grows. Actually, Littunen and Virtanen (2009) claimed that active use of founders' personal networks increases the odds of becoming a growth firm in the first place. Zhao and Aram (1995) found that RGFs have a greater range and intensity of networking and that external relations contribute to growth. This has implications for theory in business strategy, since the benefits are apparently greater than the time and cost associated with networking.

One example of the theoretical contributions within economic geography can also be mentioned. Agglomeration theory has traditionally focused on the benefits of the co-localization of related firms and industries. Skuras *et al.* (2005, p. 349) criticized the theories of Porter and argue that "clusters should not be defined in terms of industries and/or sectors," but in terms of common opportunities and advantages. They identify totally localized firms (firms which get resources from local actors and sell to local firms or customers), local importers (who import resources and sell locally), embedded exporters (who buy inputs locally and export outputs), and dis-embedded exporters (who import inputs and export outputs). As such, they argue that firms' input-output relations define clusters, not industries. This is, however, not unlike the way a market niche, or cluster, is defined by Burt and Talmud (1993). They distinguish between resource segments and define market boundaries as "clusters of structurally equivalent players similarly positioned in the flow of resources" (Burt and Talmud, 1993, p. 140).

4.4 Suggestions for theoretical combinations

In the previous sections, studies of rapid growth were briefly summarized. Different gaps in the literature were identified, and a few theoretical contributions were presented. In the

following, I will discuss what I find as a promising future development in this field. There are apparently possibilities for theoretical development within the different theoretical perspectives. However, in my view, a great potential lies in the possibilities of combining different theories when explaining organizational growth and decline. I will discuss these possibilities and identify three possible studies. These studies are based on gaps identified in the literature review as well as on the possibility of combining the theories that emerge as important for explaining firm growth and decline.

Earlier I pointed out problematic aspects of the entrepreneurship literature. In my view, researchers using this perspective to understand the nature of rapid growth can benefit from using theories that are more consistent. For example, one tradition within the entrepreneurship literature focuses on "entrepreneurial alertness" (Kirzner, 1973), identifying and exploiting unperceived profit-making opportunities based on imperfections in the market. As such, we can see a relation to theories of economic cycles and market dynamics, like population ecology, but the entrepreneurial approach focuses mostly on what the entrepreneur does, not the market dynamics. Another tradition views the entrepreneur as an innovator (Landström, 2005) and is therefore closely related to the research on innovation, knowledge-creation, and management strategies. However, this tradition is today more concerned with the characteristics of entrepreneurs or managers as opportunity creators.

Innovation is a complex and multidimensional phenomena (Wolfe, 1994). It has a strategic perspective, involving the identification of critical resources and competitive advantages but also includes strategies for exploiting market opportunities, first-mover advantages (Lieberman and Montgomery, 1988), etc. The learning perspective includes theories within sociology (like network theory, social capital, and absorptive capacity), organizational theory, cognitive theory, and management. The focus is where, how, and with whom learning occurs. Moreover, it has an economic geography perspective, focusing on how learning processes are linked to specific contexts or locations. As such, we also see a link to the industrial and locational distribution of firms. Finally, I observe that most of the innovation research uses a narrow definition of innovation that is primarily related to technological innovation and measured through R&D expenditure or patents. The innovation research could therefore benefit from including a broader set of mechanisms, measures, and theories when analyzing innovative processes.

The theoretical viewpoint in the research on RGFs' market strategies is either the strategy literature or the disequilibrium approach in entrepreneurship, while the research could benefit by discussing the results related to market dynamics (like population ecology) as

well. A firm's responses to changes in demand and technology are identified as explanations for growth, but theories explaining the changes (market dynamics) are seldom tested or discussed.

Researchers discussing the consequences of growth, like Hambrick and Crozier (1985), often refer to stage and life cycle models of growth as their theoretical fundament. In my view, they could also use relevant theories from the sociological tradition discussing learning, social capital, and absorptive capacity as explanations for this phenomenon.

As these few examples show, it is difficult to explain the phenomenon of rapid growth based on only one perspective when investigating RGFs. Carroll (1984), for example, argues that population ecology has neglected the internal dynamics of population growth and decline and has focused only on exogenous factors. O'Gorman (2001, p. 71) claimed that both "industry structure" (population ecology models) and "strategic choice" explanations are important: "Companies drive markets as well as markets driving companies." Managers have to decide both where and how to compete, and growth is explained through a combination of these perspectives. In the following, I will briefly discuss why both internal and external dynamics should be included in future studies on rapid growth.

4.4.1 Including internal and external dynamics of growth and decline

When discussing theories of growth, it is logical to start with Edith Penrose and her book "The Theory of the Growth of the Firm" (1959). I will briefly summarize the most important components of the book as I read it. She is interested in what promotes or limits the growth of a firm. She criticizes traditional economic analysis, especially the neoclassical models of equilibrium that treat growth as "merely an adjustment to the size appropriate to given conditions; there is no notion of an *internal* process of *development* leading to cumulative movements in any direction" (Penrose, 1959, p. 1). As the title indicates, the unit of her analysis is the firm. She makes a clear distinction between the firm and the market and defines a firm as a collection of resources bound together in an administrative framework. She concentrated on the internal resources of the firm and saw the environment as opportunities for investment and growth. The external causes of growth, like demand conditions, must be understood in the light of internal incentives for growth, and limits to growth. The limits to growth are determined by the extent to which managers can plan and implement plans for expansion.

Resources are the key factors explaining growth. Human resources, especially managerial, are important: how managers are plan and organize activities and search for

opportunities. An important capability is the ability to combine resources to create various forms of innovations. Unused, or "slack," resources in the organization are viewed as internal stimulus for growth and innovation. Experience is another important resource. It is a firm-specific resource that is difficult to transmit and therefore constitutes a possible competitive advantage. In general, the ability to learn from and develop knowledge, whether it is objective or based on experience, is central to her theory. In her foreword to the third edition (the appendix in the fourth edition), she writes: "One of the primary assumptions of the theory of the growth of the firm is that 'history matters'; growth is essentially an evolutionary process and based on the cumulative growth of collective knowledge" (Penrose, 1959, p. 237). She believes that to learn and develop, one needs prior knowledge and capacity in order to obtain knowledge, and the firm is a better arena in which to create knowledge than the markets. Later, she realized that collaboration across firms and thereby across networks of relations provides important arenas through which to access resources such as technology and access to markets and knowledge[14]. She actually states (in the later foreword) that because the logic of network relations is very different from that of independent firms competing in the marketplace, a new "theory of the firm" (Penrose, 1959) may be necessary. I have no intention to develop such a new theory, but I will describe what I think her theories can still explain and what other theories can explain better, in regard to rapid growth.

In my view, Penrose manages to combine elements of economic theory with elements of organizational theory. She also clears the way for a new strategic theory: the aforementioned resource-based view (RBV). In the RBV, all resources in the firm are possible sources of competitive advantage, and the internal process of coordinating and combining resources creates heterogeneous firms (Barney, 1991, 1995). While both the RBV and Penrose's theory have important contributions for understanding the importance of internal resources for creating new knowledge and competitive advantage, they are criticized for their inward focus. These theories have an economic focus, where the environment is mostly seen as a market of rising or falling demand more than actors in a system of interplay. Sociological theories, like network theories and social capital, have highlighted the idea that resources are embedded within and available through networks of social relations (Granovetter, 1985; Inkpen and Tsang, 2005). Similarly, strategic theories have criticized the RBV for ignoring the relational advantages (Dyer and Singh, 1998). However, there are not only advantages but also market failure arguments to consider when deciding to make, buy, or contract in the

[14] See both the introduction to the fourth edition by Christos N. Pitelis and the foreword to the third edition by Penrose.

market (Williamson, 1981). Economic geography further demonstrates that regions or clusters are arenas in which firms can specialize, compete, and interact to share and create knowledge and thereby generate competitive advantage (Dicken and Malmberg, 2001; Porter, 2000). Therefore, a theory engaged in the importance of resources to create growth should consider both internal firm capabilities to exploit resources and external opportunities to access resources. In the intersection of these approaches, we find the theory of absorptive capacity: the firms' ability to identify external information, assimilate it, and utilize the information (Cohen and Levinthal, 1990).

While Penrose uses organizational theory to explain the internal functions of structure for organizational efficiency, I argue she has an instrumental perspective, focusing on efficient means to achieve specific ends. One reason for this observation is that discussions of internal conflicts are absent in her book. When discussing limits to growth, I think it is insufficient to focus only on managers' capability to make plans and implement them. The implementation of plans is obviously indirectly related to power, authority, conflict, and trust between members of an organization. However, to really understand the organizational challenges of growth, the perspectives of power and conflict should be central in the discussion. Furthermore, conflicts can be positive for the organization, creating opportunities to re-think assumptions and initiate innovations.

Power, conflict, and trust are essential concepts in organizational theory and different sociological disciplines (like conflict theory), but several other theories can also be used. A potential conflict between shareholders and managers without ownership interest in the firm is discussed in economic theory as moral hazard (Berle and Means, 1932). Agency theory further discusses the problems of an agent acting in his self-interest instead of in the principal's interest. In extension, this can be further discussed through the institutional perspective and stakeholder theory. In order to survive, organizations must conform to the rules and beliefs of the systems prevailing in the environment (DiMaggio and Powell, 1983). Particularly new organizations suffer from the liability of newness and need to become accepted by their stakeholders to survive (Stinchcombe, 1965). A firm has to become legitimate and accepted by the environment to be able to grow as well as to develop an acceptable and legitimate firm culture for the members to avoid internal collapse. As such, the firm is pressed by both their internal structures and arrangements and environmental constraints (Hannan and Freeman, 1977).

While Penrose's theory, and management theories in general, use the individual firm as the unit of analysis, population ecology analyzes aggregates, or populations, of

organizations (Hannan and Freeman, 1977). While management theories argue that decision makers optimize profit and create growth, population ecology argues that it is the environment which optimizes and selects optimal combinations of organizations. These arguments may be combined to explain growth, but according to population ecology, the environmental forces are strongest. Or, as Aldrich, McKelvey, and Ulrich (1984, p. 71) explain: "Human purposes and actions are thus necessary, but not sufficient, to explain changes in organizational forms." To define a population, one must find relatively homogeneous organizations with common characteristics, like formal structures, patterns of activities, geographical locations, markets, etc.

Similar to Penrose and the RBV, population ecology focuses on resources. Hannan and Freeman (1977) assume that the resources available for each population are finite and fixed within a short-term perspective. Therefore, to what extent a unit (firm) can be added to the population of organizations depends on the fixed capacity at the time. If there is great amount of unexploited capacity in the environment, then there are possibilities for a faster rate of growth in the population. To analyze growth, one must consider the capacity of the environment to supply the amount of resources required by the size of the population, which is called the environment's "carrying capacity." If two populations are sustained by the same type of resources, they compete. If one of the populations increases, then the other should decrease. Moreover, any exogenous shock or changes which add constraints to a system can result in the elimination of one of the populations. If one of the two populations (dependent on the same resources) is less fit in terms of the environmental contingencies, it will most likely be eliminated.

There are liabilities of newness and smallness, but population ecology further identifies liabilities for the middle-sized firms. Small firms compete with small and middle-sized firms. Large firms compete with large firms and middle-sized firms. Middle-sized firms must compete with smaller and more dynamic ones and at the same time the larger ones with longer histories (legitimacy) and more resources. Even though Penrose does not discuss the middle-sized firms in a similar way, she argues that large and old firms have a competitive advantage because of their monopolistic power. However, the large firms cannot take advantage of all opportunities, allowing for small and dynamic firms. Contrary to Penrose, population ecology holds that excess capacity (slack resources) is too costly. Penrose argues that slack resources can be used to initiate improvements and innovative activities or diversification and that they are critical resources when the environment changes. Population ecology argues that slack resources are used to develop and maintain formalized systems,

which hinder innovation and thereby create generalist organizations. When the environment changes rapidly, such organizations will spend most of their time and energy adjusting their structures. The cost, tendency toward formalization, and reduced innovative capability are not favorable either in stable or unstable environments. Therefore, firms should aim for a specialist strategy.

This short discussion indicates that different theoretical elements can explain different aspects of growth when seen from different theoretical angels. At some points, the theoretical elements intersect. The elements then either complete each other or, in certain cases, have conflicting explanations. I argue that researchers should both search for theoretical elements that complete the other and test for conflicting explanations. Moreover, if a grand theory or explanatory model of rapid growth ever should be written, I suggest that it should include both the internal and external dynamics of growth and decline. Different theories represent a continuum ranging from totally internal to external dynamics, which each explain important elements of the whole. The theories range from economic management and strategy theories at the "internal" end to population ecology and economic macro theories at the other end. In between, we find organizational theory, theories of social networks, innovation, learning, social capital and absorptive capacity, institutional theory, agglomeration or cluster theory, etc. These theories in "the middle" link the internal firm dynamics with the external environment.

This categorization is, of course, an oversimplification. It is meant only as an illustration of the continuum and the interrelatedness of the different theories. Earlier, I explained that a multitude of perspectives contributes to our understanding of the rapid growth of firms. This review indicates that economic cycles and market dynamics are important explanations for organizational growth. However, the firms' internal capabilities and resources also offer important explanations for why some firms are able to grow and continue their growth. Each perspective provides valuable contributions. I further state that different theories in combination can explain internal firm dynamics, external dynamics, and link internal and external dynamics. There is much to learn from combining different theoretical perspectives to reach a better understanding of rapid growth and decline. Too often, researchers use one theoretical explanation without comparing or contrasting it with other—for instance, conflicting explanations. As such, I criticize the one-sided theoretical focus in some of the previous research. However, I am aware that theoretical combinations are seldom welcome in journals. I will further mention the difficulties in combining elements of different theoretical perspectives in the same analysis. Theories are, for example, often

built on different basic assumptions, and on consistent and complex sets of mechanisms, and therefore are not always easy to apply in combinations. Nevertheless, this opportunity to combine theoretical perspectives is one of the driving forces in my research and is apparent in all three articles.

4.4.2 Gaps identified in the literature

In section 4.2.1, I identify a lack of systematic knowledge on RGFs in terms of both the external dynamics of growth and internal performance and characteristics, compared to the rest of the population. Therefore, I argue that there is a need for more research identifying the following: 1) the relationship between market dynamics, like business cycles, and the growth in an industry; 2) (consequently) whether RGFs are well represented in growth markets, sectors with many newly established firms, and business environments with medium barriers of entry; 3) whether there are industrial sectors or locations attracting or attractive for RGFs; 4) whether RGFs are typically innovative; and 5) RGFs' age, size, and economic performance compared to the rest of the population. Such an analysis can be conducted if elements from theories of market dynamics, location theory, industrial dynamics, economic theory, and organizational theory are combined in the analyses. A general research question to be asked can be: How is the industrial and regional distribution of RGFs and their economic performance compared to the rest of the population of firms, general economic growth, and new firm formation?

Secondly, I have recognized a lack of research identifying a) where RGFs acquire information, and b) which and how firm capabilities facilitate the acquisition of knowledge from these external sources. To understand a), we can use theories of social capital and social networks. To understand b), I argue that elements from both the RBV perspective and theories of organizational structure and functions, combined with theories of absorptive capacity, will be useful. As stated earlier, a theory engaged in the importance of resources to create growth should consider both internal firm capabilities to exploit resources and external opportunities to access resources. In the intersection of these approaches, we find the theory of absorptive capacity. A general research question to be asked can be: Which RGFs acquire information from different external sources, and which firm-based resources and capabilities are important for accessing this information?

Thirdly, I identify a need for more research focusing on the challenges and consequences of rapid growth; specifically, there is a need to focus on the development of resources and capabilities that are crucial for firms' growth and future development. To

investigate firm resources and capabilities, we can use elements from different theories such as economics (financial resources), RBV, organizational theory, and the strategy literature (for diverse organizational resources and capabilities). Moreover, to control for the market effect of growth, such as whether growth is caused by increased market demand or new niches more than by firm resources and capabilities, it will be useful to include theories of market dynamics, such as population ecology. A general research question to be asked can be: How can resources and capabilities developed during a period of rapid growth explain the firms' later development?

So far I have summarized the studies of rapid growth, discussed the different theoretical perspectives used, and argued for possibilities to combine different theories to explain growth and decline. Lastly, I identified three general research questions based on the gaps in the current literature, where I briefly outlined possible perspectives to be combined. In the following, I will discuss both the gaps and the possibilities for combining perspectives in more detail. Moreover, I will briefly describe how this study intends to contribute in filling these gaps and which relations can be investigated. The actual papers and the outcomes of the three studies are explained later in Chapter 6. The following discussion is therefore not a complete presentation of the papers but rather will focus on the gaps identified in the literature review and how these can be investigated through three different studies.

4.4.3 Exploring the role and location of rapid-growth firms in Norway

As explained above there is a general lack of systematic knowledge of RGFs. In the introductory chapter, I stated that almost no studies of the phenomenon of RGFs exist in the Norwegian context. Based on both gaps, the purpose of the first study is to identify the industrial and regional distribution of RGFs in Norway and to compare their economic performance with the rest of the population of firms, including new firm formation. Such a study can also investigate the relationship between the general economic development in Norway and how this seems to be related to the appearance of RGFs. Because of the lack of knowledge in this field, I will argue that an explorative approach can generate a good description of the phenomenon of RGFs and reveal interesting observations. These observations can indicate interesting areas for further in-depth studies.

In the review, I find that changing demand and technological changes can explain why new niches arise and that market rivalry can explain the conditions favorable for firm growth and what constrains growth. In the first study, we should therefore describe the market dynamics. One possibility is to look at the general economic growth in Norway and how this

is related to new firm formation and RGFs. I further find that the research into growth conditions in industries and geographic localizations is inconclusive. However, studies of locational dynamics indicate a spatial distribution of industries. We should therefore ask whether there is a relationship between market dynamics and the growth of an industry, if we find a geographical clustering of RGFs in Norway, and whether there are preferred spatial patterns of the different industries. Knowledge from the population ecology literature, location theory, and industry characteristics can be combined to expand our knowledge. In the review, I also find that there are inconclusive results regarding whether RGFs are more innovative than other firms. Moreover, most of the research on innovative activities uses variables like R&D expenditure or patents. It will therefore be interesting to investigate whether RGFs are typically more innovative and use other available measures, such as R&D intensity and knowledge intensity[15].

A limitation for an explorative investigation into RGFs compared to the total population of Norwegian firms is a lack of available data from publicly registers. Relevant variables to investigate are industry categorization, firm-localization, economic performance, age, and size. By using the variables age, size, and sales revenue, we are able to explore whether RGFs are younger and smaller than the average firm and whether rapid growth measured as relative growth first and foremost represents a measurement bias. Secondly, we can look at their economic performance to find out if they have higher labor productivity, higher debt, whether investors get a better return on invested capital, and so forth. Based on the firms' industry categorization, we can investigate whether RGFs are more represented in knowledge-intensive industries that expand rapidly than in mature or labor-intensive ones, which could indicate either that internal knowledge intensity is important for growth or that there are favorable market dynamics in certain industries. Further, we can examine the market dynamics of the different industrial sectors, asking if there is a correlation between industrial sectors with many newly established firms and firms with rapid growth. Finally, by including localization variables, we can study the regional distribution of growth and the locational pattern of firms. As such, we can ask if there are regional conditions for growth—that is, regional economic dynamics—and if there are "preferred locations" for particular industries to grow.

[15] Only a few RGFs have R&D expenditures or patents. An alternative is therefore a classification based on to what degree the industry is high-tech/low-tech or KIBS.

4.4.4 Firm capabilities and external sources of knowledge

I argued that there is a lack of research identifying where RGFs acquire information and identifying which and how firm capabilities facilitate the acquisition of knowledge from these external sources. The aim of the second study is therefore to investigate which and how firm capabilities facilitate the acquisition of knowledge from different external relations. It is difficult to analyze firm capabilities and external relations based on publicly available data. Such a study must be based on data from the firms themselves, and a relevant method is to collect data through a survey.

In the review, I find that RGFs, to a higher degree than other firms, form extended relations with several external actors. Network relations provide firms with resources and information important for their growth. However, there is a lack of studies identifying which types of RGFs take advantage of which relations. A variety of sources of information appear to be important for RGFs, and different firms might relate to different actors. We should therefore investigate which relations and sources RGFs use to acquire information, what type of information the firms acquire from them, and how important the relations and sources are for the firm. This will inform us of the importance of different sources of information for RGFs.

It is of further interest to get a better understanding of the knowledge-development processes in RGFs. A central reason firms engage in networking is to acquire information from outside. This information must be incorporated into and utilized in the organization. Learning in organizations does not happen in isolation from the environment, and therefore it would be interesting to identify what form of internal competencies and capabilities are important for utilizing different sources. We should therefore investigate which firm capabilities facilitate the acquisition of knowledge from different types of actors and sources. As such, we will be able to get a better understanding of how different firm characteristics and resources are associated with knowledge spillover from different external relations.

Based on the literature review, I argue that it may be useful to combine the sociological perspective of social networks, social capital, and absorptive capacity with the RBV perspective. Such a combination opens up for investigating both a firm's need for external resources with the firm-level capabilities needed to exploit these resources. The concept of firms' absorptive capacity should be central in such an analysis. The theory of absorptive capacity identifies research capabilities as being important for firms' abilities to recognize external information, assimilate it, and apply it to commercial ends. R&D capabilities are especially important for the ability to recognize technological information as

well as information from other R&D actors. However, there might be firm capabilities other than R&D capabilities important for a firm's ability to recognize information from sources other than R&D actors. We know that cooperation with external partners is an organizational challenge and that the managerial capacity challenge can be overcome by focusing on internal organizing or inter-organizational relationships. Therefore, one should test whether firms who focus on developing efficient internal structures are more able to utilize inter-organizational relationships. Moreover, the RBV perspective and organizational theory argue that managers' previous experience can be important for the firm's competitive advantage and that these managers can reduce firm uncertainty by channeling information and providing access to resources based on the network they have developed over time. One should therefore investigate whether firms with experienced managers are more able to recognize, assimilate, and utilize external information. Such an investigation might broaden our understanding of firms' absorptive capacity as well.

4.4.5 Firm capabilities and later development

I identify a need for more research focusing on the challenges and consequences of rapid growth. Few studies investigate whether the resources and capabilities developed during growth are important for firms' future development. Most studies investigate whether different variables explain why firms grow, measured while the firms grow. However, the resources and capabilities revealed might possibly have a spurious effect on growth, or explain growth in the very short term, while they have no lasting effect of growth. Also, studies exploring whether firm resources and capabilities create sources of competitive advantage across different macroeconomic conditions are scarce. The recent financial crisis presents a good opportunity to test whether firm capabilities and resources developed during a period of rapid growth can explain later growth or decline in a turbulent macroeconomic environment. The third study aims to investigate whether firms' resources and capabilities developed in their period of rapid growth can explain their later development, especially during an economic decline.

Most studies use total growth (both organic and acquired) as a measure due to a lack of data (Coad *et al.*, 2014). McKelvie and Wiklund (2010) argue that research on firm growth should differentiate between growth modes. There might be different processes and consequences between organic and acquired growth. It is difficult to establish whether growth is caused by internal processes or mergers and acquisitions based on publicly available data. A survey should therefore be used to identify growth paths. By conducting a survey, it will be

possible to solely focus on organic, internally developed growth and select out RGFs who have acquired or merged with other firms. As such, the results are not biased towards the challenges and consequences of acquisitions and mergers. The third study should focus on which firms are able to continue their organic growth after a period of rapid growth and why.

There is apparently a need for more research investigating the challenges and consequences of growth. There are, for example, conflicting results regarding whether firms should apply different strategies, like diversification strategies related to products or markets, to continue their growth. The study should therefore investigate whether diversification strategies like international market orientation and innovative activities are related to continued growth or decline. A more profitable or financially solid firm might be better positioned to invest in growth opportunities when the market drops. Similar arguments can be applied to ownership. Institutional owners can act like strategic controllers or valuable supporters when a crisis appears. The problem with register data in regard to ownership is that it is difficult to identify the real ownership structure in the firm. Register data should therefore be supported with data from a questionnaire to obtain a more nuanced picture of the situation. Few studies investigate all three variables (profitability, solidity, and ownership) within the same study. Studies of growth and decline seldom measure the market dynamics firm operate in. The external and competitive environment might influence growth and decline. The effect of market dynamics should therefore be a central variable for understanding opportunities for growth. Further, are the resources and capabilities identified in previous studies—such as efficient internal structures, education, and experience—important only for rapid growth or their later development as well? Also, few ask whether these variables are directly or indirectly related to growth. By constructing such an analysis, it is possible continue the discussion about which variables can be important for future growth. This will give us a better understanding of if and how these variables are important for firm growth and decline.

Briefly summarized, we can say that the first general research question is mostly concerned with the external dynamics of growth, but it is also linked to internal characteristics such as economic performance, age, and size. The second research question combines the external and internal with a focus on resources (internal capabilities and external sources of knowledge). The third research question primarily looks at the internal dynamics of growth and decline, but it is also related to the firms' market orientation and the market dynamics firms operate in.

In the next chapter, I will discuss methodological choices and considerations in regard to my study. But first, I will briefly discuss why policy makers will face difficulties in promoting RGFs.

4.5 The problems of promoting rapid-growth firms

I have argued that this field of research is young. The initial question asked which firms create employment and economic growth (Birch, 1981; Birch and Medoff, 1994). In particular, two groups of stakeholders signaled interest in the firms identified as creating the most jobs and economic growth: policy makers and the business press. They wanted to know who these firms are, and researchers initially provided them with the firms' characteristics. It is probably important to note here that this thesis is financially supported by a policy oriented applied research program. Also, several Norwegian business newspapers have showed interest in this research and have asked for comments and results during the process (see, for example, footnote 27). However, the problem is that it is difficult to give politicians and managers clear-cut recommendations.

According to Shane (2009) policy makers should think like venture capitalists and reallocate resources to programs focused on R&D and innovation. By focusing on R&D programs they may be able to support firms with growth potential. Mason and Brown (2013), on the other hand, argue that RGFs are heterogeneous in nature in terms of sector, age, size, and origins. Growth in these firms is not solely driven by innovation or R&D intensity. Policy should rather be based on indicators of RGFs and what such firms need, as identified through research. One indicator of their growth potential is the firms' international ambitions. Supporting firms' internationalization, in particular in the early stages, could therefore be one important policy tool to promote growth. Other tools may be support in sales and marketing, bringing together experienced entrepreneurs with new entrants, and other support activities. Fischer and Reuber (2003) suggest that governments should promote a local network of RGFs together with government policy makers and external resource providers (such as investors, bankers, and consultants). The point is that current policy approaches, strongly tied to technology and R&D, are not relevant for most firms with growth potential. Henrekson and Johansson (2010) state that policy often promotes R&D and innovation, yet there is no evidence that RGFs are overrepresented in high-tech or R&D intensive industries—rather, there is some evidence that they are overrepresented in service industries. According to Hölzl (2009), being a high-growth firm is primarily an economic, not a technological, phenomenon.

The rapid-growth experience appears to be fragile, and many RGFs fail to continue their growth over time. Adopting “best practice” and static management strategies from one period seems counter-productive in a later period (Parker *et al.*, 2010). Growth also has an element of luck or coincidence: “being in the right place at the right time.” This limits the policy instruments that can be used to support RGFs since it is difficult to target which firms have the potential. Generally, it is problematic for governments to support individual firms since they do not have the competence to pick winners (Saxenian, 1994). Moreover, we do not as of yet know enough about the internal features and characteristics of RGFs and the mechanisms important for sustaining their growth (Coad *et al.*, 2014). By investigating RGFs in Norway, my intention is to help policy makers understand what characterizes these firms. Furthermore, managers, owners, and investors might get a better understanding of the challenge these firms face and the mechanisms behind growth.

Chapter 5 Methods

Three main research questions are raised in this dissertation: (Q1): How is the industrial and regional distribution of Norwegian RGFs and their economic performance, compared to the rest of the population of firms, general economic growth, and new firm formation? (Q2): Which RGFs acquire information and knowledge from different external sources, and which firm-based resources and capabilities are important for accessing this information? (Q3): How can resources and capabilities developed during a period of rapid growth explain the firms' later development, especially during a macroeconomic decline?

The aim of this project is, of course, to find new, interesting, and significant answers to these questions. However, in this wish there is a potential trap of overstating positive findings and correlations and understating the problematic aspects of the statistics and interpretations.

This chapter starts with a presentation of the research design, followed by methodological issues concerning validity, reliability, and generalizability. I present the sample and my study, and discuss potential problems. Then I discuss the challenge of choosing a measure of growth that makes comparisons across studies possible. The methodological discussion in this chapter is related to the whole study. Each paper has an additional methods section as well. At the end of the chapter, the methodology concerns are summarized.

5.1 Research strategy and design

The primary purpose of this study is to obtain results that can be generalized directly to a particular real-world situation, the phenomenon of rapid growth of firms in Norway. The goal of this research is to link the theoretical and empirical worlds. As researchers, we use theory to explain our results and the results to refine theory. According to Howe and Eisenhart (1990), the research questions should drive the research strategy rather than vice versa. Platt (1964, p. 348) warns about becoming "method-oriented" rather than "problem-oriented." To obtain our goal, we can use different research strategies, like qualitative and quantitative research. Qualitative research is first and foremost used to identify, describe, and understand social phenomena. Such research is therefore relevant in order to gain insight into new or incompletely documented phenomena. Quantitative research tries to build or test theories

through the use of data analyzed statistically and is therefore appropriate for studying problems based on defined problems and developed theory.

The phenomenon of RGFs was identified in the early 1990s, and we observe several early case studies based on qualitative methods. These first studies focused on the phenomenon rather than theory. As the phenomenon was described, more theories were applied and developed. However, the field is still young, and almost no research has been conducted in the Norwegian context. Therefore, I want to start with a descriptive analysis of RGFs in Norway compared with the rest of the population of firms. This study will be my basis for identifying the population of RGFs in the Norwegian population, which will be used as a basis for selecting RGFs in a follow-up study. The hypotheses are based on previous research and theories and are centered on the firms' industrial and regional distribution, economic performance, and market dynamics. A descriptive analysis was chosen for several reasons: to compare central characteristics with other studies from other countries, to investigate whether firm performance or market dynamics are related to growth, and because of their relevance for the policy debate regarding growth. It would be almost impossible to conduct such an analysis based on qualitative research. The population is nearly 100,000 firms, and official register data are available.

Cook and Campell (1979) classify quantitative design into three main categories: the classical experiment, the quasi-experiment, and the non-experimental field study. The first is favorable for establishing causal relationships and testing theory. However, reproducing complex social events and relationships for treatment manipulation in a laboratory setting is costly and probably impossible to conduct when studying RGFs. The quasi-experiment is an experiment in a natural setting; however, it has quite similar limitations. Non-experimental or longitudinal design based on panel data and time series allows for observations from several periods. As such, it is possible to define two separate situations in time and statistically demonstrate that the cause precedes the effect. However, the available register data do not have all the variables needed to answer Q2 and Q3. The register data do not contain information on external relations or on internally developed capabilities and resources. Therefore, another research strategy had to be explored—namely, correlation design.

Correlation does not prove causation. Even though social research aims to develop causal systems, causal order "can seldom be checked nonexperimentally" (Davis, 1985, p. 9). Q2 hypothesizes about correlations between organizational capabilities (X) and use of external sources of information and knowledge (Y). In this case, however, it is difficult to decide if X comes before Y or vice versa. They might also influence each other. To establish

the direction of causality, the cause must precede the effect (in time), or, as Davis put it: "after cannot cause before […] one-way arrows flow with time" (Davis, 1985, p. 11). Separating the cause and effects of organizational capabilities and external sources of information implies that we have to know the exact time when the capabilities are developed and when the external relation is established. The problem is that both capabilities and relations are dynamic; they are developed over time, with no definite start or end point. Even the birth date of the firm cannot be regarded as a start point. Actors in the firm can, for example, have experiences (capabilities) and networks (external relations) from other firms or situations before the new firm started up. Therefore, I seek to find statistical correlations between variables while being careful not to assume directions.

Regarding Q3, we have a slightly different situation. Here the effect is growth after the period of rapid growth. The question posed is what can explain a firm's later growth. As such, we have a defined period, a start and end point for the dependent variable (2006–2009). In this case, I can use official register data as independent variables separated in time from the dependent variable. An equity ratio can measure the solidity of the firm, and a low equity ratio can indicate a higher level of debt. During the financial crisis, lending policy became more restrictive, and solid firms may have had better opportunities to finance later growth. Similar arguments can be used for return on sales, an indication of profitability. By selecting figures from 2005, it is possible to test if solidity and profitability is related to firms' later growth (2006–2009). According to the evolutionary perspective, RGFs may be trapped by structural and cultural inertia when the competitive environment changes. Small and young firms are therefore probably more able to respond to changes. On the other hand, large firms may have the necessary resources to implement changes. Therefore, we can use register data on age and size to test these relations.

Other data such as firm-developed capabilities, experience, and educational level are not available from official statistics and must be collected using a survey. Better structured and more efficient firms might be able to increase their effectiveness. Firms with intangible resources oriented towards innovation, and firms oriented towards international markets, might use their capabilities to diversify and grow. Firms with experienced managers or highly educated managers might have better knowledge of market dynamics and a better understanding of how to react to uphold their growth. Two problems arise regarding separating these variables in time: 1) It is very difficult to predict which firms are in the process of becoming an RGF. A survey of RGFs must therefore be retrospective. 2) To ensure that variables collected retrospectively are clearly separated in time from the dependent

variable, we have to use a dependent variable from a period after the collection. In our case, that would be 2010–2014. However, my interest was in the first period after firms' rapid growth, and especially the financial crisis, which appeared in 2009, not 2014. Therefore, I have to acknowledge that the variables collected in a survey will violate the requirement for establishing direction for causality.

When selecting a research strategy, one option would be to use only official register data to reduce design problems related to time and causality. If this solution is chosen, then new research questions must be developed. It is not possible to test all the hypotheses derived from research questions Q2 and Q3 based on available data. The other choice is to keep the questions and accept the problems related to causality. I kept the questions and developed a questionnaire and am using these data for Q2 and Q3. The descriptive analysis of Q1 is only based on register data. Register data are moreover added to the database of answers from the survey. This process will be explained soon. Problems related to validity, reliability, and generalizability will be discussed next.

5.2 Validity, reliability, and generalizability

Basically, validity refers to the relevance of measures and variables. Cook and Campbell (1979) present four different forms of validity: internal, external, statistical, and construct validity. In an ideal world, one should design one's study to ensure that all forms of validity are achieved. However, this is not always possible in social science. Internal validity refers to causality between two variables—whether variable A has an effect on variable B. External validity refers to generalizability—whether the causal relationship can be generalized to settings other than those investigated. It is entirely possible that there is causality between the two variables, even though this causality does not hold outside the setting.

Construct validity refers to whether you measure what you intend to measure. A problem can arise if a third variable could be substituted for variable A or B—that is, the operational definition of a variable can be interpreted in terms of more than one construct (Cook and Campbell, 1979; Mitchell, 1985). The problem is particularly relevant "for correlation research in which the construct validity of the measures is infrequently tested" (Mitchell, 1985, p. 194).

Statistical conclusion validity refers to whether one can derive valid conclusions from the study with the appropriate use of statistics and tests. According to Cook and Campbell (1979), typical threats related to conclusion validity are low statistical power (small sample size and low alpha), random heterogeneity of respondents, violated assumptions of statistical

tests, and low reliability of measures (unreliability inflates standard errors of estimates). Reliability refers to how accurate the measures and survey are—the robustness of the study. Reliability is considered in terms of whether one will find the same results if the same study is conducted again—that is, that the results are consistent over time, or if similar results are found in other studies by other researchers—that is, a convergence of results using the same measures.

In testing causal relations, the main focus should be on internal validity and construct validity. Statistical validity should be sufficient. External validity (generalizability) is least important because the possibilities to repeat or conduct similar studies later, or the possibility to compare with similar studies previously conducted (Cook and Campbell, 1979; Mitchell, 1985).

However, according to Calder, Phillips, and Tybout (1981), generalizability can be distinguished by effect application (the effects are expected to be generalizable) and theory application (the theoretical explanation is expected to be generalizable, not the effects obtained). The two types of application lead to different priorities when designing studies. My research is primarily concerned with obtaining findings that can be generalized directly to a particular real-world situation (the rapid growth of firms in Norway) —in other words, effect application. The premise here is that there is "*sufficient* correspondence to expect the effects observed to be repeated in the real world" (Calder *et al.*, 1981, p. 198). Methodological issues include selecting a statistically representative sample of individuals for the target population. The operationalization of variables is determined by the need for correspondence, and one should therefore use events that occur in the real world when target variables. Because of variations and heterogeneity in the real world, measurement error is a concern, and multiple measures of variables are desirable. Moreover, the background factors most likely to impact the effects of interest should be identified as best as possible.

5.3 Sample

The sample is well described in the three papers, but I will briefly present the main figures first. Moreover, I will explain more about the process of data selection. The sample consists of firms active from 2003–2006. From the total population of 125,555 firms, we identified 3,650 firms complying with the criteria of rapid growth. The criteria included a turnover of at least NOK 1 million in the first year (2003) and growth in sales income of at least 100 percent over the period of four years. The firms needed to have a positive operating profit over the years and no negative growth of income each year in the period. As explained in paper 1, we

excluded 55 firms in specific industries[16], and ended up with 3,595 RGFs. We also excluded similar firms (see footnote 16) from the total population, ending up with 94,473 firms for comparison.

The first paper is based on register data from the public Register of Company Accounts and Register of Business Enterprises, available at the Brønnøysund Register Center. In the next step, a survey was initiated. It was possible to send the survey to all of the 3,595 RGFs, but I wanted to investigate active companies of a certain size. First the smallest and the largest were excluded. Secondly, I decided to exclude firms involved in simple resale and operations which do not include the processing of goods or services, like real estate activities or firms in industries subject to strict regulations and public licensing, like education (see paper 2 for the selection criteria). A total of 1,347 firms were excluded because of their size (1,251 had less than NOK 10 million in turnover); 744 because of their industry; and 93 firms were reported bankrupt, sold, or merged (2006 – 2009) —leaving a sample of 1,466 firms. All these firms received the questionnaire and 400 responded (27% response rate). Of these, 391 responses were complete answers of the questionnaire, and used in the analyses in paper 2.

The purpose of paper 3 is to investigate why some firms are able to continue their growth after a period of rapid growth, especially when facing an unexpected macroeconomic downturn. Growth might well be caused by acquiring or merging with other firms. Firms reporting in the survey that their growth was caused by acquisitions or mergers, firms with indications of mergers and acquisitions in the register base, and firms reporting bankruptcy or having sold, were excluded (N=307). As such, I was able to investigate internal, organic developed growth.

For descriptive statistics on the different samples in the three papers, see Table 1. The samples are quite similar, in particular when looking at the mean, but the firms in the smallest sample have lower turnover and less wage cost than those in the larger samples.

[16]Companies in ISIC 65 “Financial intermediation” and 67 “Activities auxiliary to financial intermediation” were excluded due to the problem of “empty” investment companies and specific regulations in the sector. ISIC 75 “Public administration, defense, compulsory social security” and 85 “Health and social work” were excluded because these industries are dominated by the public sector in Norway and have extensive regulations. Further, all companies with zero expenses in labor cost and social expenses were excluded.

Table 1. Descriptive statistics of the sample of rapid-growth firms 2003-2006: Turnover, wage cost and year established.

	Turnover 2006 (1000 NOK)				Wage cost 2006 (1000 NOK)				Year established	
Sample	Maximum	Minimum	Mean	Std. Dev.	Maximum	Minimum	Mean	Std. Dev.	Oldest	Mean
N=3595 (paper 1)	8 437 135	2 028	62 514	289140,1	919 913	1	11 077	41564,7	1900	1995
N=391 (paper 2)	872 906	10 070	55 574	78696,7	99 480	520	11 252	14280,5	1948	1995
N=307 (paper 3)	872 906	10 070	50 659	73589,8	98 066	520	9 884	12356,1	1948	1995

The literature is not conclusive on the preferred sample size (N), but it does indicate that the number of independent variables affect the recommended sample size. The more independent variables, the larger the sample size is required (Hair *et al.*, 1998). If the ratio of observations for each independent variable is low, it is difficult to detect strong relationships in the sample. A type I-error, which represents the possibility to reject a true model based on few observations (Cook and Campbell, 1979), makes it problematic to generalize the results. Hair *et al.* (1998) recommend at least 5 and up to 20 observations for each independent variable. In paper 2, I use 28 independent variables, and the ratio is almost 14:1. This indicates that the size of the sample gives the analysis acceptable statistical power and strengthens the generalizability of the results. In section 5.5, generalizability is further discussed. But first, I will present the register data used and how the survey was developed.

5.4 Register data and survey

The register data used in this dissertation are primarily from the SNF[17] database for accounting and firm information. The database consists of accounting data and other firm information, like geographical localization, ownership, bankruptcy, year of establishment, etc., for all Norwegian firms with limited liability (AS, ASA) from 1992–2010 (Mjøs and Øksnes, 2011). The information is based on the Register of Company Accounts and the Register of Business Enterprises[18]. However, the database was incomplete for some firms, and was supplied with additional information from the Brønnøysund Register Center.

There are several reasons I wanted to carry out a survey. First, I wanted to control and improve some of the information from the register data, like year of establishment, ownership distribution, mergers and acquisitions, firm development, and market situation. Secondly, I wanted to ask the respondents questions about the organizational consequences of their rapid growth, what they consider to be their competitive advantages, the managers' competence and

[17] Center for Applied Research at the Norwegian School of Economics
[18] Delivered via Dun & Bradstreet Norway AS and in collaboration with Menon Business Economics AS

previous experience, the educational level of managers and employees, important aspects of their local environment, and their external sources of information and knowledge. The questionnaire is divided into six main parts, with a total of 147 items in 24 questions and one open alternative for comments (see Appendix B). The questions were designed based on reviews of theories, earlier studies of RGFs, and earlier studies within related fields like innovation and economic geography.

After several rounds of revisions with help from colleagues, the questionnaire was first pre-tested on a CEO. Then new rounds of revision followed, it was tested again on several colleagues and acquaintances, and a final test was conducted with a CEO of a RGF. The reason for pre-testing and revision was to ensure that the questions were understandable and that the respondents' understood the intended meaning behind them, in addition to how long it took them to answer the questions. During the tests I observed the respondent, clocked the time, and noted if questions seemed difficult. I asked some respondents how well they understood every question. The others were instructed to ask me if they did not understand the question. Thereafter I rewrote the questions that had revealed ambiguities. In the first test, the respondent took 25 minutes (not counting discussion with me). Several questions were removed and made easier to understand. In the final test, no questions were reported to be ambiguous or inconsistent, and the respondent took 15 minutes to complete the questionnaire. None of the 391 respondents reported back that the questions were difficult to understand.

Construct validity addresses the problems of measures. By asking questions in the questionnaire aiming to control and nuance the official register data, the quality of these data are improved. For example, register data give a broad categorization of ownership structures, but the questionnaire gives additional insight into the ownership situation and mergers and acquisitions during their growth. As such, I am able to control and improve the register data, and make it possible to use multiple measures of variables, as recommended by Calder *et al.* (1981). Although, in retrospect, I see that more questions should have been asked to improve the respondents' understanding even more. However, to increase the response rate to obtain satisfactory statistical power, I aimed to reduce the length of the questionnaire.

5.5 Response

The questionnaire was sent by post to the CEOs of the 1,466 RGFs in October 2009. The cover letter explained the intention of the study, the financing of the research project (The Research Council of Norway), confidentiality, estimated time for answering (20 minutes), and how to answer (see Appendix A). The respondents could either use the enclosed paper version

and return it in the pre-stamped envelope, or use the web-based survey on the Internet: 51.7 percent returned the paper version, and 48.3 percent used the web-based survey.

Of all respondents, 88 percent were CEOs (see Table 2). Almost 50 percent of the CEOs were also the founders of the firms and more than one-third of them owned at least 50 percent of the firms.

Table 2. Frequency and percent of respondents' position, frequency of respondents being founders, and frequency of respondent owing > 50 percent of the firm.

	Frequency	Percent	Frequency of founders	Own > 50% (freq.)
CEO	344	88.0	164	123
Chairman/board	18	4.6	7	9
Department manager	24	6.1	7	3
Administration	5	1.3	1	1
Total	*391*	*100.0*	*179*	*136*

From this, we can conclude that the respondents are people in central positions and with great knowledge of the firm. They form a quite homogeneous group, which should strengthen the statistical conclusion validity. However, the data are based on only one respondent from each firm and represent a possible single-source bias. Having both homogeneous respondents and only one respondent from each firm can be problematic if it represents systematic biases. One could suggest that the top management may tend to answer in a "favorable" manner for the firm (self-serving bias). Ideally, I should have collected responses from several sources in the firm. On the other hand, the questionnaire did not particularly focus on evaluating management performance but rather on the firms' situation and recent historical events. This should reduce the possibilities for systematical single-source and self-serving biases.

The historical aspect is another possible source of bias. The respondents are evaluating their firms' development over a period of four years in retrospect, and their memory might be distorted. I argued above that the respondents are people in central positions with great knowledge of the firms' development. We can only hope this reduced the problem of retrospective bias. It is difficult to select RGFs before or during their growth period because we do not know which firms will become RGFs[19]. Altogether, it is unlikely that single-source,

[19] We know that between 2–4 percent of the population will achieve gazelle status. A possible strategy will therefore be to ask about 50,000 firms, hoping for 27 percent response (our response rate on our questionnaire), and hoping that 3 percent of those who responded become RGFs. This strategy will probably work if we use only a web-based questionnaire and email correspondence, but would be very expensive and resource demanding

self-serving, and retrospective bias are systematically distributed in the dataset and should rather emerge as random errors. A possible systematical bias is survivor bias. Only those firms who survived were investigated.

As reported in papers 2 and 3, no significant difference between respondents (391) and non-respondents (the rest of the population of 1,466 firms) were found. With regard to generalizability, Calder *et al.* (1981) recommend selecting a representative sample of the population. The target population in this dissertation is RGFs, as described. I find no statistical difference between respondents and non-respondents, and the individual respondents hold similar positions. As such, the sample seems to be representative.

No differences were found between web answers and paper answers, either. In the following I will discuss possible problems of web-based versus paper-based studies. Secondly I will describe how I tested the differences. There are limited space and possibilities to discuss these issues in depth in my articles.

Researchers argue that highly educated people with higher incomes use web-based questionnaires more often than other people, and that the same goes for younger people as opposed to older people. Web-based samples are therefore not representative, even though the data provided are of at least as good quality as the traditional paper-based (Gosling *et al.*, 2004). Similar conclusions were made by Kaplowitz, Hadlock, and Levine (2004), but they showed that the response rate is the same for web and paper. A later survey found no differences between education and income, only age, where the youngest prefer web-based, and older persons prefer to use paper (Windle and Rolfe, 2011).

There are reasons to believe that the availability and knowledge of using the web has increased from the referenced studies in 2004 to those in 2011. The socio-demographic differences of education and income related to the choice to respond via the web might be erased, but perhaps age still discriminates. Even though the research by Gosling *et al.* (2004) indicated that the quality of the responses via the web was as good of quality as the paper-based, there are still concerns about the quality, based both on the visual and technical limitations related to web-based surveys. Windle and Rolfe (2011) argue that respondents using the web find such surveys more difficult to follow than those who use paper and could turn the pages back and forth. Based on the recommendations by Vandenberg and Lance

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if we decide to send them a personal letter by post asking them to participate. The email/web survey strategy is, however, an interesting opportunity to test in future projects.

(2000) we[20] conducted cross-group comparisons to test measurement invariance across groups (answers on web versus paper).

At first we tested whether there were significant differences between those who answered by paper versus web on variables like industry, geographic location, age, size, etc. No differences were found. Then a variety of items from the questionnaire used in the analyses were selected. First a t-test for equality of means was performed. From the 22 questions, two significant differences in items q14p (p = .006) and q17a (p = .036) were found (see Table 3).

Table 3. t-test for Equality of Means for web versus paper. Significant differences are highlighted in the table.

Item	Item text	*t*	Sig. (2-tailed)	Mean Diff.	95 % CI Low	95 % CI Upper
q13k	Our focus on long-term planning and development	.463	.644	.040	-.130	.221
q13n	We have formalized our management and control system	1.194	.233	.109	-.070	.288
q14	The unique qualities of our products or services	1.177	.240	.130	-.087	.346
q14a	Our patents and licenses	.267	.790	.031	-.196	.257
q14b	Our knowledge of branding and product protection	1.275	.203	.152	-.082	.386
q14c	Our understanding of our customers' specific needs	1.805	.072	.128	-.011	.267
q14f	Our experience with research and development of new products or services	.200	.842	.026	-.233	.285
q14m	Our ability to develop tailor-made products or services	1.037	.301	.098	-.088	.283
q14n	Our ability to apply new knowledge and develop our competence	.778	.437	.079	-.120	.277
q14o	Our internal organizing of the firm	1.659	.098	.158	-.029	.345
q14p	The culture and cooperative spirit in the firm	2.761	.006	.258	.074	.441
q14q	Our ability to develop and follow-up strategic choices	.938	.349	.088	-.096	.272
q14r	Our ability to handle changes, increase our capacity and use flexible production	1.420	.156	.136	-.052	.325
q14s	Our focus on economic government and control	1.019	.309	.092	-.086	.270
q17	Experience with establishing other firms	1.878	.061	.251	-.012	.513
q17a	Experience from other fast growing firms	2.105	.036	.256	.017	.495
q17b	Experience from other firms within the same industry	1.140	.255	.158	-.114	.430
q17c	Experience from firms in other industries	1.297	.196	.156	-.081	.392
q17d	Experience as board members in other organizations	-.334	.739	-.039	-.269	.191
q17f	Experience with strategy development in other firms	-.086	.932	-.011	-.255	.233
q17j	Experience from previous work with patents or branding	-.233	.816	-.025	-.236	.186
q17k	Experience from previous work with research and development processes	-.159	.874	-.022	-.288	.245

N = 391. df = 389

Secondly, a preliminary test of four possible variables of these items was conducted (see Table A in Appendix D). The alpha was quite similar for all together, web and paper. We further tested whether there were significant statistical differences between web and paper using Feldt's W-statistics. No differences were found (see Table B in Appendix D).

A measurement invariance test was carried out for all four constructs. A presentation of the results is supplied in Appendix D (see Table C). We did not find any differences to be

[20] With important statistical help from Olav Kvitastein.

concerned about. According to Vandenberg and Lance (2000), the delta chi differences between the models should not be larger than $p > 0.01$. Although a slight deviance can be found for the construct *customer knowledge*[21], all concepts passed the test for strong invariance across groups. However, there is no general agreement concerning what to consider to be an acceptable level of measurement invariance. I claim that these tests show that the answers for web and paper can be used simultaneously and that there is no need to employ them separately in the analysis in papers 2 and 3.

Using factor analysis, I constructed new variables based on different items in the questionnaire[22], as explained in papers 2 and 3. These variables are not "frequently tested" (Mitchell, 1985), and the construct validity is therefore problematic. Even though the questions are based on theory and research, we cannot verify if the constructs are valid. Moreover, some of the variables, like organizational capability, are quite broad in scope. However, in later discussions with several RGFs, those who experienced growth later argued that their focus on internal organizing was important for them to not lose control and secure steady development after 2006. Those who experienced problems claimed that they lost control and should have focused more on building a strong organization. As such, this variable might be "events close to the real world" (Calder *et al.*, 1981). However, when seen in retrospective, I am the first to admit that these variables should be further elaborated and refined into different variables. Hopefully I will be given the opportunity to do so in future research.

5.6 Growth as the dependent variable

In Chapter 2, the discussion of growth measures was presented. The heterogeneity of growth measures in the literature makes comparisons between studies difficult and lowers the reliability of results in the field. In my view, it is important to try to find at least one variable which makes comparisons across studies, industries, and countries possible. In the following, I claim that growth in sales is the best measure in the research on rapid growth. It is important to specify that the arguments are claimed to be valid for the field of research on rapid growth, not simply the specific Norwegian case.

[21] I decided to not use the construct "customer knowledge" in the later analyses.

[22] The respondents were asked to evaluate statements based on a 5-point Likert-type scale. The scale was furthermore explained in words—for example, from not important at all to very important (see Appendix B). The argument for using a 5-point scale is that it is easy to explain each number in words and is thereby understandable to the respondents. This scale is widely used in surveys.

5.6.1 Employment growth as an indirect effect

Employment growth is, as mentioned earlier, seldom the main goal for managers, even though quantifiable employment growth might be a goal for policy makers. However, firm growth has most often positive spin-off benefits for the society as a whole, but these benefits can be difficult to measure from the firm level. The research by Gallagher and Miller (1991) supports this assumption. They argue that firms with high turnover create jobs and benefit the economy indirectly because of their demand for goods and services.

When interviewing respondents from two rapid-growth fish-farming enterprises[23], we learned that they had employed some, but not many, new employees during their period with gazelle status or in the eight years after their gazelle period. Still, they have continued to grow in terms of sales. This growth enables them to compete in the highly competitive marketplace. The alternative—no growth—would mean having to sell out or, in the worst case scenario, go into bankruptcy and thereby lose the approximately one-hundred local jobs. When they lose their jobs, most employees have to leave their municipalities to find jobs elsewhere. I will therefore argue that growth, in terms of sales, is the most important growth indicator from the firm's perspective but that it is also a useful and important measure for the political domain indirectly.

Another aspect regarding the notion of spin-off effects is about contracting and contingent labor. The staffing of a firm is usually associated with permanent employment. However, rather than permanent employment, firms can choose to hire people directly for shorter contracts from a staffing/recruitment firm or use freelancers, consultants, etc. These options give the firm alternative courses of action when in need of labor and are probably of interest particularly for new firms lacking resources and legitimacy in their start-up and expansion phases (Cardon, 2003). A study by Bastesen and Nesheim (2008)[24] illustrates how a certain firm uses contracting and contingent labor during their first 10 years (see also Appendix E).

This firm has a core of permanent employees and hires others when they are in need of extra capacity or special expertise. Such arrangements provide the business flexibility. Therefore, the firm gives income to a greater number of people than they report as being their employees. I doubt this is unique for this single firm, and I will argue that this phenomenon makes it difficult to make exact calculations of how many people work for a firm. As for the

[23] This is qualitative data from an ongoing research project. Data are collected by two master's students. It is here meant only as an illustration.

[24] This study is not included in my PhD thesis, and it is written in Norwegian. I will therefore give a very short presentation of the study here and in Appendix E.

financial variables discussed earlier, the extent of contingent labor used by a firm can also differ from industry to industry. The difficulty in defining the borders of a firm, who is working in the firm and who is not, is an important discussion (Atkinson, 1984; Lepak and Snell, 1999; Pfeffer and Baron, 1988) but has largely been neglected in the discussion of measuring growth[25].

The third aspect with regard to employment is the availability of data. In Norway, as specified in the articles, firms do not need to report numbers of employees[26], only total wage costs. The figures of employees that exist in these databases are not reliable. In regard to wage cost, different industries have different wage structures. It is therefore difficult to calculate the exact numbers of employees. Also, as just discussed, when hiring employees from other firms, these numbers are hidden as general production costs, not wages.

Therefore, as long as firms have to report their total sales to their governments (tax offices and public registers), I will argue that the best measure for growth is sales. This is a measure comparable across countries and industries. However, we have to acknowledge that sales figures may be influenced by the level of production costs, depreciations, etc. in different countries. As such, sales are not a *perfect* measure for cross-country comparisons, either. Before we are able to solve this problem (if ever), the number of employees and other indicators can be additional measures of growth. However, if we want to progress in the field of research on RGFs, I would argue that sales should be the main growth indicator.

I have put forward three arguments for why sales growth, rather than employment growth, is the best measure in this research field: First, research into firm growth should have a firm perspective, not a political perspective of employment growth. Sales growth has indirect effects in terms of employment and national wealth. Secondly, many firms provide income to more individuals than they report. Contingent labor makes it almost impossible to calculate the amount of manpower used in production. Thirdly, employment data might not be available or be unreliable, as in the Norwegian case.

5.6.2 Combination of growth indicators

There are still more problems with regard to measuring growth, and I will discuss some of them here. Delmar *et al.* (2003) used six different growth measures and found that there were very low correlations among them. They conclude that an RGF "is, conceptually and

[25] There are only a few examples of studies of rapid-growth firms where the authors measure and discuss labor flexibility; see, for example, North and Smallbone (1995) and Deschryvere (2008).
[26] In the Register of Company Accounts and the Register of Business Enterprises.

operationally, very dependent on the growth measure used" (Delmar *et al.*, 2003, p. 211). I have mentioned organic versus acquisitive growth, and one solution to that problem is to distinguish between them and clarify what kind of growth is being analyzed. A Finnish report identified that only 65 percent of the sample of RGFs represented organic employment growth (Deschryvere, 2008). Organic, internally developed growth creates internal challenges such as those related to effectiveness when developing the organization (Quinn and Cameron, 1983), while acquisitive growth can create challenges for integration (Stahl *et al.*, 2013). In articles 1 and 2, they are both mixed together, but in article 3 I investigate only organic growth.

Another problem is that different industries may have different growth rates, and it is of course possible to measure the growth relative to its industry (Moreno and Casillas, 2007). In article 3, I try a variant where I measure their later growth relative to industry and location. Not only industry, but also local markets may have different growth rates. This is seldom problematized in the research. Further, in the literature it is discussed whether one should measure growth in one leap from the first of the year to the end of the year or according to a certain percentage of growth each year over a period of time (and how many years that growth period should be).

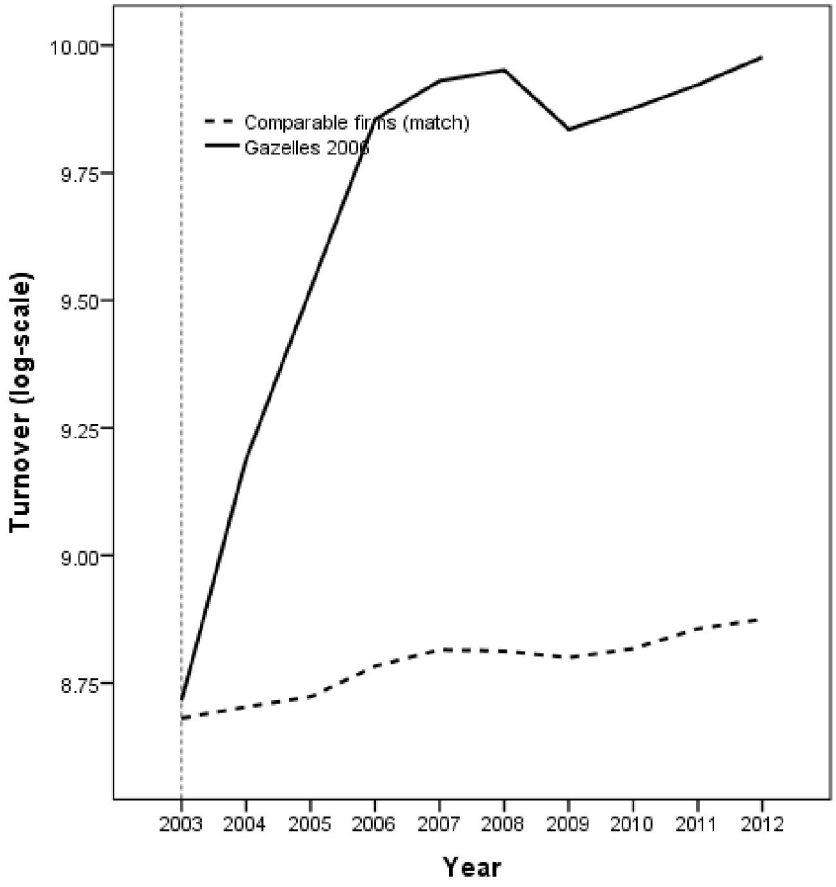
Measuring absolute or relative growth is also an issue for further elaboration (e.g. Davidsson and Wiklund, 2000; Delmar, 1997; Delmar *et al.*, 2003; Weinzimmer *et al.*, 1998; Whetten, 1987). While absolute growth refers to annual change in numbers, this measure is most relevant for measuring employment growth. Relative growth refers to percentage change (each year or over a certain period) and is normally the growth measure used for sales growth. When measuring growth in sales, a period of 3–5 years is most common, even though a 10-year period is also used.

For now, we can affirm only that different measures are used and encourage researchers to clarify their methods and measures so that comparisons are possible. Shepherd and Wiklund (2009) stated that there are few studies that use the same combinations of growth indicators, formulae, and time spans in their research, resulting in slow theoretical progress. The reliability of results in this field is weakened because of the problems of comparing results across studies. I have chosen sales growth, as explained, and use relative growth over a four-year period, which is the most common time span and was also used by Birch. In paper 3, I selected only firms that have an organically developed growth. In this paper, the dependent variable is somewhat special: the firms' growth after their rapid growth period. In the following, I will explain why I selected the specific time span after their rapid-growth period.

5.6.3 Measuring firms' development after a period of rapid growth

The dependent variable in paper 3 is the firms' growth in turnover from 2006–2009. Given the rapid-growth period of 2003–2006, one could suggest that the dependent variable should be growth over the period 2007–2010. However, most firms experienced the downturn in 2008–2009 and slowly recovered in 2010. Even though Norway as a country had comfortable economic resources to use in its stabilization policy, both the exporting industries and domestic industries experienced a great loss in demand during this period. I will therefore argue that despite this state's wealth, the Norwegian case is still relevant.

Figure 1. The development of rapid-growth firms (2003–2006) matched with comparable firms. Log transformed turnover from 2003 to 2012.



The development (turnover from 2003–2012) of the sample of RGFs and of comparable firms is displayed in Figure 1. Here, a set of comparable firms (N=3,415) and the RGFs in the sample (N=3,638) are matched based on Log turnover in 2003, Log wage cost in 2003, year of foundation, and industry. The matching procedure is based on the recommendations by Iacus, King, and Porro (2011). By using this procedure, we are able to study the development

of two groups of comparable firms—one under rapid growth and one with normal slow growth in the period 2003–2006. The graph illustrates that the RGFs of this study had a more distinct drop in turnover from 2008–2009 than the slow-growth firms. Therefore, 2009 is a more interesting end year for the dependent variable than 2010. Also, the rapid-growth period was 2003–2006, and by including 2006 in the next period, I have included their end year from this period as their first year in the next period investigated. Several RGFs might perfectly well have dropped in performance from 2006–2007. In fact, 92 of the 391 respondents in the sample reported negative growth in turnover from 2006–2007 (23.5 %), and 81 of the 307 respondents in the sample (26.4 %).

5.7 Methodological concerns

This evaluation of methodological concerns of validity, reliability, and generalizability identifies both weaknesses and strengths in my dissertation. The methodological sections in each paper will discuss some of these issues more in detail (see also limitations and suggestions for future research). For now, I will sum up the most important methodological concerns discussed in this chapter.

The construct validity is strengthened by the improved quality of official register data through the survey and also by allowing for multiple measures of the register variables. On the other hand, new variables were constructed that had not been tested previously, and we cannot verify if the new constructs are valid.

Strengths include acceptable statistical power (conclusion validity) based on the sample size, which thereby also strengthens the generalizability of the results. The statistical conclusion validity is further strengthened by comprehensive statistical tests and homogeneous respondents. However, single-source, self-serving, and retrospective biases might appear as random errors as well as survivor bias as systematic errors. In total, these errors will lower the predictive power of the results.

Some of the results support previous studies, strengthening the reliability, but due to different methods and measures of growth, I acknowledge the problems of comparing results across studies. To test the reliability, similar studies must be replicated.

The problem of comparing results across studies based on different growth measures affects the generalizability of results within this field. The generalizability of my study is strengthened by the homogeneous sample where the respondents to a large extent hold similar positions, and we did not find statistical differences between respondents and non-respondents or between responses via the web versus paper.

I have not discussed internal validity thus far for the simple reason that I have almost no evidence of causality in my research. I primarily measure whether variables are related. Moreover, for Q2 (paper 2), the practical and theoretical implications are more important than causality. Statistical correlation between the variables implies that specific capabilities and resources are important for firms when interacting with specific external sources. The correlations help in explaining the phenomenon and enhancing the theories. In paper 3, a few independent variables are separated in time from the dependent variable (growth 2006–2009); equity ratio (solidity) 2005, return on sales (profitability) 2005, age, size, and institutional ownership. Only equity ratio and young age positively relate to later growth. However, there can be alternative explanations for the relationships as well. In the mediation analysis, I found, for example, that older firms positively relates to equity ratio. It is difficult to sort out every possible underlying and mediating effect, and I am therefore cautious to claim definite causality. For the remaining variables, we cannot establish a timeframe to separate them.

The assumptions of causes and effects in the articles are primarily based on theory, but also on general conversations with managers of RGFs. Although these conversations are not systematically collected and analyzed in this dissertation[27], they have been helpful in trying to understand the mechanisms of rapid growth. More solid qualitative analysis is recommended for future studies. However, based on the design proposals by Calder *et al.* (1981) of selecting a representative sample, correspondence with "the real world," and multiple measures, I argue that the results are generalizable for RGFs in Norway.

[27] This "conversation" with managers and founders of rapid-growth firms (2003–2006 gazelles) is a combination of structured interviews and general dialogs. The reason for not using the information actively in this dissertation is that it is an ongoing project, an unfinished analysis. One example of a statement by one of the founders in a mechanical manufacturing company I have investigated was also interviewed in the business paper Ukeavisen Ledelse (my translation): "The quality of our products and processes, our attention towards the customers, our focus on building the organization, structure, and future-oriented strategy […], has been the key factors for our growth. […] Nothing last forever. […] I am very determined on quality assurance. We work very hard with economic control and routines" (Myklemyr, 2013, p. 9). Myklemyr A. 2013. Gasellene som vokste seg gjennom finanskrisen (The gazelles which have grown through the financial crisis). In *Ukeavisen Ledelse*; 9-12. (English: The gazelles which have grown through the financial crisis).

Chapter 6 Presentation of the papers

In the following, I will give a short presentation and discussion of the purposes, results, and contributions of the three papers in this dissertation. Limitations and suggestions for future research are presented at the end.

6.1 Paper 1: Rapid-growth firms: Exploring the role and location of entrepreneurial ventures

Despite this increasing interest in the phenomenon of rapid growth, we identified a lack of empirical studies investigating the industrial and regional distribution of RGFs in a country and comparing their economic performance with the rest of the population of firms, including new firm formation. Also, few investigate the relationship between general economic development and how this seems to be related to the appearance of RGFs. The aim in the first paper is to get a better understanding of these relationships.

Paper 1 has an exploratory approach, where we compare the 3,595 Norwegian RGFs (growth period 2003–2006) with the total population of 94,473 firms. Our results suggest that RGFs are found in most sectors in the economy. There are actually fewer RGFs in medium/high tech industries compared to the total population, and they are not overrepresented in innovative or knowledge-intensive industries. RGFs are well represented in industries that expand rapidly, in growth markets, in sectors with many newly established firms, and in business environments with medium barriers of entry.

There is still only 3.8 percent of the total population of all Norwegian firms (in the period 2003–2006) who actually managed to become a RGF. We therefore suggest that firms' capabilities are important, especially skills in managing market opportunities. This also includes the quality and/or flexibility of their products and services and good relations with customers and/or suppliers. Further, RGFs return higher labor productivity and use their resources more efficiently, resulting in higher productivity than in the "normal" firms. They present a better return on equity and total assets, and their investors receive a better return on invested capital.

In regard to the regional distribution, our research concludes, as most research, that RGFs are found in most regions, with a slightly underrepresentation in the most peripheral regions. Larger urban environments or specialized clusters are regions with a higher frequency of RGFs. Such clusters might function as markets for specialized and skilled labor

and well as spaces for firms to specialize, compete, interact, and share knowledge (Dicken and Malmberg, 2001; Malmberg and Power, 2006; Porter, 2000).

This paper offers several contributions. First of all, we combine measures and theories seldom combined to expand our knowledge of RGFs distribution and performance. Most research measuring innovation uses variables like R&D expenditure, but in this article we combine several measures to classify such activities. Our results challenge the research and general descriptions in the press arguing that these firms grow because they are innovative and high-tech. We further identify a complex set of mechanisms in the relationship between market dynamics and the growth in an industry. The research has tried to explain a firm's growth as first and foremost a result of specific attributes of the firm and its entrepreneur (micro perspective), but our research indicates that rapid-growth is first of all concerned with business cycles and the demand side of the economy in which niche markets exists (macro). Also, our results indicate that rapid growth is related to locations that seem to be the "preferred location" of particular industries, indicating possible "optimal" locations for firms.

6.2 Paper 2: Firm capabilities and external sources of knowledge: Which capabilities are important for which relations?

Knowledge is a crucial resource in the modern learning economy (Lundvall and Johnson, 1994). Access to information and knowledge from outside the organization is often linked to firms' possibilities for growth (e.g., Barringer *et al.*, 1998; Lechner and Dowling, 2003; Moreno and Casillas, 2007; Zhao and Aram, 1995). From this perspective, it is important to understand where firms acquire information. Different firms might relate to different external actors and relations, but few have tested a comprehensive set of relations. The research has often been limited to publicly available data and few industries and regions. Moreover, less attention has been paid to the importance of the firms' internal resources and capabilities to access and use external information and knowledge. The aim of the second paper is to investigate to what extent the firms' internal characteristics and capabilities influence RGFs' use and valuing of a broad range of external sources of knowledge and information.

In paper 2, I use my own developed survey (explained in Chapter 5) combined with public data to explore the relationship between internally developed firm capabilities, age, size, localization and industry, and the firms' use and valuing of 10 external sources of knowledge and information. These 10 sources are categorized into four main groups. I find that learning from close relations, like customers and alliance partners, is associated with higher educated managers and organizational capabilities and is based on managing,

coordinating, and structuring activities. Learning from informative sources, like publications and conferences, is associated with networking capabilities based on experience in networking and abilities related to searching and systemizing information. Learning from public sources, like research and public institutions, is associated with R&D capabilities based on research experience and a mutual communicative platform. Learning from the firms' support networks, like distributors, suppliers, and service providers, is associated with managers' prior experience and relations, the intensity of the relations, and the size of the RGF. I do not find any evidence that geographical location of a firm is a barrier to information and knowledge from external sources.

The paper contributes to a more nuanced understanding of the concept of firms' absorptive capacity by identifying how different firm capabilities facilitate the use and value of external sources of information. Furthermore, I argue that these results indicate that the analysis of absorptive capacity should not be solely based on register data, like R&D spending, but should also include the firms' internally developed capabilities. Innovative capabilities are measured based on five items in the questionnaire, which can give a more precise indication of their actual capabilities than official register data. Register data indicate the degree of technology intensity or average cost for R&D in different industries. However, a specific firm in a high-tech industry or in an industry with high R&D costs may not focus on innovative activities at all. Organizational capabilities and managerial experience is measured through a similar method. As such, the paper contributes to a better understanding of how firm capabilities, characteristics, and resources are associated with knowledge spillovers from external relations.

6.3 Paper 3: Growth and decline in a changing macroeconomic environment: When rapid-growth firms met the financial crisis

The firms in my study were defined as RGFs in the period 2003–2006. This was a period of macroeconomic growth in Norway and most of the world and was followed by an economic recession (the financial crisis). It is entirely possible that firms that experience rapid growth in a period of macroeconomic growth fall behind during an economic recession. There are very few studies exploring whether firms' resources and capabilities developed in their period of rapid growth can explain their later development, especially during an economic decline.

As for article 2, the database for article 3 is composed of a questionnaire supplemented with register data. The companies included in the analyses are companies that reported that their growth was internally (organically) developed and that their later performance was not

affected by acquisition, splitting up, or merging companies. The theoretical basis for the paper is RBV, economic theory, population ecology, and organizational theory. As discussed earlier, each of these theories has their strengths and limitations. Employed together, they provide a better answer to the research question.

In general, the study shows that the ability to continue a firm's growth stems from an interaction between internal processes and resources and market dynamics and emergent niches as well as an ability to take advantage of market opportunities. More specifically, the first analysis reveals that a) RGFs with a high equity ratio before the financial crisis grew at a faster rate than those with a low equity ratio, b) better internally organized firms had a better growth rate, c) young firms, but not those of small size, is related to later growth, indicating that young firms are less affected by structural and cultural inertia, and d) firms experiencing a less fluctuating market, like an emerging market segment or a new market niche, have a better growth trajectory than others.

In the second analysis, I tested mediation effects. Management teams with past and heterogeneous experience are not directly related to later growth but are indirectly through organizational capabilities. Experienced managers might use their experience to advocate for building an efficient organization because of the unpredictable future. Large firms are also related to growth through organizational capabilities. Formalization, specialization, and well-organized coordination among activities might increase such firms' effectiveness. The analyses further indicate that successful international expansion is complicated. International capabilities are positively related to growth as a mediation variable, where highly educated and experienced managers, financial solidity, and support from institutional owners positively affect the growth of firms with an international focus. Highly educated managers are also positively related to better financial solidity. A focus on R&D does not increase the probability of firm growth, indicating that a focused technological-innovative strategy is not necessarily a competitive advantage on its own during an economic downturn. Intangible capabilities (R&D) are related to growth only in combination with experienced managers, emerging markets/niches, and markets with few competitors. Such managers might use their experience to focus on opportunities in the market and the commercialization of products and services.

This paper offers several contributions. The theoretical base and departure of the paper is the RBV, building on Penrose's (1959) work focusing on the growth processes in established firms. By including theories such as population ecology and organizational theory in the analysis, I show that the RBV and Penrose's theory remain relevant even during a

macroeconomic downturn. Continued growth is related to internally developed capabilities and the firms' abilities to take advantage of market opportunities. A deterministic view of large firms as unable to respond to external changes is not supported, and internal structures and routines are important to sustain efficiency in the market. However, growth has an element of be present in an emergent niche with few competitors and environmental capacity to support growth. A focused technological-innovative strategy is not necessarily a competitive advantage on its own, as most innovation theory postulates, but is mediated through other variables. My results indicate that human capital is at least as important as firms' financial capital. However, financial solidity is important when entering a macroeconomic downturn, contrary to what mainstream economic theory of perfect capital markets would suspect.

6.4 Discussion

Most firms die young. Those who survive grow incrementally and stay in the game for a while, even for long time. Very few experience an intense period of rapid growth. For those who do, most firms only experience such growth once in the life-span of the firm. These firms gain an almost mythic status as the successful dream firm. They are important for general economic development and applauded by policy makers. But their characteristics, the reasons for their growth, and the organizational consequences of rapid growth are still poorly understood. I have discussed the theoretical and empirical contributions in this field throughout this thesis, particularly in Chapter 4. In the following, I will briefly discuss, based on the review and my own investigations, why I argue for a combination of investigating environmental dynamics and internal firm capabilities when studying rapid growth.

The macro perspective of firm growth explains firm growth as being caused by environmental dynamics and characteristics of age, size, and industrial and regional distribution. Population ecology argues that growth depends on the environmental conditions for growth. If the environment has the capacity to supply the amount of resources required by the size of the population, there are conditions for growth within the population. In this thesis, I find that the cyclical development of the economy is an important explanation for rapid-growth. There is a relation between geography and growth, where RGFs seems to be overrepresented in regional economies undergoing growth. There is also a relation between high demand in the market, indicating a greater "carrying capacity" in the environment, and later RGFs growth. While this thesis indicates that the environmental forces strongly influence the possibilities for growth, surprisingly few investigate environmental dynamics in

the research on rapid growth. Those who do, like Almus (2002) and Iudanov (2007), find that emergent niches provide an important explanation for the possibilities of rapid growth.

Evolutionary economics criticizes organizational ecology for eschewing simple premises for economic behavior. The results in this thesis demonstrate that RGFs perform better than the average firm of the total population. They have better productivity, win market shares, and have profitable operations. Furthermore, the more financially solid firms are more likely to continue their growth after a period of rapid growth. This is one of the indications that environmental dynamics is not the one and only explanation for growth. To take and/or hold a position in an emergent niche or a stable population, economic efficiency and solidity are important mechanisms for growth.

Different theories discuss the implications of age and size on growth, especially economic theory, organizational theory, organizational ecology, and strategy. Economic theory discusses whether small and young firms are creating employment and growth. Organizational theory and organizational ecology discuss to what extent the internal structures and culture promote or hinder a firm's capability to grow. The strategy literature discusses the managerial implications of directing firms. This is a comprehensive, complex, and long-lasting debate. This thesis provides evidence suggesting that there are opportunities for growth for firms of all ages and sizes. Young firms are related to later growth, indicating that they are less exposed to structural and cultural inertia. However, old firms are better at securing financial solidity, which seems to be important for later growth when the environment changes. Also, large firms focusing on better internal organizing, appear to have better development when the environment changes. Organizational theory argues that large organizations typically develop more formalized and bureaucratic structures. Such structures can both make the organization more efficient, but also more inert and difficult to change. The strategy literature argues that large organizations have slack resources that can be used to initiate improvements. The findings in this thesis are in opposition to the population ecology theory arguing that large firms with formalized structures will lose in the competition when the environment changes rapidly. Rather, it supports the view that large organizations with efficient structures can use the excess capacity provided by their predictable structures to improve and compete. So, even if the environmental dynamics are important factors for explaining possibilities for growth, the internal capabilities and resources within firms are important factors for explaining why some firms are actually growing or not.

In the first chapter of this thesis I also discussed luck as an explanation for growth. When analyzing the data, it was evident that the variables did not explain every aspect of

growth. In my survey, I asked the respondents to what extent luck, or being "in the right place at the right time," was an important explanation for their rapid growth (scale 1–5). One-third answered "to a low extent" (1–2), one-third answered "to a certain extent" (3), and one-third answered that this was an important explanation for their growth (4–5). As one of the respondents answered: It was a coincidence. A disease led them into a new product line. This resulted in an enormous expansion. Therefore, growth also has an element of luck, or coincidence. The problem of "luck" or coincidence is that it is difficult to measure. What one actor claims is luck can be related to internal skills or environmental conditions. What another actor claims is good skills can be a coincidence. The non-explained variance in my regressions shows that there are elements of randomness that are difficult to explain.

6.4.1 Implications

This thesis shows that rapid growth is related to the cyclical development of the whole economy (paper 1). There are possibilities for growth in all industries and regions and for firms of all ages and sizes, and the growth is mostly demand-driven. The population ecology theory seems to explain the macro conditions for growth fairly well. Changing demand or new technologies arises in the market and creates dynamics. However, despite the market dynamics, which every firm is subject to, there are only a few firms that experience such growth. Some firms are better able to respond to changes and position themselves accordingly. In paper 1, we report the boat analogy by Storey (1998) to explain that to make a boat go faster, you must either have a capable crew or be backed by a strong current (that is, the business cycle). RGFs are probably better at locating the boat correctly in the current.

Given that RGFs thrive in business environments in which niche markets exist and market-oriented behavior is rewarded, managers and founders should be especially concerned about the development of the market they operate within. Particularly changes in customer preference and new technology are important. However, based on previous research (Eckhardt and Shane, 2011; Feeser and Willard, 1990; Iudanov, 2007; Lindič *et al.*, 2012), I would argue that firms should not necessarily be pioneers but should be fast in responding to promising opportunities and developments. Using the metaphor from above, managers should identify the new or changing current early on and act accordingly.

To be able to identify the current—in other words, the market dynamics—firms need information from outside and capabilities inside to utilize the information. The aim of paper 2 is to identify external sources of information and which firm-based resources and capabilities are important to access these resources. In this case, we must turn to theories of social

networks, social capital, innovation, and knowledge sharing and development. There are studies of RGFs identifying how their networks are developed, the scope of their relations, and which relations are most important. However, studies of RGFs seldom combine the perspectives of external relations and internal capabilities and learning. The central concept crossing these perspectives is absorptive capacity, and I try to contribute to the development of the concept. I show that different internal capabilities are important when exchanging knowledge with different relations, as explained above. This paper can inform managers how different firm capabilities facilitate the use of external information. For example, if firms want to utilize close relations, such as customers and alliance partners, managers should be aware of the organizational challenges of such relations and structure the organization accordingly.

Although RGFs have "identified the current and positioned themselves in it," it can be difficult to hold the position. Some firms probably landed in the current by luck, they were in the right place at the right time. However, currents can be erratic, and if you are unlucky, you might be turned over or stuck on a sandbank or a rock. Another possibility is to develop the skills or capabilities of "the crew" to try to maneuver the boat. Paper 3 investigates which firms are able to maneuver the boat in an unpredictable current. To understand which internal resources and capabilities firms should develop to be able to maneuver in such a way, the broader Penrosian perspective seems useful. My research shows that this perspective remains relevant even in an erratic current. The primary lesson for managers is that if they want their firm to stay correctly in the current, it is not enough to watch its movements. To be able to respond, managers have to develop internal capabilities, skills, and resources in the firm while it "flows." Moreover, different capabilities are important for different positions—for example, if the firm wants to explore international or innovative opportunities. Further, it seems like diverse experience within the management group is an especially important underlying resource for a firm to continue its growth. Therefore, companies should strive to compose a group of managers that whose skills and experiences complement each other's. It is probably not a good idea to only hire managers with similar education and experience.

6.5 Limitations and suggestions for future research

In the following, I want to point to some limitations not discussed in previous chapters, especially Chapter 5. Paper 1 is explorative, with few statistical analyses oriented towards testing correlations and causality. With a broad set of register data over time, there are several possibilities for conducting analysis with a longitudinal design. One suggestion for future research is to identify which, and causes for why, RGFs die or become acquired after their

period of rapid growth. More longitudinal studies into which, and causes for why, RGFs continue to grow or stagnate would also be welcome, contributing to expanding the knowledge from paper 3. Furthermore, I identify a lack of studies investigating the relationship between economic performance and growth and survival within a population.

In paper 1, we discuss whether RGFs are more innovative than other firms. There is little support for such a statement in the previous research. Our results indicate that there are problems when measuring innovative activities with official register data. Measures of innovative capabilities in paper 2 and 3 are used to nuance the understanding of innovative activities. Future research should strive to elaborate on measuring innovation to get a better understanding of what innovation comprises, if innovative activities contribute to growth, and how to develop innovative capabilities within a firm.

Our results in paper 1 indicate that rapid growth is related to locations that seem to be the "preferred location" of particular industries, which opens up for further investigation into whether there are "optimal" locations for firms. In general, we still know little about how industrial and geographical structures influence rapid growth and the importance of firms' local environment. In papers 2 and 3, I have a relatively small sample, including only RGFs. A larger data set would open up for more detailed analyses of industrial and locational distribution related to RGFs' external relations and sources of information.

As explained earlier, there are several theories not used and factors related to rapid growth not investigated empirically yet, for example the influence of regulations and politics (institutional dynamics), power and conflicts in RGFs, and more. In general, analyses of larger datasets with a broader set of variables, including datasets across countries, are recommended for future studies. In addition, more in-depth case studies are also needed to understand the mechanisms of growth and decline.

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Article 1

Rapid-growth firms: Exploring the role and location of entrepreneurial ventures

8. Rapid-growth firms: exploring the role and location of entrepreneurial ventures

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8.1 INTRODUCTION

In the struggle for long-run economic performance, governments try to find incentives and make priorities to enhance effectiveness, innovation and job creation (OECD, 2002; 2006a). Entrepreneurs, especially high-growth firms, are recognized as central actors in fostering employment opportunities, growth and innovation (Birch, 1987; Europe-Innova, 2006; OECD, 2002). Despite their importance in the economy, we have little systematic knowledge about them (Hvide, 2005).

Organizational growth is not well understood, partly because of the heterogeneity of growth patterns at the firm level. Different theoretical contributions discuss whether organizational patterns of growth depend on the size of the firm, its age or industry; on the type of governance and its relationship to other economic agents; on its market potential in niche markets and locations; or on the ambitions of the entrepreneurs. We know that the study of growth is dependent on the measure used to identify firm growth, and that high-speed growth is not a sustainable position for most firms but an episode that usually happens once or twice in the lifespan of a firm.

A special interest is ascribed to the study of rapid-growth firms. These firms have gained special attention because they must have done something better or different than others. Rapid growth is seen as an indicator of the firm's overall success (Fischer and Reuber, 2003). Normally these firms are young, rapidly expanding small and medium-sized enterprises (SMEs) and central drivers in generating new jobs and wealth. They are seen as an important instrument for restructuring local and national economies and are found in most industrial sectors and regions. They serve a variety of markets, are based on a diverse set of capabilities and are involved in innovative activities of different kinds. They are popular

and ranked in business news journals as the new, dynamic and up-coming businesses and are hoped to be the outcome of science parks or venture capital funding. They generate income and jobs much faster than competing firms in the same sector and are looked upon as the 'dream firms' of public policy. Still, we know surprisingly little about these firms and their sectoral distribution, profitability, location, etc.

The primary focus of this chapter is explorative and empirical: to identify the industrial and regional distribution of rapid-growth firms in the Norwegian economy and to compare their economic performance with the rest of the firm population. The intention is to give the reader an introduction to the literature on rapid-growth firms and a descriptive overview of the empirical appearance of this phenomenon in a mature economy. An explorative approach will generate interesting observations but not conclusive results. More detailed investigations are needed and will be published elsewhere. To our knowledge, there are very few empirical studies analysing the relationship between the general economic growth in a country, its distribution in industries and regions and how this is related to new firm formation and rapid-growth firms. Several studies try to explain why some firms grow more than others, most often with a managerial perspective and focus on the firms' superior qualities, as partly explained in the next section.

Section 8.2 reviews the sparse literature on rapid-growth firms. Included is a discussion of the conceptualization of rapid-growth firms and a report of previous empirical findings. Section 8.3 describes the research methodology used and the format of the secondary data. Section 8.4 reports the results of a descriptive analysis of the sectoral and regional distribution of these firms and their performance compared with the total population of firms. In the final section (8.5), these findings are discussed in the context of debates on agglomeration economies and the spatiality of economic growth and knowledge production.

8.2 LITERATURE REVIEW

8.2.1 Defining Rapid-Growth Firms

One problem with the research on rapid-growth firms is the diversity of findings and the difficulties in comparing results. This makes it difficult for governments to make decisions and work out policies for the economy. The lack of coherence in previous research is also a problem for researchers working with this phenomenon. One reason for this is that there is still no commonly accepted definition of 'high growth' (March and Sutton,

1997). From a practitioner perspective, the gap between theory and practice is even more difficult and calls for practical tools to be used in decisionmaking (Sims and O'Regan, 2006).

The concept 'growth' is used and measured differently by different scholars. Growth is a multidimensional phenomenon (Delmar et al., 2003), and the term 'growth' is used both for 'increase in amount' and for the process that leads to development (Penrose, 1959). Delmar (1997) states that there is lack of agreement on how growth should be measured and calculated, and Davidsson and Wiklund (2000) point at the difficulties of defining the unit of analysis when measuring growth.

We will show three different ways that growth has been measured: growth in employment, growth in sales or turnover, and a combination of these. Other measures are also in use, such as growth in performance satisfaction and perceived market share, but these are more subjective measures (Delmar, 1997) and are therefore not as appropriate for our purpose.

8.2.1.1 Growth in employment

Employment growth has been used in some research as the unit of analysis. Depending on how it is measured, it can have a bias toward large or small firms. If one uses a proportional (percentage) rate of change in employment as a measure of growth, it leads to a bias toward small firms. Small firms will have a higher percentage in growth than a large firm when they add one more employee. An absolute growth, as change in the number of employees, leads to bias toward large firms. Therefore some argue for a combination of these measures by controlling for employment size at the beginning and end of the sample period (OECD, 2002).

Some studies focus only on employment growth from when the firms are established. The rationale behind this is to identify the start-up firms that actually create new jobs (Birch, 1979; 1987). Birch argued that new establishments, which started with 20 to 499 employees or belong to an existing parent company of this size, are the firms that create the most new jobs. Some studies defined high growth as adding 20 or more employees over a 5-year period from initial start-up (Malizia and Winders, 1999; Stam, 2005). Skuras et al. (2005) measured business growth both in terms of actual work units and in terms of percentage of growth in employees over a 5-year period. For an excellent overview of research with different measures of employment growth, see also Henrekson and Johansson (2009).

One problem seldom recognized in these studies is the use of contingent labor (Cardon, 2003). The use of part-time workers, self-employed workers, contracted workers and other types of labor flexibility is more difficult to find in the statistics used in research. Nevertheless, there are no

indicators of a higher tendency to use labor flexibility in high-growth firms than in other firms (Smallbone et al., 1995).

8.2.1.2 Growth in sales

The second measure of growth is growth in sales. This is a growth measure widely used in the business newspapers and economic magazines reporting on rapid-growth firms, such as the different 'gazelle' lists, the 'Inc. 100/500' lists and others. Often researchers use these lists and their criteria as a starting point, maybe with some additional conditions. For instance, Hambrick and Crozier (1985) use the 'Inc. 100' list, which investigates firms over a 5-year period. In the early 1980s, this list defined rapid-growth firms as those that were independent and publicly held in year 5 in the defined period. The firms had to present a sales history of at least 5 years, the sales could not exceed $25 million the first year of the period defined, there could be no sales decline and the 5-year sales growth had to be among the highest 200 firms. Hambrick and Crozier (1985) added some extra conditions firms had to fulfill: they had to have a minimum of 20 percent sales growth every year in the period investigated, no more than 30 percent of the growth in the total period could be due to acquisition and no more than 10 percent of the firms' growth could be due to unrelated acquisition in the period.

Most of the empirical work has focused on growth within a period of 3 to 5 years. Some define high growth as double its initial size in this period (Littunen and Tohmo, 2003); others focus on firms that have achieved a sales growth of at least 25 percent (Storey, 2001) or 20 percent (Tatum, 2007) in each of the years. Storey (2001) also suggested that the definition of a high-growth firm could be dependent on the initial size – 25 percent growth in each of a series of 4 years for smaller companies and 15 percent for larger companies.

Smallbone et al. (1995) considered firms that have grown strongly over a 10-year period. To be defined as a high-growth firm, sales turnover had to double during the period, had to reach a minimum of £0.5 million at the end of the period and had to have consistent profitability. The firms they selected had to be in one of eight specified manufacturing sectors (that is, printing, instruments, pharmaceuticals, electronics, furniture, industrial plant, toys and clothing). Sims and O'Regan (2006) drew their samples from two sectors: electronics and engineering. Most of the previous research measured growth without considering the industries to which the firms belonged. Moreno and Casillas (2007) defined high growth in relation to the industry in which the firm operates. In a 4-year period, a high-growth firm is a firm that has more than 100 percent higher growth than the median of its sector.

8.2.1.3 Multiple measures of growth

In a study by Wiklund and Shepherd (2003), growth in sales and employment were combined to define growth firms. Growth was calculated as the relative change in size from the start to the end of the period investigated (3 years). Delmar (1997) claimed that multiple indicators should be favored if the purpose of the research is to predict and explain organizational growth. Multiple measures of growth 'would likely provide a more complete picture of any theoretical relationships as well as provide a way to test the robustness of any theoretical model' (Delmar et al., 2003, p. 195). In their research, Delmar et al. used six categories of growth in sales and employment to define the top 10 percent growth firms. Based on their analysis, they identified seven types of firm-growth patterns.

Gallagher and Miller (1991) combined both employment growth and turnover in measuring firms' performance. They defined 'flyers', or rapid-growth firms, as firms that had reached a turnover of at least £3.5 million or employed at least 50 people from initial start around 1980 up to 1987. 'Sinkers' only reached a turnover of £0.25 million or less and also employed ten or fewer employees in the same period. Acs et al. (2008) argued that gazelles are traditionally defined as enterprises that at least doubled their sales in a 4-year period, but to measure 'high-impact firms', one should also include employment growth, defined as firms having an employment growth quantifier of two or greater over the same period. In trying to make a tool for identifying gazelles, Sims and O'Regan (2006, p. 946) used as many as four measures to calculate a firm's 'growth footprint': increase in number of employees; increasing sales; increasing profits; and increasing margins over a period of 3 years.

These few examples clearly show that what is defined as a rapid-growth firm is dependent on the growth measure used, which again will have an impact on the outcome of the studies.

8.2.2 Characteristics of Rapid-Growth Firms

The research on rapid-growth firms seems to analyse the empirical material in three general categories: the first is about the characteristics of rapid-growth firms, the second about the causes of why some firms grow more rapidly than others and the third is about the effects of growth. In the literature on the effects of growth, some consider the internal organizational challenges to growth while others consider the effects on the economy as a whole. Several analyses discuss more than one of these levels of analysis simultaneously. In particular, research on the management of rapid-growth firms often treats the results as *characteristics* of managing these firms and the way they are managed as the *cause* of growth. Just a

few studies are interested in the spatial or structural dimension of rapid growth.

In the following, we will describe some of the empirical findings on the characteristics of rapid-growth firms. We will only select a few works to give a brief overview of some issues concerning growth. The brief review will reveal a great difference in results and interpretations, largely the result of different ways of defining and measuring growth.

8.2.2.1 Characteristics of age, industry, markets and location

Most researchers argue that rapid-growth firms are first and foremost SMEs, they exist in all industries and they tend to be younger on average (Henrekson and Johansson, 2009). Sims and O'Regan (2006) found that these firms are likely to be less than 15 years old and have a chief executive officer (CEO) who is less than 50 years old. Acs et al. (2008) found the average firm age to be around 25 years and characterized them as relatively old. The discrepancy in characteristics of rapid-growth firms is a result of the different ways these firms are defined and measured.

Malizia and Winders (1999) claimed that these firms are primarily established in low-tech and traditional industries with low entry barriers and are not necessarily very innovative. Even though rapid-growth firms are not necessarily very innovative, Smallbone et al. (1995) found that product innovation varies between industrial sectors. They also found that these firms are more likely to make changes in their production processes and are more likely to introduce new technology. This is in contradiction with others claiming that innovating firms grow faster and are more profitable than less innovative counterparts (Geroski et al., 1993). As for growth, innovation is also a fuzzy concept (Fagerberg, 2005) and lacks both a single definition and measure (Adams et al., 2006). The results of these studies then depend on how these concepts are defined and measured, and are therefore often difficult to compare.

Even though some findings indicate that rapid-growth firms mainly exploit and serve local markets (Malizia and Winders, 1999), research has shown that firms in remote rural areas more often export their products to outside their local area (Skuras et al., 2005) and that their geographical market extension could be a reflection of their limited local market opportunities (Smallbone et al., 1995). In general, rapid-growth firms are found to be more export-oriented than other firms (Smallbone et al., 1995). There are also a few findings indicating that rapid-growth firms are more market-oriented and have a deeper level of customer knowledge (Barringer et al., 2005; Smallbone et al., 1995). Eisenhardt and Schoonhoven (1990) argued that differences in markets affect the growth, where, for example,

growth markets provide the best opportunities for new firms, but emergent and mature markets are difficult environments for new firms.

Birch (1979) had a special focus on job-generation processes. His finding indicated that the overall characteristics of gazelles do not vary across industries and regions in the US. His investigations were followed up by Acs and Mueller in a recent study (2008). They compared different regions and identified some regions that have a predominance of rapidly growing companies. These 'gazelle regions' were located in or near the largest cities in the US, especially in the areas near Los Angeles, Chicago and New York. In their view, there are several reasons for this. Major universities and research facilities are located there, and these regions offer access to a wide variety of competences and services. Referring to Florida (2002), this also implies a concentration of people in the creative classes with creative capital (that is, talent, technology and tolerance). The larger cities exhibit a highly competitive environment, which forces firms to grow to survive competition. Research by Gallagher and Miller (1991) found a similar concentration of gazelles in the central urbanized areas of the UK.

The picture is not clear-cut though. Lyons (1995) found that overall there is little regional or hierarchical logic to the spatial distribution of gazelles in the US. He argued that the domination of rapid-growth firms in the metropolitan regions decreased during the 1980s and 1990s. At the same time, he showed that the new fast-growing high-technology firms are concentrated in San Francisco and Los Angeles while higher-order service firms, like communications, banking, business services and advertising, are dispersing down the urban hierarchy. Stam (2005) did not find any general spatial patterns of gazelles in the Netherlands either, only a slightly underrepresentation of gazelles in remote rural areas. He did find some spatial patterns of sectors. Firms within the high-tech manufacturing sector are concentrated in rural areas while firms within the knowledge-intensive business services (KIBS) sector are concentrated in highly urbanized areas. The KIBS sector includes sub-sector finance, insurance, information technology, research and development (R&D) and other higher-order services. Based on a survey of rapid-growth firms in four mountainous (that is, peripheral) areas in southern Europe, Skuras et al. (2005, p. 349) claimed that local clusters should not be defined in terms of industries and sectors 'but in terms of common strategic entrepreneurial actions which can mix industries under common opportunities (entrepreneurship) and advantages (strategies)'.

8.2.2.2 Managers and relations

In the strategic and management literature, researchers are concerned about the strategic planning and management practices of leaders. Often

the general characteristics of leaders are considered the main reason some firms grow rapidly. Shuman et al. (1985) found that these firms have a short-term planning horizon that is operationally oriented, that their planning process is informal, and that the firms' CEOs have active and strong involvement in strategic planning. According to Nicholls-Nixon (2005), managers in rapid-growth firms are able to build structures that enable self-organizing behavior to emerge in the organization. Because such firms are in a period of rapid change, formal structures and systems are not always capable of responding to these changes. The ability to self-organize is helping people more effectively to act on changes. This is in line with later research claiming that self-organization and agility are the key drivers of success (Sims and O'Regan, 2006).

A lack of formal and rational planning is also reported in regard to marketing-related behavior in rapid-growth firms (Hultman and Hills, 2001). 'Growth entrepreneurs' have a close relation to the market through personal interaction with people and use such information more actively than formal market research when they focus on improving customer value. It does not mean that these firms are not market oriented. They are reported to be very active in developing their products and markets, both in exploring new markets for their existing products and in developing new products or services for existing customers (Smallbone et al., 1995). The last point contrasts somewhat with a British study that emphasized that high-growth firms tend to avoid developing new products and services (Parker et al., 2005).

The importance of close relationships with other actors is also highlighted in other areas than the market. In a study of pharmaceutical or pharmaceutical-related companies, Beekman and Robinson (2004) found that when these firms grow, they often expand their relationship with critical suppliers because such long-term relationships with a few suppliers are more beneficial and more effective than with several suppliers. The relational advantage seems to outperform the use of the market potential.

8.2.2.3 Resources and networks

According to the resource-based view of the firm (Barney, 1991; Penrose, 1959), a firm is a set of resources, and the availability of idle resources can explain why firms grow (Penrose, 1959). There seems to be disagreement about the role of financial resources and growth performance. Some claim that access to financial resources does not influence firm growth (Moreno and Casillas, 2007) while others claim that firms with access to more financial capital actually grow more (Wiklund and Shepherd, 2003). Rapid-growth firms can expect to have problems in financing their growth (Phelps et al., 2007), and self-financing and loans are the most common

way of obtaining finance (Moore, 1994). High-growth firms seems to have lower levels of solvency and liquidity than non-high-growth firms (Moreno and Casillas, 2007).

Non-financial resources are often labeled as 'slack resources'. Slack resources allow firms to react to pressure for change as well as possibilities to initiate change. Slack resources can be tangible (that is, physical resources) or intangible resources, such as human and managerial resources (Penrose, 1959). Firms try to put these slack resources to use, so these resources can be seen as an incentive for growth. Empirical research shows that idle assets are an explanatory factor of a firm's high growth (Moreno and Casillas, 2007).

Different theoretical 'schools' focus on the importance of firms' networks in generating and getting access to critical resources, like the strategy field (Dyer and Singh, 1998; Gulati et al., 2000), economic geography (Bathelt and Glucker, 2003; Maskell et al., 1998), organizational learning and innovation (Edquist, 2005; Lundvall and Johnson, 1994; Powell et al., 1996) and entrepreneurship (Birley, 1985; Greve and Salaff, 2003; Jarillo, 1989). Such resources could be access to new knowledge (Zahra et al., 2006), information or control over the flow of information (Burt, 1992), financial capital (Fischer and Reuber, 2003; Hambrick and Crozier, 1985; Uzzi, 1999) or access to labor (Barringer and Jones, 2004), among others. Cunneen and Meredith (2007) revealed that rapid-growth firms pursue a wider range of network relationships and network more frequently than others. Similar findings were found by Zhao and Aram (1995) in China. If firms are connected to the right networks, they are probably in a better position to grow faster (Moreno and Casillas, 2007). Jarillo (1989) found that the fastest-growing firms clearly made more use of external resources, such as venture capital, than the average and further claimed that networking is a critical entrepreneurial skill. Another critical resource for firms that grow is access to labor. Managers with broad social networks can use their networks to find new qualified personnel and to partner with other firms. At the same time, they can lessen the need for hiring many employees (Barringer and Jones, 2004). Rapid-growth firms are reported to be more involved in inter-organizational relationships and alliances than others (Barringer et al., 2005).

The empirical work investigated here reveals large differences in how growth is measured, which conclusions are drawn from the analysis of rapid-growth firms and the difficulty in comparing the results. The very few aspects researchers agree upon is that few firms can actually be defined as rapid-growth firms, but that rapid-growth firms are to be found in most industries and regions. There also seems to be an understanding that these firms need resources from outside and probably have more developed

networks giving them access to these resources. The firms are reported to be more dynamic and more market-oriented, but it is difficult to conclude if this is a general characteristic of rapid-growth firms, if this is a reason why they grow fast or if it is a consequence of their growth.

8.3 METHODOLOGY

This study of rapid-growth firms is based on data from the official Register of Business Enterprises/Register of Company Accounts of Norway.[1] Included in the database are accounting data for the years 2000–2006 for all limited companies and public limited companies, savings banks, mutual insurance companies and petroleum enterprises. According to the Act on Company Accounts, these companies are obliged to submit their annual accounts, including the auditor's report. This statutory basis secures full response from the total population of companies and data of relatively good quality. Jointly the Register of Business Enterprise and the Register of Company Accounts includes data on firms' economic and financial performance and information on organizational form, owners, addresses, industry, etc.

Our research analyses the segment of private limited companies or AS *(Aksjeselskap)* (few shareholders/Ltd/Corp.) and public limited companies or ASA *(Allmennaksjeselskap)* (many shareholders/PLC/Inc.). Overall 97 percent of the companies of the total population are AS. Because of the problem of many 'empty' investment companies and specific regulations and organizational arrangements in the financial sector, companies in NACE code 65 'Financial intermediation' and 67 'Activities auxiliary to financial intermediation' are not included. The same counts for 75 'Public administration, defense, compulsory social security' and 85 'Health and social work', as these industries are dominated by the public sector in Norway and are subject to profound regulations on firm behavior.

Altogether this segment consisted of 125 555 firms in 2006. However, many of them are basically investment or holding companies with few or no employees. These companies own other active companies, real estate investments or a portfolio of investments in financial instruments. Our interest is to study active, producing companies that include employees. We therefore excluded all companies from the database with zero expenses to salary and social costs and ended up with a total population of 94 473 companies. From this total population, we identified all companies that correspond with the criteria we set to define a rapid-growth firm. The firm had to be active over a period of 4 years – in our case from 2003 to 2006.

In the initial year, the firm must have a turnover of at least NOK 1 million (around €120 000) and a growth in sales income of at least 100 percent over this 4-year period. It also needs to show a positive operating profit over these years and no negative growth of income year by year in the period.

As seen from the literature review, there is no authorized definition of a rapid-growth firm. Our definition follows a conventional approach, uses growth in revenue and profitability as criteria and turns out a small firm bias as we use proportional growth as identification. Many studies on rapid-growth firms have favored growth in employment as an indicator of growth basically because the main purpose of the study is to analyse job creation but also because employment data are easiest to obtain. In our database, income data are more accurate and reliable than the data on employment. We also have data on the total cost of salary/wage and social benefits. The Act on Company Accounts does not require companies to report their number of employees. As a consequence, these numbers are incomplete in the database used. It could also be argued that the number of employees is not an accurate measure because it could be difficult to distinguish between part-time employees and full-time employees, and comparisons between different companies might turn out to be inaccurate.

In all, 3650 companies were identified as complying with these criteria. This does not include companies in ISIC 65, 67, 75 and 85 as explained above. Some hold extreme values on sales income or salary,[2] and others were identified as passive holding or investment companies. For these reasons, 55 companies were removed, and we ended up with 3595 rapid-growth firms. In the forthcoming comparative analysis, we will use 3595 companies representing all rapid-growth firms compared with a total population of 94 473 companies. Only 3.8 percent of the total population of firms is thereby listed as rapid-growth firms.

The unit of analysis is the firm. It could be independent or a member of a company group. Our focus is on the legal company; thus each legal company in a company group is treated as a separate entity in the dataset. One specific problem in this relation is the restructuring of companies and the creation of 'new' companies identified with a unique identification number and establishment year. In the register, such companies occur as 'new', but as this is a result of change in ownership, a merger of companies or the reorganization of an existing company, a 'going concern' may appear as a start-up. This is particularly relevant for larger companies owned by institutional owners. In this study, we did not control for these circumstances.

In line with this reasoning, we will also expect to see rapid growth caused by the acquisition of companies and the merger of two companies into one. In this case, growth is not organic and could be just the sum of

two existing companies. Still, acquisition is a common strategy to expand production and capture market shares. The dynamic result is often a 'real' growth process that produces rapid expansion of the joint production of the merged partners.

8.4 RESULTS

8.4.1 Size and Age of Rapid-Growth Firms

Similar to previous research, we could suspect that rapid growth is related to a period after start-up, the period when an entrepreneurial venture has survived the first couple of troubled years of entering a market, formed an organization and safeguarded the financial foundation of the firm. If the company survives this period and is accepted in the market, it is time to win market share and to focus on scale economies and the advantages these economies return to an expanding company. In other words, we should expect that many rapidly growing companies are young and still in their entrepreneurial phase. We also have to acknowledge that the measure we use – relative growth – will favor smaller firms as it is much easier to expand from 1 to 2 million over a period of 4 years than it is from 100 to 200 million.

Rapid growth could also correlate with other events in a company's life. It could be triggered by a takeover of a larger company using the company as a strategic bridgehead to enter international or regional markets.[3] It could be related to other radical changes of ownership or management or to a specific rapid expansion in cyclical markets, such as construction or investment in the offshore oil sector in a Norwegian setting. For all these reasons, there should not be an obvious correspondence between the young age of the company and rapid growth. In the latter cases, we should suspect we will see an expansion of a solid and well-established company with good relations to the market and specific capabilities to serve this market.

None of the rapid-growth firms identified were established later than 2003 by definition as this is the start of the time series we use to identify rapid-growth firms. The average age of rapid-growth firms in this study was 10.6 years compared to 12.1 years for the whole population of companies. Overall, 40 percent of firms were first registered in the period 2000–2003 (4–7 years in 2006), 24 percent in the period 1996–1999 (8–11 years), 12 percent in the years 1992–1995 (12–15 years) and the last 24 percent from 1991 and earlier (16 years or older). This indicates that rapid-growth firms first and foremost are young and related to the early period

Table 8.1 Firm size measured with sales revenues; rapid-growth firms compared with all firms in number of firms and percent of the total, 2006

Revenue from sales – NOK	Rapid-growth firms		All firms	
	No. of firms	%	No. of firms	%
< 5 million	454	12.6	53 790	56.9
> 5 million < 10 million	797	22.2	14 524	15.4
> 10 million < 20 million	836	23.3	10 684	11.3
> 20 million < 50 million	776	21.6	8 920	9.4
> 50 million < 100 million	358	10.0	3 295	3.5
> 100 million	374	10.4	3 260	3.5
Total	3 595	100.0	94 473	100.0

of the lifecycle of the firm, but still many firms are older than 15 years. Not surprisingly, the oldest companies report the highest value on income from sales with a median value of NOK 25 million for the oldest group compared with NOK 12 million for the youngest. Here, the variance inside each group is large.

Table 8.1 illustrates the size distribution of firms. Of the total population, 57 percent of the firms are very small compared with only 13 percent of the rapid-growth firms. However 10 percent of the rapidly growing firms are large in the Norwegian context compared with only 3.5 percent of the total population. Rapid-growth firms have a mean value on sales revenues 2.1 times that of firms in the total population. Even with the biased selection criteria we use, these numbers indicate that rapid-growth firms are not only small, newly established firms but also well-established medium-sized firms with a solid position in the market. In our dataset, rapid-growth firms are accordingly younger and larger than the average company. This finding is in line with other studies on characteristics of rapid-growth firms (for example, Henrekson and Johansson, 2009).

8.4.2 Industrial Sectors Attracting Rapid-Growth Firms

In a Schumpeterian perspective, one should expect that rapid-growth firms are specifically well represented in industries that expand rapidly. Many of these 'new' or 'sunrise' industries are driven by innovative products and high efficiency in production combined with high demand elasticity. In mature economies, knowledge-intensive activities are sectors that expand rapidly. The same could be said about most parts of the service industries. Alternatively, we could expect to see falling production and

fewer growth firms in mature industries or labor-intensive production exposed to international competition and falling prices. In industries with high entry costs and profound scale economies, we should also expect to see few growth firms.

Over a number of years, the Organisation for Economic Co-operation and Development (OECD) has developed different classifications of knowledge-intensive activities. Manufacturing industries have been classified as low-tech, medium-low-tech, medium-high-tech and high-tech sectors based on R&D intensity (OECD, 2007) or knowledge-intensive business services (KIBS) (OECD, 2006b). These knowledge-intensive industries are highlighted in Table 8.2. One could suspect that these knowledge-intensive sectors would grow faster than activities in the low-tech sector of mature economies like Norway.

The OECD average does not always correspond with the industrial structure of a specific member country, particularly not the Norwegian. In Norway the average R&D and innovation costs were 1.7 percent of sales revenues in 2004 for all sectors (Salte, 2007). Industries with more than 3 percent of sales revenues used in innovative activities can be seen as innovation-intensive in the Norwegian context. These industries are shown in italics in Table 8.2. Another measure for identifying sectors specifically attractive for rapid growth could be the increase in value added over a period of time. Here we use national accounting data and the growth in value added in the period from 1980 to 2006. Some sectors grow faster than others and could be a good environment for companies to grow. These industries are shown in bold in Table 8.2.

A simple inspection of Table 8.2 reveals two important issues.[4] The first is an absence of growth firms in several sectors. Most of them are small industries with very few private companies in total (ISIC 10, 16, 19, 23, 30 and 95). The same goes for ISIC 13, 41 and 62, but here one or two rapid-growth firms make up a large share of a small total. Many of these industries are dominated by scale economies and a high entry threshold.

Industries with a relatively large share of rapid-growth firms are: '05 Fishing/fish farming'; '28 Fabricated metal products'; '31 Electrical machinery and apparatus'; '32 Radio/television/communication equipment'; '34 Motor vehicles, trailers and semi-trailers'; '35 Transport equipment, ships, etc.'; '37 Recycling'; '51 Wholesale trade and commission trade'; '60 Land transport; pipelines'; '71 Renting of machinery'; and '72 Computer and related activities'. As can be seen from Table 8.2, most of these industries are growth industries (shown in bold type) in the Norwegian context and/or characterized as knowledge-intensive activities (shown in italic type). Many are also directly or indirectly related to the booming offshore oil and gas industry. This could indicate a certain

Table 8.2 Percent growth firms of all firms in the same two-digit NACE industrial sector, 2006

Industry	%	Industry	%
01 Agriculture	4.7	*28 Fabricated metal products*	8.8
02 Forestry	2.8	*29 Machinery and equipment*	6.6
05 Fishing, *fish farming*	10.4	***30 Office machinery and computers***	0.0
10 Mining of coal/lignite; extraction of peat	0.0	*31 Electrical machinery and apparatus*	8.7
11 Extraction of crude petroleum/natural gas	6.2	***32 Radio/television/ communication equipment***	7.2
13 Mining of metal ores	25.0	***33 Medical, precision/optical instr, watch***	3.9
14 Other mining and quarrying	8.3	*34 Motor vehicles, trailers and semi-trailers*	10.2
15 Food products and beverages	4.0	35 Transport equipment, ships, etc.	7.6
16 Tobacco	0.0	*36 Furniture*	2.3
17 Manufacture of textiles	3.7	**37 Recycling**	11.0
18 Manufacture of wearing apparel; dressing	2.9	40 Electricity, gas, steam/ hot water supply	2.0
19 Leather; luggage, handbags, saddlery	0.0	41 Collect, purific. and distribut. of water	11.8
20 Products of wood	4.9	45 Construction	6.3
21 Pulp, paper and paper products	1.3	50 Sale, repair of motor vehicles, automotive fuel	3.3
22 Publishing, printing, recorded media	1.8	51 Wholesale trade and commission trade	5.7
23 Coke, refined petro products, nuclear fuel	0.0	**52 Retail trade, repair of personal goods**	1.7
24 Chemicals and chemical products	2.9	55 Hotels and restaurants	1.4
25 Rubber and plastic products	5.9	**60** Land transport; **pipelines**	6.6
26 Non-metallic mineral products	5.3	61 Water transport	4.3
27 Basic metals	9.2	62 Air transport	2.6

Table 8.2 (continued)

Industry	%	Industry	%
63 Supporting transp. activities; travel agen.	5.4	80 Education	4.0
64 Post and telecommunications	4.6	**90 Sewage and refuse disposal**	4.7
70 Real estate activities	0.4	**91 Activities of membership organizations**	0.0
71 Renting of machinery	6.3	**92 Recreational, cultural, sporting activities**	2.5
72 Computer and related activities	6.2	93 Other service activities	1.6
73 Research and development	1.8	95 Private households with employed persons	0.0
74 Other business activities	3.4	National average	3.8

Notes:
1. Industries highlighted with a gray tint represent industries classified by the OECD as medium-high-tech/high-tech manufacturing or knowledge-intensive business services (KIBS).
2. Industries in *italics* represent sectors in the Norwegian context with 'above-average' costs for R&D/innovation activities.
3. Industries in **bold** font are industries in which the growth in 'value-added' is higher than country average in Norway.

Source: NACE rev.1.1 and authors' own data.

relationship between the relative share of growth firms in a specific industry and the overall growth and innovative activity in Norway.

The second issue is that many growth firms are to be found in sectors that do not show high growth or high knowledge intensity. The largest group of rapid-growth firms is found in industries like '45 Construction', '51 Wholesale trade and commission trade' or '74 Other business activities'. Overall, 30 percent of rapid-growth firms belong to industries classified by the OECD as medium-high-tech/high-tech compared to 41 percent for the total population. Additionally 42 percent of rapid-growth firms are active in industries that grow over-proportionally compared to 52 percent of the total population. Acs et al. (2008) also found that growth firms exist in all industries and are not limited to high-technology industries. Some industries have a higher percentage of what they call high-impact firms, like oil and gas extraction, construction, chemical products, fabricated metals, electronic equipment and instruments. They argued that at an aggregate level, manufacturing is generally performing

well. In a recent review, Henrekson and Johansson (2009) also presented many of the same conclusions but suggested that rapid-growth firms appear to be overrepresented in service. As shown in Table 8.2, service industries are the most important arena for rapid-growth firms in this study, but the importance of manufacturing as a growth arena should not be underestimated.

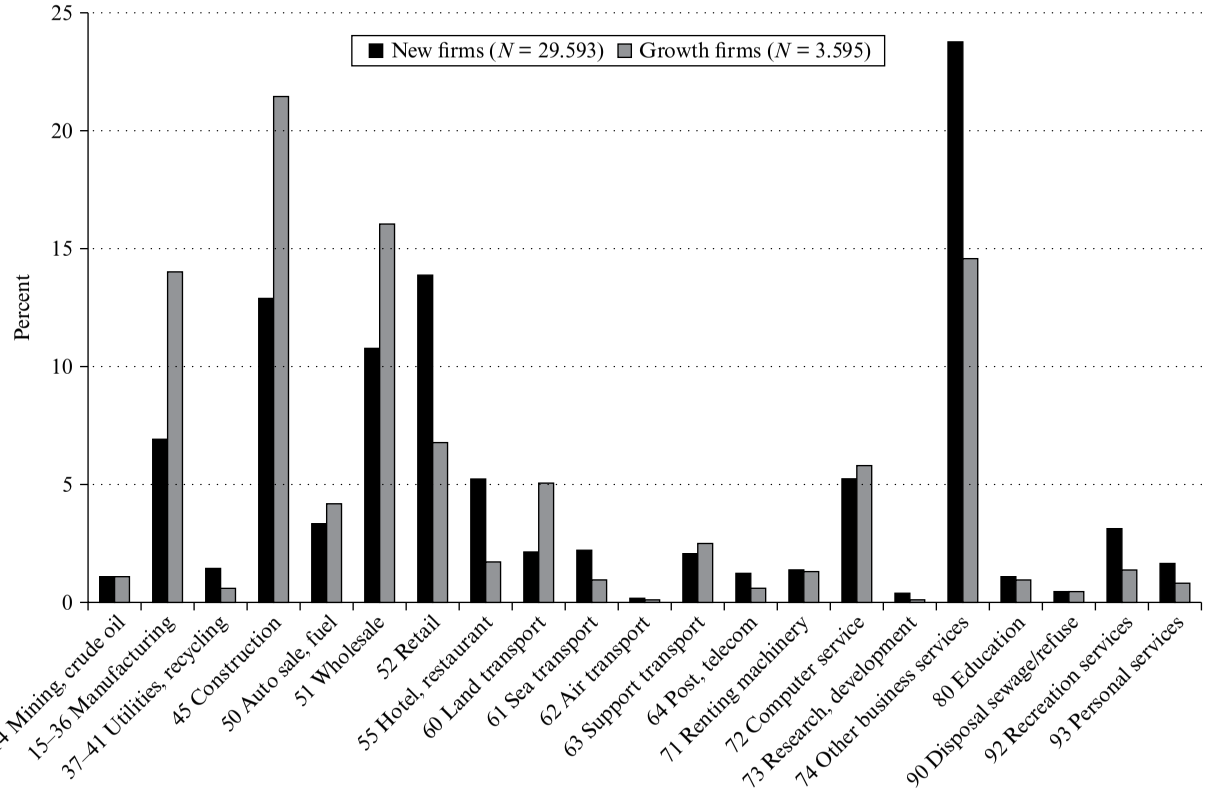
Before we conclude anything from this, we should remind ourselves that the total firm structure is dominated by very small firms compared to few – but larger – rapid-growth firms. Altogether, it is false to say that rapidly-growing firms are particularly well represented in innovative or knowledge- intensive industries, even though such a tendency seems to be present. In general, rapid-growth firms could be found in most sectors of the economy.

New firm formation is another indicator of industrial growth and dynamics. Growing sectors will attract entrepreneurial activity and new establishments. On the other hand, new firm formation could also be associated with the absence of scale economies and thereby low barriers of entry in a specific industry. Regardless, one could suspect that there is a correlation between industrial sectors with many newly established firms and firms with high growth. The broad picture in Figure 8.1 confirms this relationship.[5] The appearance of growth firms or new firm formation obviously has something to do with the size of the production volume/ total number of firms in each industry.

Figure 8.1 illustrates the industrial distribution of rapid-growth firms based on their growth history for the period 2003–2006 and the relative distribution of newly established firms for the same period. In the statistics of new establishments, the primary sector is not included. For growth firms, we have already explained why several sectors are not included. A large share (33 percent) of new firms is also in the real estate sector. As most of these firms are 'empty' investment companies, 'Real estate activities' is also excluded.

Based on this universe, rapid-growth firms – compared with new firms – seem to thrive particularly well in manufacturing, as also shown by Acs et al. (2008), especially for 'Fabricated metal products' and 'Machinery and equipment' and, foremost in the service sectors, 'Construction', 'Wholesale and commission sales' and 'Land transport'. New firm formation has the highest concentration in 'Retail' and 'Other business services'. 'Recreation, cultural and sporting activities' also seems to be relatively more important as a business arena for new firms than growth firms.

National accounting data for the 2003–2006 period shows that output in constant prices expands most rapidly in 'Recycling' (106 percent) followed by 'Transport equipment' (84 percent), 'Oil platforms, ships and boats' (57



Source: Statistics Norway: Statbank – table 0306 and author data.

Figure 8.1 *Distribution of new firms and growth firms by two-digit NACE industrial sectors. Percentage of all new firms compared with growth firms for the period 2003–2006.*

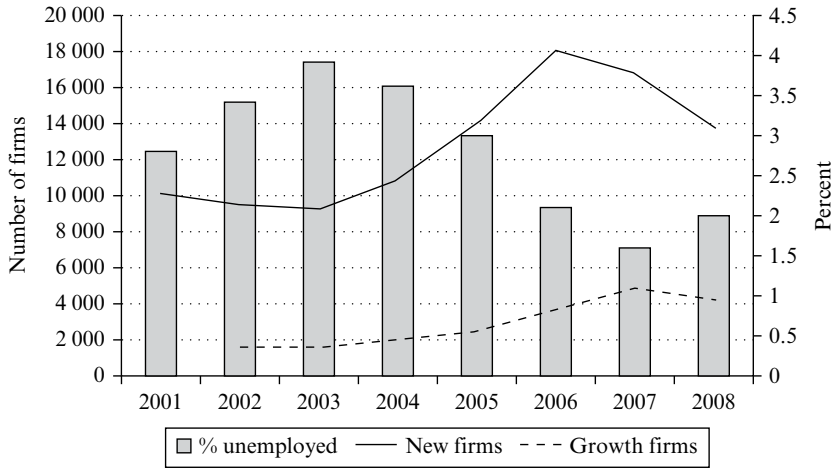
percent), 'Services to oil and gas extraction' (55 percent), 'Communication equipment' (42 percent) and 'Electric machinery' (41 percent). Some of these are small industries under rapid expansion, such as recycling. According to Eisenhardt and Schoonhoven (1990), firms founded in growth markets are more likely to become large. Growth markets provide many resource opportunities for new firms and are characterized by turbulence, and well-established firms could be locked into old technologies, which tends to be a disadvantage. Emergent markets, on the other hand, are characterized by low demand and high uncertainty and are thus a difficult environment for young firms. In mature markets, the growth rate of demand is low, which also provides limited opportunities for new firms. Rapid growth and larger volumes in a specific industry should therefore indicate an arena for new firms or rapid expansion of existing firms.

One should suspect that there will be room for only a few new firms or growth firms in small industries like recycling, even if this industry expands rapidly. There are more new or growth firms found in large industries with a steady, but slower, growth – such as 24 percent growth in output in current prices for construction, 31 percent for wholesale or 36 percent for business services over a period of 4 years. A simple relationship between the existence of growth firms in a specific industry and the growth rate of this industry does not seem to hold.[6] The same could be said about the relationship between the rate of new firm formation and growth firm formation in each industry. The appearance of a high share of growth firms in a particular industry does not need to correspond with a high rate of new firm formation in the same industry.

New firm formation and the appearance of rapid-growth firms seem to correlate with the cycle of the economy, as seen from Figure 8.2. The share of the unemployed workforce is here used as an indicator of economic cycles. The growth rate of new firms is given as a percentage of the full stock of limited liability firms. In this statistic, it has not been possible to exclude passive investment companies. The same procedure is therefore used to identify rapid-growth firms in this case, and explains the lower rate of rapid-growth firms compared to the numbers in Table 8.2. As the figure illustrates, there seems to be an inverse relationship between the unemployment rate, firm formation and the appearance of growth firms.

One conclusion is that there is no simple relationship between the existence of rapid-growth firms in a particular industry and the growth rate of that industry. A more complex set of mechanisms related to the expansion of particular industries, the scale economies dominating these industries, the cyclical development of the whole economy and the rates of new firm formation is needed to explain the rapid growth of firms in sectors.

The relationship between business cycles and the number of rapid-growth



Note: In 2006, changes in tax regulations created a boom of investment companies and new firm formation. The effect of this is excluded by a constructed and lower rate for 2006.

Source: Statbank table 04471 (unemployment), table 03206 (newly established firms) and author data (rapid-growth firms).

Figure 8.2 National unemployment rates in percent and the number of new firms and rapid-growth firms, 2001–2008

firms or newly established firms could indicate that rapid-growth and new firm formation are first of all concerned with business cycles and the demand side of the economy rather than specific attributes of the firm and its entrepreneur.

8.4.3 Productivity and Profitability

In general terms, rapid-growth firms return higher labor productivity than the 'normal' firm. Each employee in a rapid-growth firm produces 14 percent more in sales revenues than the average firm of the total population.[7] This is valid for most industries, but small numbers in several industries make this relationship unstable. Labor productivity is higher in the total population compared to rapid-growth firms in industries with manifest scale economies, such as sea and air transport, electricity/water production and distribution, metal production or mining.

Rapid-growth firms, on average, seem to comprise capabilities that imply larger than normal sales revenues and a more efficient use of their resources, resulting in higher productivity than normal. Success in

increasing sales revenues seems to correlate with better productivity compared to the total population in the same industry.[8] This does not come as a surprise since a more efficient use of resources is one important component of success in the marketplace and a driver of rapid growth. As discussed previously, such resources could include access to new knowledge, information, financial capital or labor (among others). Several authors highlight the importance of getting access to resources outside the firm and the ability to absorb and utilize these resources (Cohen and Levinthal, 1990). Jarillo (1989) found that the fastest-growing firms clearly made more use of external resources than the average firm and claimed that networking is a critical entrepreneurial skill. Barringer et al. (2005) argued that firms participate in inter-organizational relationships to absorb resources from their partners and discovered that fast-growth firms participated in such relationships to a higher degree than others. Cunneen and Meredith (2007) revealed that rapid-growth firms pursued a wider range of network relationships and networked more frequently than others.

According to Hultman and Hills (2001), rapid-growth firms also have a close relationship to the market through personal interaction with people and use such information more actively than formal market research. Growth firms use referrals to a much higher degree than non-growth firms as a key part of their marketing. They found that networking plays an important part of the growth firms' marketing, especially for SMEs. A variety of researchers emphasize information about markets as the most important information firms seek. The aim is to discover opportunities in a market and take advantage of the market potential to earn higher profits than others (Shane and Venkataraman, 2000).

The most common measures for analysing accounting data are listed in Table 8.3. A commonly used procedure is to allocate firms to one category in a five-scale typology of performance, from 'unsatisfactory' to 'very good'. The separation between the categories is according to conventions for the different measures. Here we compare the economic performance of rapid-growth firms with all firms in the total population that returned a positive operating profit in 2006 ($N = 69\ 300$). One reason for this is the selection criteria for rapid-growth firms – positive results over a period of 4 years.

From Table 8.3, we can read that rapid-growth firms perform better than the average firm of the total population. They are not only growing faster, but they also present a better return to equity and total assets. The investor in a rapid-growth firm receives a better return on invested capital than what could be expected on average. Rapid growth indicates a need to secure financing for the expansion. The numbers for equity and debt–equity ratios signify that the share of debt or liabilities is larger in

Table 8.3 Comparing the performance of rapid-growth firms with the total population of firms with a positive economic result; six performance measures distributed over five performance groups in percent, 2006

Performance measures	Unsatisfactory	Weak	Satisfactory	Good	Very good	*N*
Return on equity – all 'profitable' Ltd/PLC	8.0	8.9	6.5	6.2	70.4	69 292
Return on equity – growth firms	6.0	3.5	2.6	3.3	84.7	3 569
Equity ratio – all 'profitable' Ltd/PLC	7.4	6.3	20.7	37.6	28.1	69 317
Equity ratio – growth firms	3.0	6.7	30.2	42	18.1	3 569
Return on total assets – all 'profitable' Ltd/PLC	2.0	17.7	14.3	14.8	51.2	69 240
Return on total assets – growth firms	4.7	9.1	10.5	14	61.8	3 593
Operating profit – all 'profitable' Ltd/PLC	0.0	20.7	12.4	10.3	56.5	69 341
Operating profit – growth firms	2.8	15.3	13.2	10.9	57.7	3 542
Working capital ratio – all 'profitable' Ltd/PLC	4.9	13.5	38.6	18.8	24.3	68 288
Working capital ratio – growth firms	1.0	11.2	55.8	19.6	12.4	3 525
Debt–equity ratio – all 'profitable' Ltd/PLC	2.7	12.1	28.3	34	23	69 106
Debt–equity ratio – growth firms	2.2	17.3	35.9	34.5	10.1	3 579

Note: Each row sums to 100.

Source: Authors' data based on accounting data.

rapid-growth firms compared to the normal firm. The differences are not dramatic, and very few rapid-growth firms end up in the categories of bad performance. The measure for operating profit tells us how much is left as operating profit for each unit of revenue. The results indicate that rapid-growth firms perform as well as the average firm, even though they are pressed by a higher cost on debt due to rapid expansion. Compared with all firms (that is, positive and negative profit), rapid-growth firms perform even better.

These results are not surprising. One should suspect that firms under rapid growth would expand because they have more success than normal in selling their products or services in the market. Mixed with better productivity, this should result in an expanding income and profitability. On the other hand, rapid growth normally demands financial muscle to handle rapid expansion of the production and distribution facility. As the numbers indicate, financial stress is managed by a rise in the debt–equity ratio but not worse than a solid equity ratio in most of the rapidly expanding firms.

We can conclude that rapid-growth firms seem to win market share but also succeed in having profitable operations and in developing a solid financial position. The return on equity is commonly better than what is expected for normal companies. Related to invested capital, growth firms also seem to return a healthier cash flow to investors compared to the normal profitable firm.

8.4.4 Regional Differentiation

A first presentiment could be that the rapid growth of firms is related to regional economic growth and is distributed according to the expansion of the general economy. Regional economic growth could be calculated as an index consisting of data from regional accounting data.[9] Not surprisingly, these data rank counties with the largest urbanizations in Norway on top. Number one in regional economic growth for the period of 1997 to 2006 is Akershus County as part of the capital city region and shared with Rogaland County including the Stavanger region (Norway's oil and gas capital and third-largest conurbation). Rank three goes to Hordaland County including the Bergen region (second-largest conurbation) and rank four to South Trondelag County including the Trondheim region (fourth-largest conurbation), followed by Oslo (the capital city) in rank five.[10] Following this growth pattern, we could expect to find a clustering of rapid-growth firms in the most urbanized counties and in the most central regions.

The regional distribution of rapid-growth firms on the other hand is

also related to the location pattern of the industries to which they belong. As we saw from Table 8.2, the rapid expansion of firms is spread out among industries, some of them in industries with a rural location pattern, such as fish farming; some in industries traditionally clustered in urban environments, such as business services or computer-related activities; and still others in home market-related industries, such as retail or construction where a more even 'per capita' distribution of activities is present. An important industry for rapidly expanding firms is production of fabricated metal, machines and equipment or transport equipment, ships, etc. In the Norwegian context, these activities are often related to construction of petroleum installations and are located along the coast.

It is probably a mixture of general growth processes and location patterns that determine the location pattern of rapid-growth firms. Table 8.4 (pp. 184–185) reports statistics of the regional distribution of rapid-growth firms. Norway is divided into 20 counties. In the table, they are numbered in a system from the southern border with Sweden followed by the capital city and the inner part of eastern Norway, before counties along the coast from southern to western Norway, mid-Norway and northern Norway. The last county reported is the islands of Svalbard in the far north.

Columns I and II report the number and share of rapid-growth firms registered in 2006. Unsurprisingly, most rapid-growth firms are found in the capital region (Oslo and Akershus) followed by Rogaland, Hordaland, More and Romsdal and South Trondelag. With the exception of More and Romsdal, these counties include the largest cities of Norway. The distribution of rapid-growth firms is compared with the regional distribution of all limited liability companies in Norway (column III) and the regional distribution of population (column IV) and jobs (column V). Generally there is a strong correlation between the regional distribution of growth firms and the location pattern for firms in general (0.97). The same is true for the distribution of jobs. Correlated with the distribution of the population, this relation is a bit weaker (0.94). The main reason for this difference is the fact that the county of Oslo is the core of the metropolitan region with many work places for populations living in the neighboring counties.

Columns VI, VII and VIII report the number of growth firms per 100 limited liability companies in each county. On the national level, only 3.8 percent of these companies achieved rapid growth. In Rogaland County, 5.3 percent of all companies grew rapidly, compared to 2.5 percent in Hedemark County in the inner Eastern Norway region. All counties reporting higher values than the national average are highlighted. This measure (percentage growth firms of all firms) will be influenced by the size and structure of the industry of each county. Other indicators of regional distribution of growth firms could be the number of growth firms

per inhabitant or work places in the same region. These three measures have a strong correlation and will probably appraise the same underlying tendency. If they are combined as a measure of regional distribution of high-growth firms, Rogaland County comes out on top, followed by More and Romsdal, Vestfold, and Buskerud. Rogaland has been on top in regional economic growth for a long time and is home to a complete cluster of petroleum-related industries. More and Romsdal include a dynamic manufacturing sector related to shipbuilding, offshore and fisheries. Vestfold includes a dynamic cluster of high-tech firms related to the electro-mechanical sector, and Buskerud contains Norway's fifth-largest city – an auxiliary city to Oslo and Kongsberg, a dynamic cluster of marine/offshore and defense industries.

The regional distribution of rapid-growth firms is pretty much in line with the overall distribution of producing limited liability firms. The same counties mentioned above, in addition to West Agder and South Trondelag, have a larger share than expected from a normal distribution when we use the combined measure (columns VI, VII, VIII). The latter counties are well integrated into the petroleum economy and knowledge-intensive activities both in manufacturing and services. Two counties in the inland of eastern Norway (Buskerud and Oppland), East Agder and the northernmost counties represent counties with fewer growth firms than expected from a uniform distribution. The underperforming counties are regional economies with a slower growth rate than the rest. The capital region does not include more rapid-growth firms than expected from a normal distribution. On the other hand, there is an indication that larger urban environments or specialized clusters are regions with a higher frequency of rapid-growth firms. This observation seems to correspond with the findings of Beaudry and Swann (2009), who found that British firms, particularly in the manufacturing sector, grew faster than their competitors if they were co-located with other firms in their own sector and thereby possibly shared some external localization economies.

So far, we can conclude that rapid-growth firms seem to be over-represented in regional economies undergoing rapid growth. They also seem to cluster in counties with the highest urbanization with some important deviations. Less-urbanized counties that include clusters of dynamic manufacturing industries also perform well.

We also use another measure to analyse the centrality of firms' location. Norway is divided into 434 municipalities. These are classified according to their attachment to a larger regional labor market and are assigned six different groups of regions. *Peripheral regions* are defined as isolated municipalities without any densely populated area. *Small town regions* include a town and a surrounding labor market of 5 000–15 000

Table 8.4 Regional distribution of the total number of rapid-growth firms (I), percentage of growth firms, all firms, population and jobs by counties (II–V), the share of growth firms as a percentage of all firms in a county and the nation (VI), and number of rapid growth firms per 10 000 inhabitants or jobs by county and nation (VII–VIII), 2006

County	I	II	III	IV	V	VI	VII	VIII
	No. of rapid growth firms	% of rapid growth firms	% of all active AS/ ASA	% of population in Norway	% of working population after place of work	% growth firms of all firms	Growth firms per 10 000 inhabitants	Growth firms per 10 000 jobs
01 Østfold	175	4.9	4.8	5.6	4.8	3.9	6.7	15.4
02 Akershus	345	9.6	10.4	10.8	9.6	3.5	6.9	15.1
03 Oslo	563	15.7	16.4	11.6	17.1	3.6	10.5	13.9
04 Hedmark	75	2.1	3.1	4.1	3.5	2.5	4.0	9.0
05 Oppland	97	2.7	3.2	3.9	3.6	3.2	5.3	11.3
06 Buskerud	212	5.9	5.4	5.3	4.9	4.2	8.6	18.4
07 Vestfold	195	5.4	4.9	4.8	4.2	4.2	8.8	19.5
08 Telemark	126	3.5	3.3	3.6	3.2	4.1	7.6	16.8
09 E-Agder	65	1.8	2.2	2.2	1.9	3.1	6.2	14.5
10 W-Agder	130	3.6	3.5	3.5	3.4	3.9	8.0	16.3
11 Rogaland	392	10.9	7.9	8.6	8.8	5.3	9.9	18.8
12 Hordaland	327	9.1	9.2	9.8	9.7	3.8	7.2	14.2
14 S&Fjordane	68	1.9	2.3	2.3	2.2	3.1	6.4	13.0
15 M& Roms.	233	6.5	5.6	5.3	5.1	4.4	9.5	19.4

16	*S-Trøndl.*	230	6.4	5.7	5.9	6.2	4.3	8.4	15.7
17	N-Trøndl.	70	1.9	.5	2.8	2.5	3.0	5.4	12.0
18	Nordland	151	4.2	4.7	5.1	4.7	3.4	6.4	13.7
19	Troms	88	2.4	3.1	3.3	3.3	3.0	5.7	11.4
20	Finnmark	51	1.4	1.7	1.6	1.5	3.2	7.0	14.6
21	Svalbard	2	0.1	0.1	–	0.1	3.0	–	15.8
Total		3595	100.0	100.0	100.0	99.9	3.8	7.7	15.2

Notes:
1. Cells highlighted indicate counties performing better than the country average (3.8, 7.7, 15.2) on three measures of the importance of rapid growth firms in a regional economy.
2. Counties that include the four largest conurbations in Norway are printed in italics. The capital city extends over two counties: Oslo and Akershus.

Source: Own data based on national accounting data/company data. Statistics Norway, Statbank: table 03026: Population per 1 January, table 03256: Employed persons per 4th quarter.

Table 8.5 Distribution of all firms, growth firms and people according to the centrality of their location, 2006

Regions	Number of firms – %		% of total population
	All firms	Growth firms	
Periphery	10.0	9.2	10.1
Small towns	6.3	5.3	6.4
Medium towns	16.2	16.7	17.6
City regions	22.3	21.8	23.1
Larger cities	17.8	21.1	18.7
Metropolitan area	27.3	25.9	24.1
Total	99.9	100	100
N	94473	3595	4640219

Source: Author data and Statbank table 03026.

inhabitants. *Medium town regions* include a smaller town or towns, and a surrounding area with 15000–50000 inhabitants. *Medium city regions* include a medium-sized city or cities and a labor market of 50000–150000 inhabitants. *Larger city regions* include the second-, third- and fourth-largest cities and their influence area. Lastly, the *metropolitan area* consists of the inner circle of the greater Oslo region.

From Table 8.5, we see that growth firms seem to be under-represented in the most sparsely populated regions and in the most central region. One-fourth are located in the capital region but in a lesser degree than all firms. They are more concentrated in the second-largest city regions and slightly over-represented in regions around medium-sized towns. One reason could be the industrial distribution of growth firms, as seen in Table 8.2 and the location pattern of industries attractive for rapid growth. Another is the well-known territorial division of labor between different types of regions. While capital regions often dominate the knowledge-intensive sector, the regional capitals are still important locations for the distribution of goods and services and for specialized manufacturing, and smaller cities or towns are important for what remains of manufacturing in more general terms.

Somehow rapid-growth firms seem to find a specifically vibrant business climate in level-two cities/regional capitals of west and mid-Norway. Due to this, the centrality of rapid-growth firms is higher than for the total population of firms.

In Figure 8.3, we compare the location pattern for all firms and rapid-growth firms for a selection of industries representing (1) decentralized and

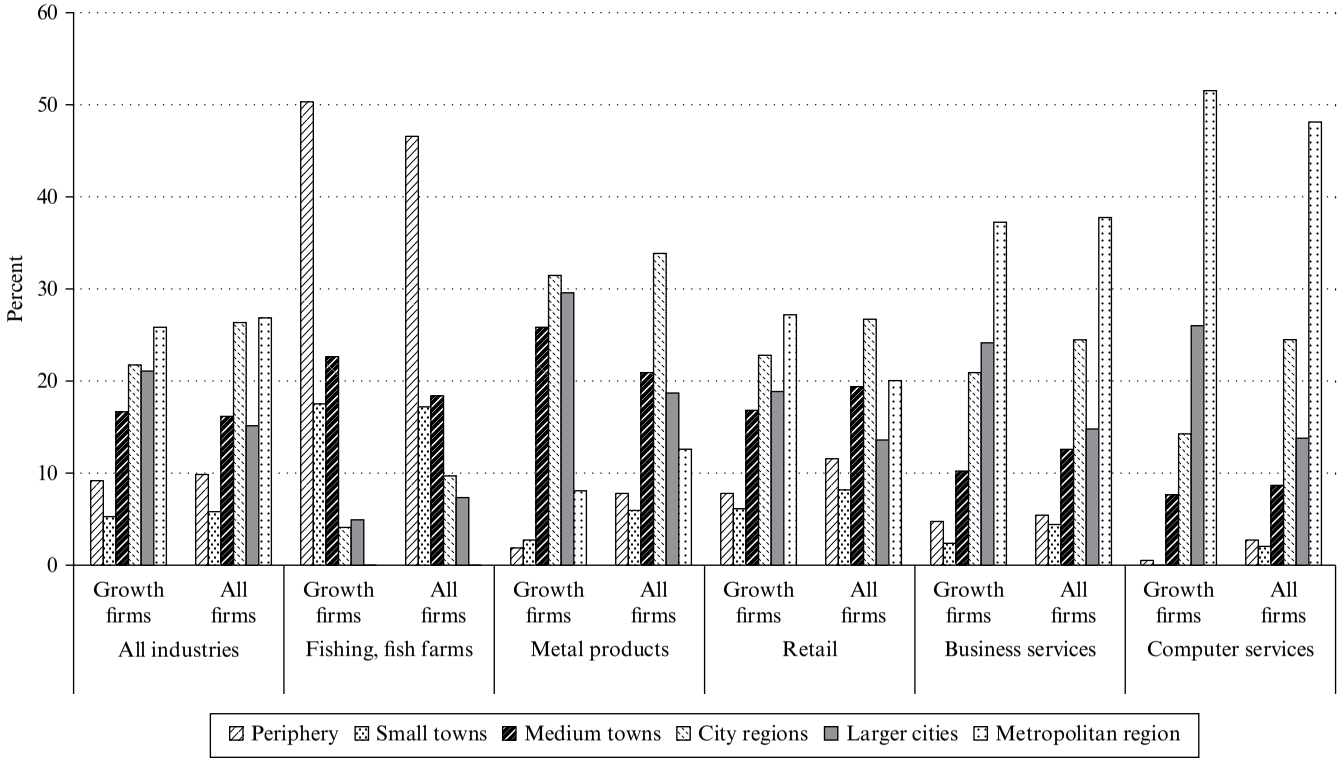


Figure 8.3 *The location of firms related to industries. Percentage of all firms (N = 94.473) and all growth firms (N = 3.595) distributed over six different types of regions first in all industries (first column) and thereafter a selection of industries with different location patterns, 2006*

(2) centralized location patterns and (3) a location pattern related to consumer services or what we could call a 'per capita' distribution. The bars in the first section of the figure illustrate the patterns found in Table 8.5. In the second section, 'Fishing, fish farms' represents an extraction industry with a dominant decentralized location pattern. The bars show that a large number of firms in this industry are located in the most peripheral regions. The periphery therefore seems to be the most preferred location in this industry and reflects the fact that a large part of this industry is involved with extracting resources from the sea and is thereby dependent on access to this natural environment. It can also be seen in Figure 8.3 that growth firms are more concentrated in the preferred location of the periphery than the total universe of firms in this sector. Medium-sized towns also seem to be especially attractive for growth firms. Manufacturing of 'metal products' is concentrated in the middle of the periphery–centrality dimension, but growth firms are more concentrated here than the universe. 'Retail' represents an industry in which distribution is more in line with the distribution of people. The location pattern for this industry is very much in line with the total distribution of firms or population, but growth firms again seem to prefer a more concentrated and also centralized location. In 'Business services', a centralized location pattern is seen, but growth firms are more concentrated in regional centers than the capital region. Lastly, the figure illustrates that knowledge-intensive activities like 'computer services' are very centralized on average but even more among rapid-growth firms.

Rapid-growth firms are both more centralized and more decentralized than an average distribution would suggest. This indicates that rapid growth is related to locations that already seem to be 'the preferred location' of the particular industries. We could ask if this means that rapid-growth firms are more skillful in finding an 'optimal' location.

The location of firms can be measured along a periphery–centrality dimension. The different types of regions in Table 8.5 are given a value from one to six. The higher the number, the more centralized the location pattern for the industry. Using this measure, we find that rapid-growth firms are slightly more centrally located than the total population of firms in this study (value 4.18 compared to 4.09).

In Table 8.6, all industries with at least ten growth firms have been included. These are ranked according to the general location picture for all firms. 'Computer related activities' are the most centralized industry in Norway (the regional distribution shown in Figure 8.2). Next follows a Norwegian peculiarity: the primary part of the offshore oil and gas industry (extraction) is highly concentrated to Stavanger, Bergen and Oslo.[11] The ranking of industrial location is basically in line with an international

Table 8.6 Ranking industries from a central to peripheral location pattern based on a location index (from 1 = periphery to 6 = metropol), 2006; pattern for all firms used as basis and compared with the location pattern of growth firms

Industries	Rank all firms	Rank growth firms	Industries	Rank all firms	Rank growth firms
72 Computer related activities	4.89	5.20	45 Construction	3.87	4.00
11 Crude petroleum and gas	4.78	3.80	29 Machinery equipment	3.83	3.75
51 Wholesale/commis. trade	4.62	4.70	52 Retail, repair	3.83	4.21
22 Publishing, printing and recorded media	4.61	5.10	50 Sale vehicles, fuel	3.78	3.92
74 Other business activities	4.52	4.69	36 Furniture	3.73	3.15
64 Post and telecom	4.49	4.50	55 Hotels and restaurants	3.72	3.89
33 Precision/optical instrument	4.48	4.85	61 Water transport	3.71	3.29
31 Electrical machinery	4.34	4.32	90 Sewage, refuse disposal	3.68	4.21
80 Education	4.25	4.63	60 Land transport, pipelines	3.68	3.73
92 Recreation, culture, sport	4.23	4.53	27 Basic metals	3.66	3.82
70 Real estate activities	4.16	5.13	25 Rubber/plastic	3.65	3.35
63 Support transport activities	4.13	4.28	37 Recycling	3.64	3.70
71 Renting of machinery	4.12	4.23	26 Non-metallic mineral	3.53	3.43
01 Agriculture*	4.06	4.04	35 Transp. Equipm. ships	3.43	3.48
93 Other personal services	4.02	4.63	20 Products of wood	3.29	3.31
34 Vehicles, trailers	3.90	4.00	15 Food and beverages	3.21	3.53
28 Fabricated metal products	3.88	4.09	14 Mining and quarrying	3.04	2.46
			05 Fishing, fish farming	2.15	1.96

Notes:

1. * Farms are not included. In the agricultural sector many production units are not organized as limited liability companies and are therefore excluded from this analysis.
2. Cells highlighted in gray indicate ≥ 0.5 points difference between the two groups. Light gray indicates that the group of growth firms in this industrial sector is more decentralized than all firms in the same sector. Dark gray indicates that growth firms are more centralized.

pattern for advanced economies with the extraction industries as the activities with the most peripheral location pattern.

In the next column, the ranking of rapid-growth firms is reported. The general picture is more or less the same but with some important divergences. The five industries in which the divergence between the location patterns of the rapid-growth firms and all firms are the highest is highlighted: dark gray for industries in which growth firms are significantly more centralized and light gray for industries in which growth firms are significantly more decentralized. Rapid-growing 'real estate' companies are significantly more centralized than the total population. Next follows rapid-growing firms in 'other personal services' followed by firms in the 'sewage and refuse disposal' business. Thereafter are 'publishing, printing and recorded media' and 'retail, repair', also with significantly more centralized location patterns than the total population would suggest. On the other hand, rapid-growth firms in the 'crude petroleum and gas' sector are much more decentralized compared to the general picture of the whole industry. Industries like 'mining and quarrying', 'furniture', 'water transport' and 'rubber/plastic' follow swiftly. The discrepancies in location patterns between the two groups of firms are not very large for the other industries, although the ranking could differ. Finally, some firms are able to keep on with 25 percent annual growth over many years. The longer they have been labeled a rapid-growth firm, the higher the centrality of their location.

There is a certain tendency in the data suggesting that rapid-growth firms in the service sector are somewhat more centralized than all firms and that rapid-growth firms in the extraction industry are more decentralized. In manufacturing, there is no general difference in the location pattern. Centrally located firms seem to have a higher probability for sustainable rapid growth than more peripherally located firms.

8.5 DISCUSSION AND CONCLUSIONS

The sparse literature on rapid-growth firms has identified firms with high growth in most sectors of the economy and in most regions, although small- and medium-sized firms are in the majority and growth firms are under-represented in rural areas. In this study we have reached similar conclusions. Rapid-growth firms seem to thrive in business environments with medium barriers of entry: industries in which scale economies are not profound, but in which niche markets exist and customer-near and market-oriented behavior is rewarded. In these markets, firms' specific capabilities are important, be it in the quality of their products in relational-based capabilities with customers or suppliers or the flexibility and distributional

quality of their services (see, for example, Acs et al., 2008; Malizia and Winders, 1999; Storey, 1997; 1998). The absolute number of growth firms is the highest in the service industries, but in relative numbers, they are more important in manufacturing industries. We also conclude that Norwegian rapid-growth firms are relatively young but not necessarily micro-firms under rapid expansion. In general, rapid-growth firms are larger than the average firm – a logical consequence of rapid growth. They also reward their investors with better profitability and return on investment than the average firm.

Regarding regional distribution, this study also concludes that rapid-growth firms are found in most regions but with a specific under-representation in the most peripheral regions. We have also identified a relative concentration of rapid-growth firms in the dominant regional centers of the country and not in the capital city region. In this regard, rapid-growth firms present a more centralized location pattern than all firms seen together. We have also seen that rapid-growth firms follow the preferred location pattern for the industry to which they belong, with some deviations. In some service industries, such as real estate, personal service and retail, rapid-growth firms are significantly more centrally located than the average firm in these industries. One explanation could be the booming economy for the period we study and the sharp population increases in the largest cities. Another observation is the distinct difference in location pattern in the extraction of crude oil and gas, for which rapidly growing firms are much more decentralized than the average situation in this industry. An obvious reason is the search for new resources and a drift toward the north. In this case, new industrial capacities have to be developed in these peripheral locations.

One observer has used a boat analogy to describe the mechanism behind the rapid growth of firms: '. . . there are two strategies for making the boat go faster – one is to have a capable crew and the other is to have the boat backed by a strong current. Our observation is that the Ten Percenters (the top 10 percent of firms growing) place more emphasis upon locating the boat correctly in the current than on the quality of the crew' (Storey, 1998, p. 4). In our survey of the literature on rapid-growth firms, most scholars seems to explain the rapid growth of a firm with specific capabilities of 'the crew' and specific qualities of the firm's products and processes. This study is explorative in nature and needs to be followed by more sophisticated statistical analyses to be conclusive. Still this study indicates a possible relationship between general economic growth, its distribution on industries and regions and the arrival of rapid-growth firms and new firm formation. In other words, rapid growth is somehow dependent on macro-economic growth and increasing markets, but still

only some firms in the 'current' (that is, the business cycle) manage to take the full potential out of this opportunity. The skills of managing market opportunities are therefore important – more important than inventing or developing a new market. Based on the data available, this study cannot answer this question, but it would be worthwhile to analyse the influence of these two drivers of speed in a follow-up study based on surveys and interviews.

A specific line of research on rapid-growth firms is motivated by the contribution these firms have to the generation of new jobs in different parts of the economy and in types of regions. Henrekson and Johansson (2009) conclude that all the empirical studies they reviewed supported the proposition that rapid-growth firms generate a large share of the net contribution of new jobs in most economies even during recessions. This is one important reason why much more attention should be given toward the importance and capabilities of these firms. Another robust conclusion from their survey is that rapid-growth firms are younger than the average firm; but regarding the size distribution, the conclusions are more ambiguous. Most rapid-growth firms are small, but they include all sizes. On the other hand, larger firms tend to be the most important job contributors in absolute terms. In this study, we have not focused on job creation, but we can conclude that the average rapid-growth firm is an SME though is still larger than the average firm in the whole economy. We can also agree that rapid-growth firms are younger than the average firm. Henrekson and Johansson's final proposal was that rapid-growth firms are over-represented in high-technology industries. There was no support for this statement from previous empirical research, and again we partly join in on this conclusion. Our modification is that this is probably true if one only looks at high-tech industries with high expenditures on formal R&D. A broader avenue for understanding innovative activities on the firm level should open up an important position for rapid-growth firms. In this study, we only have weak evidence that rapid-growth firms are more innovative than the average firm. One indication is the location of these firms in industries that use an over-proportional share of their resources on R&D in the specific context in which they operate. Another is their efficiency in operating their business, revealed by high labor productivity. Further investigation is necessary before we can conclude that rapid-growth firms are innovative in the segments in which they operate.

In the literature on regional economic growth and job creation, much attention has been directed toward spatial clustering of economic activities: namely the identification of industrial districts and the concentration of dynamic SMEs in traditional sectors of the manufacturing or service

industries or the agglomeration of rapidly expanding industries and new firms based on knowledge-intensive resources, innovation and research activities (see, for example, Asheim et al., 2006; Karlsson et al., 2005). In both cases, an interest in specifically dynamic parts of the economy and geography is present.

In some senses, the findings in this study indicate that rapid-growth firms flourish in environments that could be labeled spatial clusters, but these firms are not easy to identify as new ventures in new and upcoming industries, in the environment of university–business interaction or as members of a full-scale innovation system. Still, they act as the most dynamic part of many local economies. In the end, regional policy is concerned with wealth creation and the generation of jobs in specific regional environments, be it dynamic urbanizations or stagnating manufacturing or extraction regions. The most important contribution to job creation seems to come from rapid-growth firms, not from entrepreneurial new firm formation or from businesses in the high-tech industry. This obvious fact should invite much more interest in the policy support for these kinds of firms, but first and foremost in increased research to understand the mechanism behind the success of these firms and the impact they have on the economy and regional development.

There is increased research focused on the phenomenon of organizational growth and rapid-growth firms. As we have indicated, one major problem in this field is the lack of a commonly accepted definition of rapid growth and how to measure it. If such standards are established, it would enable comparisons of results. Cross-national studies could reveal similarities and differences. As indicated in this explorative study, there are reasons to believe that national characteristics in industrial and geographical structures, industrial politics and business cycles influence which firms become growth firms and how they develop. At the same time, we find similarities in our findings compared to research from other countries. A better basis for comparisons would strengthen the arguments behind the results.

The research on rapid-growth firms is still in its early stages. We would especially welcome more studies concerning the spatial distribution and economic performance of rapid growth. Much of the research on rapid growth tends to search for explanations for why some firms grow rapidly and others do not. There is less focus on the consequences of growth and what happens to the organization as it grows. As we have pointed out, several theoretical contributions on rapid-growth firms have highlighted the importance of external relations and networks in generating access to different resources, but fewer have empirically investigated how and where these firms actually acquire different types of resources. We also

know little about the importance of the firms' business environments or localities and their proximity to specific resources or capabilities for rapid growth. What is the importance of their local environment, what is the spatial structure of their networks, and so forth? This and other questions concerning rapid-growth firms should be of interest both for the theoretical understanding of growth mechanisms, for politicians in formulating policy and developing incentives to generate sustainable jobs in regions and industries, and for managers to use for strategic decisionmaking.

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NOTES

1. The Bronnoysund Register Centre, a government body under the Norwegian Ministry of Trade and Industry.
2. These are larger, national companies in oil exploration, energy trading, construction or manning.
3. Overall, 62 percent of the identified rapid-growth firms are independent, 13 percent are controlled by another institutional investor owning 50–99 percent of the shares and 25 percent are a daughter company 100 percent owned by another company. Many of the institutional owners are holding companies controlled by the same persons active in the growth firm.
4. An econometric approach to this analysis will be developed in another paper. In this context the purpose is just to give a description of the data and possible explanations.
5. Pearson correlation 0.790, sign at the 0.01 level.
6. A multivariate statistical analysis is needed to conclude.
7. The quality of the employment data varies over the dataset, but the weakness counts for both groups compared.
8. Pearson correlation 0.515.
9. These are measures for compensation of employees, output and value added in current prices. Statbank table 05560: main results accounts.
10. A considerable share of national account values are not registered on the regional level. This particularly relates to the offshore extraction of oil and gas and international shipping activities. A regional distribution of these values would probably have been in favor of the regions already on top.
11. Production takes place offshore, but most jobs are onshore. Platform workers are employed by an oil or service company and regionally distributed after the location of the organization to which they are related.

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Article 2

Firm capabilities and external sources of knowledge: Which capabilities are important for which relations?

Firm Capabilities and External Sources of Knowledge: Which capabilities are important for which relations?

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ABSTRACT

In this paper I ask to what extent a diverse set of firm characteristics, resources and capabilities facilitate how rapid-growth firms use and value ten external sources of information and knowledge. Multiple theoretical perspectives and unique survey data are used in the analysis. I find that organizational capabilities, networking capabilities, R&D capabilities and influencing capabilities relate to specific external sources of information and knowledge. As such, this paper contributes to a more nuanced understanding of a firm's absorptive capacity and social capital. I also find that rapid-growth firms located in rural areas seem to overcome the geographical barriers of diffusion of knowledge.

INTRODUCTION

This article focuses on which and how firm capabilities facilitate the acquisition of knowledge from different external sources. Integration into networks of alliances and partnerships with other firms appears to be one of the outstanding characteristics of rapid-growth firms (OECD, 2002). Modern economies can be "characterized as 'learning economies' in which knowledge is the crucial resource and learning is the most important process" (Lundvall & Johnson, 1994, p. 23). If production is knowledge dependent, one can argue that knowledge is "the most strategically important of the firm's resources" (Grant, 1996, p. 110). Knowledge is stored within individuals, created through interaction among individuals, and normally embedded in organizations. This interaction occurs both within organizations and between organizational members and their environment. From a managerial, strategic and organizational perspective, it is important to understand not only the internal processes of knowledge creation and diffusion, but also a) where

firms acquire information and knowledge, and b) which and how firm capabilities facilitate the acquisition of knowledge from these external sources. By investigating these questions, this paper contributes to a more nuanced understanding of firms' social capital and what facilitates firms' absorptive capacity. As such, the paper contributes to a better understanding of the growth process in rapid-growth firms. The study is also relevant for policymakers and the debate of learning, knowledge development, and knowledge sharing in the context of regional innovation policy.

Several theoretical contributions point to the importance of external relations and firm networks to access information and knowledge outside the organization, in pursuit of resources, innovation and growth. Except for research of more open innovation processes (e.g., Ahuja & Katila, 2004; Laursen & Salter, 2006; Leiponen & Helfat, 2010), few have empirically investigated from where firms acquire information and knowledge. Moreover, few empirical studies include a diversity of external relations; the role of third parties such as professionals, consultants, publications, the internet, conferences, expositions and fairs are especially under-researched (Bierly & Daly, 2007; Maskell, Bathelt, & Malmberg, 2006; Pittaway, Robertson, Munir, Denyer, & Neely, 2004; Trippl, Todtling, & Lengauer, 2009). Research is often limited to publicly available data and few or only one industry or region, or all firms are treated as if they are equal without considering the firms' internal resources, capabilities and characteristics. This calls for research with emphasis on systematic variations between how firms value different sources of external knowledge and information (Bierly & Daly, 2007).

Empirical studies find that the fastest growing firms make more use of external resources, have a wider range of network relationships, and a more intense level of networking than the average firm (Barringer, Jones, & Neubaum, 2005; Cunneen & Meredith, 2007; Jarillo, 1989; OECD, 2002; Zhao & Aram, 1995). Firms connected to the 'right' networks with key resources are in a better position to grow faster (Moreno & Casillas, 2007). Such 'right' relations can give firms competitive advantages, such as better access to the market and sharing of the financial burden of expansion (S. Freeman, Edwards, & Schroder, 2006).

Based on rapid-growth firms' extended use of and need for external relations, they are a suitable sample to use for studying how firm capabilities facilitate the acquisition of knowledge from different external relations. Moreover, rapid-growth firms are of special interest to both managers and policy makers since they are recognized as central actors in fostering employment

opportunities, growth and innovation (Birch, Haggerty, & Parsons, 1995; Birch & Medoff, 1994; Europe-Innova, 2006; OECD, 2002). However, several firms stumble when they grow extremely quickly (Hambrick & Crozier, 1985; Nicholls-Nixon, 2005). Such firms are in a process of change, and experience capacity challenges and pressures on limited resources. Generally, a more global market for products and services forces most firms to respond earlier to changes. To survive in the competition, firms must understand the market and the customers, adopt new technology or organizing practices, understand the dynamics of the industry, be able to take advantage of available information and develop new knowledge. In this competition for survival and growth, it is important to have access to additional resources through a network of social relations, often referred to as a firm's social capital (e.g., Adler & Kwon, 2002; Lin, 2001; Nahapiet & Ghoshal, 1998).

Absorptive capacity is defined as firms' ability to identify and recognize external information, and assimilate and utilize this information (Cohen & Levinthal, 1990). By analyzing which and how different firm characteristics and capabilities facilitate rapid-growth firms use of external relations, this paper will contribute to a more nuanced understanding of a firm's absorptive capacity. In reviews of research on interorganizational relationships, authors argue for more use of multiple perspectives and theoretical integration across disciplines (Barringer & Harrison, 2000; Hillman, Withers, & Collins, 2009; Pittaway, et al., 2004). In this paper, theories based on the resource-based perspective (RBV), social capital and absorptive capacity are combined.

The paper proceeds in the following manner: First a brief review of the relevant literature, discussing the importance of external sources of knowledge and information, and firms' internal developed capabilities is presented. Three hypotheses are developed on the basis of the literature and previous empirical research. The next section describes the methodology, the data and the construction of the variables used in the analysis. In the following sections, the results are presented before I discuss the findings, their implications, limitations and suggestions for future research.

LITERATURE REVIEW AND HYPOTHESES

Gulati, Nohira and Zaheer (2000) suggest incorporating social networks into strategic analysis for a more comprehensive view of strategic behavior of firms. In this case, I see a promising opportunity to combine the sociological perspective focusing on social capital and absorptive capacity with the RBV perspective. This combination of perspectives enables us to bridge and investigate both the firm's need for external resources with firm-level capabilities to exploit these resources.

According to the RBV, following the tradition from Penrose (1959), growth is caused by interaction between internal processes and resources, and market opportunities. Following this view, a firm can use different *internally* focused strategies to reduce the pressure on the organization and develop competitive advantages by better exploitation of the firm's intangible and slack resources. The RBV view is criticized among others for its inward focus, putting too little notion to relational advantages (Dyer & Singh, 1998). Open system models of organizations recognize that there are both processes within the organization with internal interdependencies, *and* exchanges between other organizations and the firm's external environment (Emery & Trist, 1965). Actions taken by organizations are embedded in the structures of their social relations (Granovetter, 1985). Crucial knowledge often resides beyond firm boundaries, requiring firms to use external relations to seek help, acquire information, and to access other tangible and intangible resources from *outside* the organization (e.g., Pfeffer & Salancik, 1978; Powell, Koput, & Smith-Doerr, 1996).

The concept of social capital describes what different actors can gain from interaction with other relations. According to Inkpen and Tsang (2005), social capital is viewed as either a private good possessed by individuals in the relation, or a public good available to all the members of the relation. They define social capital as "the aggregate of resources embedded within, available through, and derived from the network of relationships possessed by an individual or organization" (Inkpen & Tsang, 2005, p. 151), thereby including both the private and public dimension of the concept. According to Lin (2001), people invest in social relations and expect returns on their investments, thereby investing for achieving goals. The resources available through social relations are typically related to information and knowledge, and common understanding between the actors facilitates knowledge-sharing. As such, firms need

internal knowledge of the specific field of interest to access, learn from, and make use of the social capital in their social relations (Ahuja, 2000; Greve, 2010).

Learning processes are collective activities where information is absorbed and knowledge is generated and diffused (Amin & Wilkinson, 1999). The perspective of ecologies of learning emphasizes that interacting organizations learn from each other (Levitt & March, 1988). Development and sharing of knowledge in 'networks of learning' are also vital parts of innovative activities (Powell, et al., 1996). Firms do not innovate in isolation, and innovation can be seen as an interactive learning process where organizations depend on interactions with their environment in the creation of new knowledge (e.g., Asheim, Coenen, & Vang, 2007; Fagerberg, 2005; Kline & Rosenberg, 1986; Lundvall, 1992; Nooteboom, 2006). To take part in interactive learning processes requires that the organization has absorptive capacity (internal competence and capabilities) to identify, interpret, assimilate and utilize new external knowledge (Cohen & Levinthal, 1990). Greve (2010) argues that firms' abilities to innovate depend on high levels of absorptive capacity together with good access to social capital (external social relations). I am adding to this strand of knowledge by asking what kind of firm-specific resources and capabilities are associated with knowledge spillovers from a diverse set of external sources? We know that there are resources, such as knowledge, in the networks of social relations (social capital), and that firms need internal competence and related knowledge to utilize this knowledge (absorptive capacity), especially related to innovation. However, we know less about what facilitates sharing of resources from different types of actors and relations. There might well be firm capabilities other than innovative capabilities important for firms' absorptive capacity, as well as important relations other than those related to innovation. Therefore, this study will investigate a mixed set of capabilities and external relations, not only related to innovation, but to growth processes in general.

Growth and External Resources

According to Penrose (1959), a firm is a set of resources, and the availability and utilization of idle, internally controlled and developed resources can explain why some firms grow. Such resources could be financial capital (Fischer & Reuber, 2003; Hambrick & Crozier, 1985; Uzzi, 1999), organizational capabilities such as coordination and structuring (Barney, 1995), the labor

force and its experiences (Barringer & Jones, 2004), and other firm-specific intangible resources and capabilities (Barney, 1991). Within the Penrosian tradition, we learn that firms need to grow, and reach a certain size and scale before they have available idle resources to put into productive use and thereby gain competitive advantage.

A firm's resources may extend beyond firm boundaries. Both the relational view (Dyer & Singh, 1998) and the knowledge-based view (Grant, 1996) extends the RBV to include both internal firm resources and a firm's ability to access knowledge beyond firm boundaries (Zahra, Sapienza, & Davidsson, 2006). Thus, a firm's performance depends not only on its scale and utilization of internal resources, but growth, survival and performance also depends on its ability to link up with other organizations and access resources controlled by others (Hillman, et al., 2009). The business environment consists of fields of relationships, including suppliers, customers, regulatory agencies, competitors and collaborators that bind organizations together (DiMaggio & Powell, 1983). The reasons for initiating relations with other organizations can be many fold, such as power or control over organizations and their resources, reciprocity and mutual advantage, division of labor and higher levels of efficiency, response to environmental uncertainty, or legitimacy in the environment (Oliver, 1990). According to Inkpen and Tsang (2005), research indicates that more productive organizations are better at transferring knowledge to their units, and new knowledge from outside the firm is especially important for change and improvements.

Cunneen and Meredith (2007) reveal that rapid-growth firms pursue a wider range of network relationships and utilize networking more frequently than others. Similar findings are documented by Zhao and Aram (1995) in China: High-growth firms tend to have a greater number of network contacts (range) and more intense level of networking than low-growth firms. Based on a comparison with the U.S., they argue that the importance of networking is universal. Jarillo (1989) finds that the fastest growing firms clearly make more use of external resources than the average firm, and Littunen and Virtanen (2009) argue that close interplay with external personal networks increases the odds of becoming a growth business. Integration into networks of alliances and partnerships with other firms appears to be one of the outstanding characteristics of rapid-growth firms (OECD, 2002).

Jarillo (1989, p. 135) defines 'external resources' as "those assets – physical or otherwise – that are used by the firm in its pursuit of growth and over which the firm has no direct

ownership." He conceptualizes external resources as 'networks'. In network analysis, the actors and their actions are treated as embedded, and the ties between actors can be viewed as channels for transfer of resources (Burt, 1992). These structures of ties, and lack of ties, provide the actors with both opportunities and limitations. Granovetter (1973) distinguishes between acquaintances (weak ties) and close friends (strong ties) in his social analysis at the individual level. Ties between organizations are often informal, 'weak' and incomplete, and the idea of loosely coupled networks of organizations (Crozier & Thoenig, 1976) opens up for less strict definitions of network systems. Because there are different types of networks, "the facilitating conditions that influence knowledge transfer differ across network types." To understand social capital "requires an analysis of the specific features of the different network types" (Inkpen & Tsang, 2005, p. 154).

Few studies include weak, informal and incomplete ties as valuable sources of knowledge and information, such as publications, the internet, conferences and expositions or trade fairs, in their research. For many firms, conferences and trade fairs are valuable arenas for exposure to novel ideas, expert insights, and new partners to actively seek information from and spend time and engage with (Bierly & Daly, 2007; Maskell, et al., 2006). Trippl et al. (2009) categorized journals, publications, fairs and conferences as 'informal linkages', and claimed that these sources played a vital role in the exchange of knowledge in the Vienna software sector. Since written sources are codified knowledge, and do not require relations or linkages between actors to be used and read, I prefer to categorize these as 'informative sources'.

This discussion demonstrates the importance of external relations to access resources that firms can use to develop and grow, and to respond to changes in the environment. Empirical research on rapid-growth firms indicates that these firms are more active than others in networking and use of external resources. Still, more research is needed to understand how these firms' resources and capabilities might facilitate the transfer and utilization of knowledge from different external sources. In the following, three hypotheses of firm capabilities and external sources are presented.

Hypotheses

Theories of social capital discuss the resources available through the network of social relations, and the importance of personal relationship and shared meaning in the relation facilitating the exchange of resources. Theories of absorptive capacity discuss the importance of internal competences and capabilities related to innovative activities to take part in innovative processes. However, few discuss whether there are other firm capabilities important for facilitating knowledge transfer from different external sources. Penrose and the RBV use organizational theory to explain the internal functions of structure for organizational efficiency, and discuss how internal processes of coordinating and combining resources create competitive advantage and growth. In this section, these theoretical perspectives are combined to develop hypotheses of how different internal firm capabilities can facilitate knowledge transfer from different external sources.

Theories of social networks argue that our closest relations are our most valuable sources of knowledge and information. Our closest relationships could be the actors we spend most time with, build mutual goodwill and trust with, are those perceived as most important to us, and are built on reciprocal services (e.g., Bradach & Eccles, 1989; Granovetter, 1973; Powell, 1990). According to Lechner and Dowling (2003), knowledge acquisition depends on weak ties, while knowledge creation depends more on strong ties.

Rapid growth leads to increased managerial complexity (Nicholls-Nixon, 2005), and the ability to structure internal activities is important for managing the increased complexity facing rapid-growth firms (Smallbone, Leigh, & North, 1995). Therefore, in order to have time to manage close relations, firms must have routines and capabilities to manage its internal activities. History is full of examples of firms failing to recognize environmental changes threatening the competition, where both lack of external information and rigorous organizing is part of the problem (Starbuck, 1983). Dynamic organizations do not disregard the importance of internal structuring of activities; rather they carefully develop their internal capabilities, including focus on reorientation, change, strategic development, culture and appropriate structures.

From the perspective of strategic alliances, we know that tight, repeated and trust-based relationships influence the advantages derived from close relations (Lorenzoni & Lipparini, 1999). The cooperation with strategic partners is an organizational challenge, and such

cooperation often fails to succeed (Day, 1995). Findings by D'Aveni and Ravenscraft (1994) indicate that vertical integration creates additional bureaucratic costs because of the need for greater internal coordination with the partners, but at the same time companies can improve their profits by vertical integration if the coordination is 'easy'. Cohen and Levinthal (1990) argue that an organization's absorptive capacity depends on both its interface with the external environment *and* its internal communication structures. Organizational structuring is related to how organizations solve their problems, process knowledge and communicate (e.g., Burns & Stalker, 1961; Thompson, 1967). We find that firms' internal structuring of activities influences how they process knowledge. Furthermore, close collaboration is complex, time-consuming, and demands well developed coordination. Therefore, one could suggest that to benefit from close cooperation, firms need to have focus on the internal structuring of activities to handle the challenge of coordination.

On this basis, I argue that firms with well-developed organizational capabilities, in their focus on reorientation, organizational culture, strategic development and structuring of activities, will possibly have the organizational capacity to better utilize knowledge and information from customers and alliance partners than others. As such, I hypothesize that a firm's absorptive capacity (their ability to recognize, assimilate, and utilize external information), is facilitated by their organizational capabilities.

> **Hypothesis 1:** Firms with higher level of organizational capabilities are able to recognize, assimilate, and utilize knowledge and information from customers and alliance partners more than firms with less developed organizational capabilities.

Establishing and sustaining competitive advantage depends upon firms' abilities to develop knowledge, utilize external knowledge and exploit this knowledge to generate new products and services (Kogut & Zander, 1992; Teece, 1996). Intangible resources, such as innovative capabilities, research, and branding skills, have been argued to be sources of success, giving firms opportunities to diversify into related activities, products, services or industries (e.g., Chatterjee & Wernerfelt, 1991).

According to Asheim (2007), industries with an analytical knowledge base often have their own internal R&D processes and closer relations with public institutions, universities and

research organizations because of their need for scientific knowledge, help, and information about rules and regulations. Tether and Tajar (2008) identified a positive link between high levels of R&D and the use of research institutions. However, Lane and Lubatkin (1998) argue that it is not the firm's level of R&D spending per se that enables the firm to learn from others, but the organizations *similarities* in knowledge bases, structure and dominant logic. Research by Fabrizio (2009) confirms that firms with more developed research capabilities benefit most from collaborations with universities and research institutions. Therefore we should not test the firms' absorptive capacity towards research institutions solely based on their R&D spending, but rather based on their actual experience and practice of research and development. Firms spending money on R&D might contract these tasks to others, and do not necessarily have the knowledge base themselves to utilize the knowledge from research institutions and universities. As such, I argue that research *experience* is a better measure of absorptive capacity than R&D *spending*, the measure used by Cohen and Levinthal (1990).

Therefore, firms with research and development capabilities, in the form of experience with research, development, patents, branding and other forms of product protection, are expected to recognize, assimilate, and utilize information and knowledge from research-, educational- and public institutions more than other firms.

> **Hypothesis 2:** Firms with experience based on R&D and branding capabilities, are able to recognize, assimilate, and utilize knowledge and information from research-, educational- and public institutions more than other firms with less R&D experience.

The RBV argues that difference in performance is linked to unique firm characteristics that are difficult for others to imitate (e.g., Barney, 1991; Wernerfelt, 1984). The knowledge based view further developed this idea and in this perspective knowledge is the most important of the firm's resources (e.g., Grant, 1996). Several studies of rapid-growth firms find that the founders and managers' previous work experience is significantly related to their growth (Barringer, et al., 2005; Chandler & Jansen, 1992; Cooper, Gimeno-Gascon, & Woo, 1994; Littunen & Niittykangas, 2010). They argue that the managers' work experience has an impact on their ability to utilize sources of knowledge and information, especially from organizations supporting the business. During their previous work, managers have established relations important for the

firm's daily operations. Pfeffer and Salancik (1978) argue that managers with previous experience and networks outside the firm can reduce firm uncertainty by channeling information and providing access to resources from their networks. Moreover, the ability to identify and acquire external information and knowledge and apply it to commercial ends, depends on accumulated prior related knowledge (Cohen & Levinthal, 1990).

The managers' previous experience, based on previous work relations, as entrepreneurs, as board members, and other network relations, should therefore facilitate channeling of external information, especially from support providers.

> **Hypothesis 3:** Firms with experienced managers are able to recognize, assimilate, and utilize external information from support providers more than firms with less experienced managers.

Control

Research identifies some variables important to control for. These variables are expected to affect a firms' ability to access and utilize information, but it is difficult to relate them to specific external relations. The first control variable is the managers and employees' educational level. In general, specific knowledge enhances a firms' absorptive capacity (Cohen & Levinthal, 1990). Sapienza and Grimm (1997) argue that skills such as searching and communication is enhanced through education. Also, research indicates a positive association between level of education and the ability to build social networks (Barringer, et al., 2005).

Secondly, I control for age and size. The liability of newness (Stinchcombe, 1965) and smallness (Aldrich & Auster, 1986; J. Freeman, Carroll, & Hannan, 1983) argument assumes that young or small firms have less developed internal resources, placing them at a disadvantage compared to older and larger firms. From the Penrosian and RBV tradition we learn that large firms have slack resources that they can put to different uses to gain competitive advantage. Small and new firms are therefore dependent on their ability to extend and maintain their network of inter-firm relationships to access external resources (Venkataraman & Van de Ven, 1998). Hite and Hesterly (2001) argue that young firms have identity based networks with fewer and more personal relations, while older firms have calculative networks which are larger and more

intentionally constructed. Organizations learn by "encoding inference from history into routines that guide behavior" (Levitt & March, 1988, p. 320). Young firms normally have less history and fewer lessons to learn from, both internally and from the environment.

Bierly and Daly (2007) have empirical results indicating that small firms use and learn from suppliers and publications more than larger firms, and that large firms use and learn more from alliance partners and consultants. Consultants have traditionally been used by large organizations because of their ability to control or direct consultancy assistance and thereby make more effective use of consultants (Bessant & Rush, 1995). Tether and Tajar (2008) find that large firms are more likely to form relationships with research institutions and consultants. These findings indicate that young and small firms have limited networks and spend most time with those relations important for their daily operations, such as suppliers and distributors. Conferences and expositions might be an easy way of extending their relations. Also, journals and other publications are easily accessible sources of external information. Large and older firms have longer histories, more experience and resources, hence more intentional developed networks.

Thirdly, I control for location and industry. The literature within economic geography has traditionally focused on the importance of regional innovation systems and the local character of learning processes, based on theoretical insight about the development and diffusion of complex knowledge. Economic regions are viewed as spaces for firms to specialize, compete, interact and develop divisions of labor between actors to generate competitive advantage (Dicken & Malmberg, 2001; Porter, 2000). Social interaction and labor market dynamics play a role in the knowledge creation process. Specialization and localized capabilities can be developed by locally shared knowledge bases (Bathelt, Malmberg, & Maskell, 2004). This is what Marshall (1919) in an ambiguous manner termed 'industrial atmosphere'. This 'atmosphere' develops in local systems or industrial districts, where shared knowledge and trust between partners reduces the transaction costs and facilitates diffusion of knowledge and skills (Asheim, 2000; Asheim, et al., 2007).

Large cities include more industries and consist of several related clusters. This creates variety and a heterogeneous environment which increase possible knowledge spillover effects (Frenken, Van Oort, & Verburg, 2007). Dynamic and innovative regions are characterized by both 'local buzz' and 'global pipelines' (Bathelt, et al., 2004). The local circulation of knowledge

and information (local buzz) is found mostly to be a phenomenon of larger urban regions. At the local level, formalized R&D partnerships are also important channels for transmitting knowledge (Trippl, et al., 2009). R&D institutions are first and foremost located in or near universities in the larger cities. One could therefore argue that firms located in central urban areas have better access to a variety of actors, and thereby improved possibilities for knowledge spillovers.

However, access to new knowledge is often acquired through inter-regional and international channels of knowledge flows (global pipelines). Maskell et al. (2006, p. 1005) argue that specifically conferences, expositions and trade fairs have an important geographical dimension, since these are events located far away, and that "active participation in [such] temporary clusters might […] help explain the success of solitary firms that are not located in industry agglomerations." Firms located in more sparsely populated areas might experience such events or temporary clusters as a bridge (pipeline) to important knowledge and information, and are more dependent on them than firms localized in central areas (areas with more buzz).

DATA, METHOD AND VARIABLES

In the following section, I first explain the selection of the sample and the data collection, then how the dependent and independent variables are constructed.

Sample and Data Collection

This study of rapid-growth firms is based on data from the official Register of Business Enterprises/Register of Company Accounts of Norway. Rapid-growth firms are defined as firms with a growth in sales income of at least 100 percent over a four year period. In the Norwegian database, income data is more accurate and reliable than data on employment, and therefore revenues from sales is used as the measure of growth. The firm must have a turnover of at least NOK 1 million (€ 125,000) the initial year, a positive operating profit over these years and no negative growth of income year on year in the period. There is no authoritative definition of a rapid-growth firm, and a lack of agreement on how growth should be measured and calculated (Delmar, 1997). My definition follows a conventional approach and uses growth in turnover (sales growth) as the most relevant growth indicator (Davidsson, Steffens, & Fitzsimmons, 2009;

Davidsson & Wiklund, 2000; Delmar, 1997). This results in a bias towards young and small firms' because proportional growth is used as an identifier.

The initial database used to identify the population contains accounting data for the years 2003–2006 for all Norwegian companies. After adjustments[1], the total population was 94,473 companies. From this population, 3,650 companies were identified as rapid-growth firms, representing 3.8 percent of the total population of limited liability companies.

A questionnaire was sent to 1466 rapid-growth companies[2] in 2009. 400 responses were received. Five were rejected due to incomplete answers and four other companies reported they were bankrupt or sold, resulting in a total of 391 completed questionnaires, or 26.7 percent of the sample. Only one key informant per firm answered the questions in the survey, and therefore represent a possible single-source bias (Avolio, Yammarino, & Bass, 1991). The great majority of the respondents represent the top management in the 391 firms. 88 percent of the respondents are CEOs; the other respondents are chairs of the board or department managers. 48.3 percent used a web based questionnaire, the rest (51.7 %) filled in their answers on an identical paper version.

The firms are quite young in age; 46.8 percent of the firms were established between 1998 and 2003. The median year of firm establishment is 1997. 28.4 percent of the firms are located in periphery- and small-city regions, 71.6 percent in medium sized to central areas. The firms are represented in 34 different industries by the 2 digit ISIC code (see Table 4 for an overview).

A t-test for nonresponse bias shows no significant differences between respondents and non-respondents regarding different variables, such as firm size, firm age, industry and geographical localization. Furthermore, different cross-group comparisons between the answers

[1] Companies in ISIC 65 "Financial intermediation" and 67 "Activities auxiliary to financial intermediation" were excluded due to the problem of many "empty" investment companies and specific regulations in the sector. ISIC 75 "Public administration, defense, compulsory social security" and 85 "Health and social work" were excluded because these industries are dominated by the public sector in Norway, and have extensive regulations. Further, all companies with zero expenses in labor cost and social expenses were excluded.

[2] The selection criteria for the survey were as follows: First, firms with less than € 62,500 in labor and social cost, less than € 1.25 million in sales income, and those with very high values in sales income (over € 62.5 million) and wage costs (over € 12.5 million) were excluded, thereby excluding the smallest and the largest. Secondly, we decided to exclude firms involved in simple resale and operations which do not include processing of products or services, or firms in industries subject to strict regulations and public licensing (i.e., ISIC 051 Fishing, 221 Publishing, 41 Collection, purification and distribution of water, 50 Retail sale of automotive fuel, 52 Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods, 70 Real estate activities, 71 Renting of machinery and equipment without operator and of personal and household goods, 73 Research and development, 80 Education and 93 Other service activities).

provided via the web and on paper are conducted, in accordance with the recommendations from Vandenberg and Lance (2000). No differences were found.

Dependent Variables

The dependent variables are the firm's external sources of information and knowledge. The respondents were asked four questions about to what extent (on a five-point scale) ten external sources had provided them with: 1) information important for their understanding of their markets, 2) technological knowledge, 3) new ideas, creative inputs and/or introductions of innovations, and 4) how much time they have spent interacting with each source. For a detailed overview of the results, see Table 1.

Table 1

The mean, standard error and standard deviation for all answers in the following questions (N=391): *To what extent have these actors/sources contributed with information about markets, technological knowledge, and new ideas, creative inputs, introduction of innovations. To what extent has your firm spent time on these actors. On a scale from 1-5, where 1 = to no extent, and 5= to a very large extent.*

	Market knowledge				**Technological knowledge**				**New ideas**				**Time spent**			
	Rank	Mean	Std.Er.	Std.Dev.	Rank	Mean	Std.Er.	Std.Dev.	Rank	Mean	Std.Er.	Std.Dev.	Rank	Mean	Std.Er.	Std.Dev.
Actors/sources:																
Customers/clients	***1***	3.90	.049	.972	***3***	2.83	.060	1.194	***1***	3.28	.054	1.065	***1***	3.88	.053	1.046
Alliance partners	***2***	3.40	.056	1.102	***2***	3.05	.056	1.103	***2***	3.03	.057	1.118	***2***	3.26	.058	1.146
Suppliers	***3***	3.08	.056	1.100	***1***	3.12	.059	1.167	***3***	2.83	.056	1.111	***3***	2.93	.056	1.103
Publications/internet	***4***	2.77	.054	1.071	***4***	2.53	.057	1.125	***4***	2.49	.054	1.069	***4***	2.42	.053	1.049
Conferences/expositions	***5***	2.53	.058	1.156	***5***	2.40	.057	1.123	***5***	2.43	.058	1.145	***5***	2.34	.052	1.023
Distributors	***6***	2.31	.057	1.136	***6***	2.13	.055	1.094	***6***	2.11	.054	1.061	***6***	2.20	.057	1.123
Consultants/advisors	***7***	1.97	.054	1.063	***7***	1.98	.056	1.110	***7***	1.81	.051	1.003	***7***	1.87	.054	1.063
Research-/education inst.	***8***	1.86	.050	.996	***8***	1.75	.048	.955	***8***	1.67	.044	.872	***9***	1.59	.043	.854
Financial-/service prov.	***9***	1.83	.049	.964	***9***	1.65	.046	.912	***9***	1.50	.040	.784	***8***	1.71	.043	.854
Public authorities/funds	***10***	1.50	.042	.832	***10***	1.40	.037	.733	***10***	1.35	.035	.700	***10***	1.45	.040	.786

There are obvious problems regarding how respondents understand the different categories, and that the categories may overlap. For example, a firm's alliance partner might also be a distributor. The result of a reliability test for all four questions about customers shows Cronbach's $\alpha = .734$. The first dependent variable is labeled 'Customers' and is constructed as the means across the four items mentioned. The second dependent variable (constructed as means across the four

items) is labeled ‘Alliance partners’. The reliability test for the four questions about alliance partners shows Cronbach’s α = .840.

Table 2

Summary of factor analysis for eight sources of information (N=391). Extraction method: Principal axis factoring. Rotation method: Varimax with Kaiser Normalization

	Rotated Factor Loadings			
Component	*1*	*2*	*3*	*4*
Items	*Publications/ internet Conferences/ expositions*	*Research-/ education inst. Public authorities*	*Suppliers Distributors Financial-/service providers*	*Consultants/ advisors*
Label used in the analysis	**Informative sources**	**Public sources**	**Support providers**	**Consultants**
Conferences/expositions (Ideas)	**.80**	.17	.18	
Publications/internet (Ideas)	**.75**	.12	.23	
Conferences/expositions (Techno)	**.75**	.20	.21	
Publications/internet (Techno)	**.74**	.14	.19	.12
Publications/internet (Time)	**.71**	.12	.16	.12
Conferences/expositions (Time)	**.68**	.18	.12	
Conferences/expositions (Market)	**.67**	.21	.15	
Publications/internet (Market)	**.67**	.15	.12	.11
Research-/education inst. (Ideas)	.24	**.75**		
Public authorities/funds (Techno)		**.73**		.17
Public authorities/funds (Ideas)		**.71**	.13	.20
Research-/education inst. (Time)	.23	**.71**		
Research-/education inst. (Market)	.27	**.69**		
Research-/education inst. (Techno)	.26	**.66**	.10	
Public authorities/funds (Time)		**.64**		.15
Public authorities/funds (Market)		**.63**		.16
Distributors (Techno)	.19	.12	**.67**	
Distributors (Ideas)	.15	.13	**.64**	
Financial-/service prov. (Techno)		.20	**.63**	.28
Financial-/service prov. (Ideas)		.26	**.61**	.33
Suppliers (Ideas)	.20		**.57**	
Distributors (Market)	.14		**.56**	
Distributors (Time)	.12		**.56**	
Financial-/service prov. (Market)		.14	**.55**	.23
Suppliers (Time)	.20		**.53**	
Suppliers (Techno)	.21		**.51**	
Financial-/service prov. (Time)		.15	**.50**	.35
Suppliers (Market)	.12		**.49**	
Consultants/advisors (Ideas)	.11	.17		**.83**
Consultants/advisors (Time)		.16		**.83**
Consultants/advisors (Techno)	.12	.13		**.81**
Consultants/advisors (Market)		.18		**.77**
Eigenvalues	4.74	4.33	4.21	3.19
% of variance	14.81	13.52	13.17	9.96
Cronbach's α	.919	.894	.860	.912

Factor loadings over .40 appear in bold.

(Market) = Market knowledge, (Techno) = Technological knowledge, (Ideas) = New ideas, (Time) = Time spent.

A factor analysis was conducted for the remaining eight variables to check if there are different groups or intercorrelated sets of variables that could be reduced to a smaller set of related variables. The result of the factor analysis is presented in Table 2. The analysis resulted in four new components[3].

The first component consists of the four questions (market knowledge, technological knowledge, new ideas and time spent) about journals, publications and the internet, and the four questions about conferences, fairs and expositions. This component is labeled as 'Informative sources' of information and knowledge. The second component is based on the eight questions about research- and educational institutions and public authorities/ public funds- and service providers. This component is labeled 'Public sources', as most of the research and educational institutions in Norway are owned by the public sector. The third component consists of the twelve questions about suppliers of goods and services, distributors of goods or services and financial- and accounting- service providers, and is labeled as the firms' 'Support providers'. The fourth component consists of only the four questions about consultants and advisors, and is labeled 'Consultants'.

The reliability test of the four new variables shows that all had high reliabilities, Cronbach's α = .860 and higher. Table 2 shows the factor loading after rotation. An initial analysis was run to obtain eigenvalues for each component in the data. The convergence of the scree plot and several analyses suggested using eigenvalue of 2. Four components had eigenvalues over Kaiser's criterion of 2 and in combination explained 51.45 % of the variance.

The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) represents the ratio of the squared correlation between variables to the squared partial correlation between variables. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. The KMO verifies the sampling adequacy for the analysis, KMO = .876 ('great' according to Field (2009)), and all KMO values for individual items are > .83, which is well above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity x^2 (496) = 8440.31, p < .001, indicates that correlations between items are sufficiently large for the principal axis factoring analysis.

[3] When running a factor analysis including customers/clients and alliance partners, the same variables clustered into the same four components. Customers/clients and alliance partners clustered into a fifth group. Cronbach's α = .788 for customers/clients and alliance partners together. Based on theory and research, I wanted to analyze customers/clients and alliance partners separately.

Based on the factor analysis and the reported tests, I composed four new variables by calculating the means across items. The means and standard deviations for the variables are described later (Table 5). These four variables, together with the variable 'Customers' and 'Alliance partners', represent the six dependent variables in this analysis.

Independent Variables

The first group of independent variables is the firm's self-reported internal resources and capabilities from the survey. The questions asked were to what extent the following statement had been important for the firm's rapid growth in the period. The respondents were to answer on a five point scale, ranging from 1 (not at all) to 5 (to a very large extent). A principal axis factoring analysis was conducted on 15 items about the firms' internal resources, competitive advantage and the management's prior experience (Table 3).

An initial analysis was run to obtain eigenvalues for each component in the data. The convergence of the scree plot and several analyses suggested using eigenvalue of 1.5. Three components had eigenvalues over Kaiser's criterion of 1.5 and in combination explained 40.16 percent of the variance. The items that cluster on the same components suggest that component 1 represents structuring of activities and internal organizational competences, and is labeled 'Organizational capabilities'. The second component represents the firms' experience and focus on research, patents and branding, and is labeled 'R&D/branding capabilities'. Component 3 measures the management's previous and diverse experience, and is labeled 'Managerial experience'. All three items have sufficiently high reliability, Cronbach's $\alpha = .709$ or higher. Table 3 shows the factor loadings after rotation.

The Kaiser-Meyer-Olkin measure verifies the sampling adequacy for the analysis, KMO = .77 ('good' according to Field (2009)), and all KMO values for individual items are > .76. Bartlett's test of sphericity x^2 (105) = 1574.17, $p < .001$, indicates that correlations between items are sufficiently large for the principal axis factoring analysis.

Based on the factor analysis and the reported tests, I composed three new variables by calculating the means across items (see Table 5 for the means and standard deviations).

The numbers for age and size used in the analysis are log transformed to correct for unequal variance. Most of the firms are young; the mean date of establishment was 1995. The

numbers are calculated for age as at 2010, and the firms' age range from 7 – 62 years old (mean 15 years old). The firms in this sample are also rather small; the average firm had a total turnover of NOK 38.6 (€ 4.8) million in 2005.

Table 3

Summary of factor analysis for competitive advantage and experience (N=391). Extraction method: Principal axis factoring. Rotation method: Varimax with Kaiser Normalization.

	Rotated Factor Loadings		
Component	*1*	*2*	*3*
Items	*Organizational capabilities*	*R&D/branding capabilities*	*Managerial experience*
Our ability to develop and follow-up strategic choices	**.78**	.20	.16
Our internal organizing of the firm	**.67**		.15
The culture and cooperative spirit in the firm	**.66**		
Our ability to handle changes, increase our capacity and use flexible production	**.52**		
Our focus on economic government and control	**.51**		
The management is focusing on long-term planning and development	**.47**		.16
Experience from previous work with patents or branding		**.72**	.15
Experience from previous work with research and development processes		**.70**	.16
Our experience with research and development of new products or services within the firm	.17	**.62**	
Our patents and licenses		**.55**	
Our knowledge of branding and product protection	.13	**.43**	.16
Experience from other fast growing firms	.13		**.77**
Experience with establishing other firms	.16		**.67**
Experience as board members in other organizations/firms	.11	.17	**.54**
Experience from firms in other industries		.22	**.41**
Eigenvalues	2.35	2.01	1.66
% of variance	15.67	13.40	11.09
Cronbach's α	.781	.747	.709

Factor loadings over .40 appear in bold

For a summary description of the remaining independent variables, education, industry and localization, see Table 4. Almost half of the managers have more than upper secondary

education, but only about one-fourth of the employees have higher education. The industries are categorized in seven broad categories. In the analysis, 'Other service' is left out and thereby represents the reference category. 71.6 percent of the rapid-growth firms are located in central areas and only 28.4 percent in periphery regions.

In the cross tabulation we find that Processing of commodities and Transportation are important industries in periphery regions, and that Retail & wholesale, ICT (information- and communication technology) and Other service are mainly found in central areas. There are more firms with highly educated managers in central areas than in periphery regions. ICT and Other service are dominated by firms with highly educated managers, and there are twice as many firms with lower educated managers in Processing of commodities and Construction than higher educated managers.

Table 4

Summary descriptives of education, industry and localization, and crosstabulations of industry and localization, industry and managers' education, and localization and managers' education. N=391

Descriptives				Crosstab			Crosstab		
Variable	*Description*	Freq.	*%*	Periphery	Central	*Total*	Edu man low	Edu man high	*Total*
Education managers*	Majority upper secondary education or less (0)	206	52.7						
	Majority more than upper secondary education (1)	185	47.3						
Education employees*	Majority upper secondary education or less (0)	284	72.6						
	Majority more than upper secondary education (1)	107	27.4						
Processing of commodities	ISIC: 01, 05, 11, 14, 15, 17, 20, 25, 26, 27, 28.	64	16.4	31	33	*64*	46	18	*64*
Other manufacturing	ISIC: 22, 29, 31, 32, 33, 34, 35, 36, 37, 40.	43	11.0	13	30	*43*	25	18	*43*
Construction	ISIC: 45.	100	25.6	33	67	*100*	68	32	*100*
Retail & Wholesale	ISIC: 51, 52, 55.	52	13.3	8	44	*52*	29	23	*52*
Transportation	ISIC: 60, 61, 62, 63.	33	8.4	14	19	*33*	22	11	*33*
ICT	ISIC: 64, 72.	36	9.2	4	32	*36*	3	33	*36*
Other service	ISIC: 74, 90, 92.	63	16.1	8	55	*63*	13	50	*63*
Total		*391*	*100*	*111*	*280*	*391*	*206*	*185*	*391*
Localization periphery	Rural areas and smaller cities up to 50,000 inhabitants	111	28.4				67	44	*111*
Localization central	Areas above 50,000 inhabitants	280	71.6				139	141	*280*
Total		*391*	*100*				*206*	*185*	*391*

* Education managers and employees are data collected in the questionnaire where the respondents had to indicate how many percent of the managers and employees with no education after primary school, upper secondary school, three years higher education, and five years higher education or more. A dichotomous variable was constructed on the basis of the data.

Industry:	ISIC:
Processing of commodities:	01=Forestry, 05=Fishing, fish farming, 11=Crude petroleum and natural gas, 14=Other mining and quarrying, 15=Food prod. and beverages, 17= Manufacture of textiles, 20=Products of wood, 25=Rubber and plastic products, 26=Non-metallic mineral products, 27=Basic metals, 28=Fabricated metal products
Other manufacturing:	22=Publishing, printing, recorded media, 29=Machinery and equipment, 31=Electrical machinery and apparatus, 32=Radio/telecom equipment, 33=Medical, precision/optical instr., 34=Motor vehicles, trailers, semi-trailers, 35=Transport equipment, ships etc., 36=Furniture, 37=Recycling, 40=Electricity, gas, steam/hot water.
Construction:	45=Construction
Retail & Wholesale:	51=Wholesale/commission trade, 52=Retail, repair personal goods, 55=Hotels and restaurants
Transportation:	60=Land transport, pipelines, 61=Water transport, 62=Air transport, 63=Support transport activities.
ICT:	64=Post and telecommunication, 72=Computer related activities
Other service:	74=Other business service activities, 90=Sewage and refuse disposal, 92=Recreation, cultural, sporting.

RESULTS

In general, this study confirms previous studies' impressions that the customers are the most important source of information and knowledge for rapid-growth firms, followed by alliance partners and suppliers (see Table 1). The results also confirm the works of Trippl et al. (2009), claiming that journals, publications, fairs and conferences play a vital role in the exchange of knowledge and information, and Bierly and Daly (2007) claiming that these sources are the third most important bases of knowledge and information for manufacturing firms. In general, my findings suggest that informative sources are important for firms in most industries. Weak and informal ties are thereby perceived as significant sources of new ideas, information about market trends and links to expertise.

The last group is, on a *general level*, not perceived as very valuable sources of information and knowledge for rapid-growth firms. This group consists of distributors, consultants/advisors, research- and education institutions, financial- and service providers, and public authorities and funds. According to Bryson, Keeble and Wood (1997), this could be more generally categorized as the firms' 'support network', providing advice, information and capital.

Descriptive Statistics

Table 5 contains descriptive statistics and the correlation matrix. Although several variables are correlated, the correlation coefficients do not indicate multicollinearity. When testing VIF (variance inflation factor), the VIF values are all well below 10 (no VIF value greater than 3). The average VIF is close to 1 (1.671), and confirms that collinearity is not a problem in this model. The tolerance statistics are all well above 0.2.

A few correlations can be commented upon. 'R&D/branding capabilities', 'Managerial experience', highly educated managers and the ICT sector significantly correlate with (3) 'Informative sources'. From the cross tabulation in Table 4 we see that most managers in the ICT sector have higher education, so this might be an industry effect more than an education effect. Firms located in periphery regions are significantly correlated to 'Public sources'. 'Public sources' includes a broad range of public instruments aiming to help firms, and these instruments are especially angled toward compensating for regional disadvantages and the disadvantages of

"smallness." For higher education we find the same relations regarding industry as in the cross tabulations in Table 4.

Table 5

Means, Standard Deviations, and Correlation Matrix (2-tailed) for Variables in the Study. N=391.

	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Customers	3.47	0.80	1																			
(2) Alliance partners	3.19	0.92	.30**	1																		
(3) Informative sources	2.49	0.88	.17**	.28**	1																	
(4) Public sources	1.57	0.64	.12*	.19**	.41**	1																
(5) Support providers	2.28	0.65	.23**	.49**	.38**	.25**	1															
(6) Consultants	1.91	0.94	.13*	.21**	.20**	.32**	.19**	1														
(7) Organizational capabilities	3.91	0.63	.13**	.15**	.09	.05	.10*	.05	1													
(8) R&D/branding capabilities	2.33	0.85	.15**	.08	.18**	.38**	.11*	.03	.18**	1												
(9) Managerial experience	2.69	0.89	.14**	.13**	.17**	.13**	.15**	.12*	.28**	.26**	1											
(10) Education managers (high)[a]	0.47	0.50	.23**	.09	.08	.18**	-.13*	.17**	-.03	.15**	.06	1										
(11) Education employees (high)[a]	0.27	0.45	.20**	.01	.15**	.19**	-.24**	.14**	-.01	.15**	.05	.57**	1									
(12) Log_Age	2.61	0.45	.02	-.02	-.05	.01	.01	-.02	.01	.05	-.13**	-.01	-.07	1								
(13) Log_Size05	4.39	0.38	.06	.10*	.01	.13**	.07	.14**	.10	.03	-.01	.11*	.02	.21**	1							
(14) Localization (periphery)[a]	0.28	0.45	-.03	.05	.03	.16**	.010	-.01	-.03	.09	.09	-.10	-.20**	.05	-.07	1						
(15) Processing of commodities[a]	0.16	0.37	-.13**	-.12*	-.01	.13**	.03	-.08	.03	.06	.06	-.17**	-.24**	.05	.04	.20**	1					
(16) Other manufacturing[a]	0.11	0.31	.06	.01	-.01	.05	.07	-.08	.08	.14**	.02	.04	.07	.11*	.08	.01	-.16**	1				
(17) Construction[a]	0.26	0.44	-.21**	.04	-.11*	-.12*	.03	.14**	-.05	-.27**	-.15**	-.18**	-.32**	.05	.00	.06	-.26**	-.21**	1			
(18) Retail & Wholesale[a]	0.13	0.34	.07	.04	.01	-.15**	.13*	-.16**	-.05	.05	-.08	-.02	-.11*	.01	-.03	-.11*	-.17**	-.14**	-.23**	1		
(19) Transportation[a]	0.08	0.28	-.00	.02	-.09	-.08	.10*	-.13*	.01	-.06	.05	-.08	.04	-.06	-.01	.10	-.13**	-.11*	-.18**	-.12*	1	
(20) ICT[a]	0.09	0.29	.18**	.10*	.23**	.16**	-.10*	.05	-.00	.11*	.11*	.28**	.46**	-.14**	-.02	-.12*	-.14**	-.11*	-.19**	-.13*	-.10	1
(21) Other service[a]	0.16	0.37	.12*	-.07	.03	.05	-.24**	.18**	.01	.06	.05	.28**	.45**	-.07	-.06	-.15**	-.19**	-.15**	-.26**	-.17**	-.13**	-.14**

*p < .05, ** p < .01 (2-tailed)

[a] Dummy variables (1 else 0)

Hypotheses Tests

Organizational Capabilities

Table 6 provides the results of the linear regression. 'Organizational capabilities' is significantly related to both 'Customers' and 'Alliance partners', giving support for Hypothesis 1, claiming that firms who focus on and develop organizational capabilities have the necessary capacity and capability to value and spend time on knowledge and information exchange with customers and alliance partners. 'Organizational capabilities' is, on the other hand, not significantly related to the other sources of knowledge and information. I therefore suggest that well developed 'Organizational capabilities' are most beneficial when firms interact with the close relations that they spend most time with.

Network theory argues that our closest relations are our most valuable sources of knowledge and information, and that knowledge creation depends on strong ties (Lechner & Dowling, 2003). Knowledge creation (instead of knowledge acquisition) and close collaboration

is complex, time-consuming and brings coordination challenges. Absorptive capacity related to such close relations seems dependent on well-developed internal communication structures, systems and strategies. Interestingly, the educational standard of managers is also significantly related to interaction with 'Customers' and 'Alliance partners', but no other sources. Educated managers seem therefore to have better capabilities in knowledge creation and more training in managing close interaction with customers and partners. We could also speculate if educated managers have more tools and training to develop internal capabilities, create well-functioning organizations, and to manage them.

Table 6

Linear regression model. Dependent variables: Customers, Alliance partners, Informative sources, Public sources, Support providers, Consultants. N=391

	Customers			Alliance partners			Informative sources			Public sources			Support providers			Consultants		
	B (SE)		β	B (SE)		β	B (SE)		β	B (SE)		β	B (SE)		β	B (SE)		β
Constant	2.19***	(.53)		1.02	(.63)		1.62**	(.59)		0.09	(.40)		1.01*	(.43)		0.20	(.62)	
Firm factors:																		
Organizational capabilities	.14*	(.06)	.11	.19*	(.08)	.13	.07	(.07)	.05	-.03	(.05)	-.03	.05	(.05)	.05	.01	(.08)	.01
R&D/branding capabilities	.03	(.05)	.03	.03	(.06)	.03	.10†	(.06)	.10	.25***	(.04)	.33	.08*	(.04)	.11	.03	(.06)	.02
Managerial experience	.07	(.05)	.08	.09	(.06)	.09	.10†	(.05)	.11	.01	(.04)	.01	.09*	(.04)	.13	.12*	(.06)	.12
Education managers (high)	.23*	(.10)	.14	.20†	(.11)	.11	-.06	(.11)	-.04	.07	(.07)	.06	-.01	(.08)	-.00	.18	(.11)	.09
Education employees (high)	-.08	(.13)	-.04	-.18	(.16)	-.09	.12	(.15)	.06	.17†	(.10)	.12	-.23*	(.11)	-.16	.06	(.16)	.03
Log_Age	.08	(.09)	.05	-.04	(.11)	-.02	-.04	(.10)	-.02	-.05	(.07)	-.03	-.03	(.07)	-.02	-.05	(.11)	-.02
Log_Size05	.09	(.11)	.04	.23†	(.13)	.10	.04	(.12)	.02	.22**	(.08)	.13	.12	(.09)	.07	.36**	(.13)	.15
Localization (periphery)	.08	(.09)	.05	.15	(.11)	.07	.12	(.10)	.06	.21**	(.07)	.15	.05	(.07)	.04	-.05	(.11)	.03
Industry:																		
Processing of commodities	-.45**	(.16)	-.21	-.20	(.19)	-.08	-.08	(.18)	-.03	.19	(.12)	.11	.20	(.13)	.11	-.47*	(.19)	-.19
Other manufacturing	-.10	(.17)	-.04	.08	(.20)	.03	-.08	(.19)	-.03	.03	(.13)	.01	.31*	(.14)	.15	-.56**	(.20)	-.18
Construction	-.44**	(.15)	-.24	.20	(.18)	.10	-.10	(.17)	-.05	.03	(.12)	.02	.28*	(.12)	.18	-.02	(.18)	-.01
Retail & wholesale	-.02	(.16)	-.01	.26	(.19)	.10	.05	(.18)	.02	-.20†	(.12)	-.11	.46***	(.13)	.24	-.65**	(.19)	-.24
Transportation	-.18	(.18)	-.06	.17	(.21)	.05	-.28	(.20)	-.09	-.13	(.13)	-.06	.44**	(.14)	.19	-.71**	(.21)	-.21
ICT	.22	(.16)	.08	.42*	(.19)	.13	.51**	(.18)	.17	.15	(.12)	.07	.14	(.13)	.06	-.33†	(.19)	-.10
R^2	.15			.09			.10			.24			.15			.14		
F	4.56***			2.64**			3.01***			8.46***			4.56***			4.42***		
Numbers of observations	391			391			391			391			391			391		

† p < .10, * p < .05, ** p < .01, *** p < .001

Standard errors in parentheses.

R&D/Branding Capabilities

Hypothesis 2 suggests that firms with 'R&D/branding capabilities' are dependent on external information, especially scientific and regulatory information and knowledge. This hypothesis is strongly supported in the regression analysis. 'Public sources' is a combination of measures related to the importance of institutions of research and higher education, and public authorities

and funds. Research is costly and complicated, and public authorities offer support for firms through different instruments, such as financial support, tax reduction, advice, market-/export information and so forth. Also, in this Norwegian case, the majority of research- and education institutions are publicly owned. I therefore argue that this combination of 'Public sources' is especially important for firms focusing on research, patents, branding and innovative activities. Firms working with research and patents are probably more in contact with such institutions, are in more need of their knowledge and services, and also have a better communicative platform for their interaction. When running *separate* regression analysis on 'Public authorities/funds' *and* 'Research-/education institutions' (splitting the component 'Public sources', see Tables 2 and 1), *both* are significantly related to R&D/branding capabilities at the $p < .001$ level.

I argue that firms' actual experience and practice of R&D (their capabilities) is a better measure than their R&D spending. When tested for R&D spending, based on the firms' accountings, I find the same significant results for all the variables as in Table 6, but in addition I find that R&D *spending* on 'Public sources' is $p = .045$ ($R^2 = .248$, $F = 8.228$***). However, when running separate regression analysis (splitting the component 'Public sources', as above), I find that R&D spending on 'Public authorities/funds' $p = .072$, and on 'Research/education institutions' $p = .114$. I therefore argue that R&D spending (based on their accounting data) *can* indicate absorptive capacity towards research- and public sources, but that R&D capability, in terms of actual experience and practice, is probably a *better* measure.

I also find that firms with 'R&D/branding capabilities' are significantly (but more weakly) related to 'Informative sources'. This indicates that such firms search for the latest knowledge within and associated to their own field of expertise in publications and at conferences. They are further related to 'Support providers'. When running separate regression analysis on Suppliers, Distributors, and Financial-service providers, only Distributors are significantly related to 'R&D/branding capabilities' ($p = .007$). This may indicate that these firms have less contact with end users/customers, but rather are getting feedback on their products and services through their distributors as an important channel of knowledge and information.

Managerial Experience

Hypothesis 3, claiming that managerial experience is associated with the firms' ability to acquire and utilize external information and knowledge from support providers, is also approved.

‘Managerial experience’ is significantly positively related to firms’ ‘Support providers’, ‘Consultants’ and to a certain degree ‘Informative sources’. This indicates that accumulated prior related experience and knowledge is an important resource, and enhances a firm’s ability to identify and acquire external information and knowledge. I argue that managerial experience should therefore be regarded as a central part of a firm’s level of absorptive capacity.

Control

Educational level

As earlier mentioned, higher educated managers are only significantly positively related to ‘Customers’ and ‘Alliance partners’. The strategic alliance literature highlights the challenging nature of alliances and partnerships (Day, 1995), and higher education among managers can have a positive impact in understanding and handling opportunities and limitations in such relations. Firms with higher educated employees are weakly related to ‘Public sources’. Educated employees probably strengthen a communicative platform between firms and research institutions and universities, thereby enhancing the firms’ absorptive capacity (Cohen & Levinthal, 1990). This is in line with empirical research by Tether and Tajar (2008) indicating a positive association between level of education and the use of research institutions. Higher educated employees are significantly *negatively* related to firms’ ‘Support providers’.

Age and Size

There are no significant relations between firms’ age and their use and valuing of external sources of information. So, if networking is a critical skill discriminating rapid-growth firms from the average firm (Jarillo, 1989; OECD, 2002; Schreyer, 2000), the data suggest that this skill is independent of the age of the firms. Large firms value information and knowledge from ‘Alliance partners’, ‘Public sources’ and ‘Consultants’ more than smaller firms do. This confirms prior research arguing that larger firms have greater access to external resources (Aldrich & Auster, 1986), and are more likely to relate to and learn from alliance partners, consultants and informative sources (Bessant & Rush, 1995; Bierly & Daly, 2007; Tether & Tajar, 2008). It could be argued from an RBV perspective that larger firms have more slack resources at their disposal

to spend on external relations. Moreover, larger firms could be in better position to control and direct this interaction for their own benefit.

Geographic Localization

I do not find more exchange of knowledge and information in more central areas than in the periphery. In fact, all numbers, except for 'Consultants', were more positively favored toward periphery areas. Tracey and Clark (2003) argue that firms are overcoming the barriers of distance and seek the most appropriate partners, regardless of their geography. In this context I argue that they seek relevant sources of information and knowledge regardless of geographical location, and I do not find any evidence in this survey that the location of the firm is a barrier to information and knowledge. In this respect the Norwegian case is quite interesting. After Iceland, Norway has the lowest population density in Europe, with 16 inhabitants per km^2 and a total of 5 million inhabitants (ssb.no, 2013), meaning that remote areas are really remote and thereby represent a good case for studying location barriers to the diffusion of knowledge.

Periphery localization is significantly related to 'Public sources' (public authorities/funds and research- and education institutions). When running separate regression analysis on 'Public authorities/funds' and 'Research-/education institutions', periphery localization is significantly related to 'Public authorities/funds' with $p = .045$ and to 'Research-/education institutions with' $p = .003$. On the basis that most of the higher research- and educational institutions are located in larger cities, I would expect the opposite effect. In the cross tabulation in Table 4, we see that Processing of commodities is an important industry in periphery regions, also confirmed in Table 5. Processing of commodities is further significantly related to 'Public sources' (in Table 5), so a possible explanation is that we are witnessing an industry effect, but this is not verified in the regression analysis (Table 6).

Industry

When looking at the industry level, we have to remember that 'Other services' (mainly business services) are left out, and represent the reference category. Processing of commodities and Construction is negatively related to 'Customers'. Within Processing of commodities, the firms often produce standardized products and might have only a few customers, which could explain why they are getting less information and spend less time on 'Customers' than other industries.

ICT is the only industry significantly related to ‘Alliance partners’ and ‘Informative sources’, thereby supporting some of the results found by Trippl et al. (2009) regarding the importance of ‘Informative sources’ for the ICT industry. Personnel in the ICT industry may have a better foundation, both from their education and daily operations, to efficiently search for and systemize information available from such sources. Remember that ‘R&D/branding capabilities’ and ‘Managerial experience’ is related to ‘Informative sources’. ‘Managerial experience’ may include experience in networking. The common denominators seem to be experience and search capabilities.

The firms’ ‘Support providers’ are especially important for Other manufacturing, Construction, Retail & wholesale and Transportation. I argue that ‘Support providers’ are more important actors for the daily operations of these industries. Looking at the correlation matrix in Table 5, we see that ICT and Other services are negatively related to their ‘Support providers’.

‘Consultants’ offer expertise and special services (Bryson, et al., 1997) which, according to the regression analysis, is perceived as not so relevant for most industries. In the correlation matrix we observe that ‘Consultants’ are important sources for Construction and Other services. ‘Consultants’ are also related to large firms and, according to Bessant and Rush (1995), large organizations have better ability to control or direct consultancy assistance and thereby make more effective use of them.

DISCUSSION, IMPLICATIONS AND LIMITATIONS

Discussion and Conclusion

There are several theoretical and practical implications of these results. This paper explores how rapid-growth firms with their diverse characteristics facilitate knowledge transfer from six broader categories of external sources: ‘Customers’, ‘Alliance partners’, ‘Informative sources’, ‘Public sources’, ‘Support providers’ and ‘Consultants’. Until now, research has focused on only a few external sources of knowledge and information, and a restricted range of firm characteristics. In this study I use unique survey data, both regarding the firms’ valuing of their external relations and in measuring their internal capabilities and resources (Organizational capabilities, R&D/branding capabilities, Managerial experience and educational level), combined with public data (age, size, localization and industry).

I use multiple theories, like RBV, organizational theory, social capital, absorptive capacity, and economic geography in this study. This paper therefore contributes to a broader understanding of which and how different firm characteristics, capabilities and resources are associated with and facilitate knowledge spillovers from external relations. These findings are relevant for managers regarding how firms develop their abilities to take advantage of and create opportunities in their interplay with their environment. The findings are further relevant for policy makers for understanding growth processes, diffusion of knowledge, and dynamics in a regional innovation policy.

Rapid-growth firms in Norway are an interesting case in at least two ways. Firstly, prior research has concluded that rapid-growth firms are more network-oriented, using more external resources and have wider range of network relations than 'ordinary' firms (e.g., Cunneen & Meredith, 2007; Jarillo, 1989; Zhao & Aram, 1995). Business managers interested in growth can learn from rapid-growth firms regarding which internal capabilities and resources these firms are developing and utilizing when targeting specific external sources of knowledge. Secondly, Norway, with its geographical characteristics and scattered population, is an interesting case in the debate of location barriers for diffusion of information and knowledge.

In Table 7, the most central findings of the analyses are summarized. In the first column we find the rapid-growth firms' external relations. They are categorized into four groups according to how the capabilities are associated with knowledge spillovers from different external relations. The categorization aims at broadening our understanding of firm's absorptive capacity. The right column sums up the most important implications for managing external relations.

In general, my study shows that close relations, like customers and alliance partners, are the most valuable sources of knowledge and information in a period of rapid growth. Learning from customers and alliance partners is associated with firms with 'Organizational capabilities' and higher educated managers. This is in agreement with the strategic alliance literature that emphasizes cooperation and coordination between strategic partners as an organizational challenge, and that firms' need well developed organizational capabilities to best take advantage of opportunities and develop knowledge in close partnerships.

Table 7

Summary of results from the analyses

Relations: Dependent variables	**Firm capabilities: Absorptive capacity**	**Implications**
Close relations: - Customers - Alliance partners	***Organizational capability:*** – Structuring of activities.	Cooperation and coordination between close relations and strategic partners is an organizational challenge. Firms need to focus on and develop internal capabilities and competences to understand the need for, to manage, and have time to utilize such relations. Highly educated managers may have tools and training to manage the challenge.
Informative sources: - Journals/publications - Conferences/fairs	***Networking capability:*** - Experience in networking and ability to search for and systemize information.	Accumulated related experience in networking and identifying sources of information, and the ability to search for and systemize information enhances a firm's ability to identify, acquire, and take advantage of information available from such sources.
Public sources: - Research institutions - Public authorities	***R&D capability:*** – Relevant experience and a mutual communicative platform.	To take advantage of information and knowledge from research institutions and public authorities, a firm needs relevant experience from research. Relevant experience enables a mutual communicative platform of knowledge.
Support network: - Distributors - Financial-/service prov. - Suppliers - Consultants	***Influencing capability:*** - Accumulated experience and size.	The strength of relations depends on how important they are for the firm's daily operations. Experience and large size enhances the firm's ability to channel information, provide access to resources and control and direct the interaction.

Rapid-growth firms actively use 'Informative sources' like written/codified information (journals, publications, the internet) and "short-lived hotspots of intense knowledge exchange, network building and idea generation" (conferences, expositions and fairs) (Maskell, et al., 2006, p. 997). These seem to be easily accessible and valuable sources of specialized information for most firms. 'Managerial experience' is related to the development of new linkages, and I argue that experience in networking and the ability to identify sources of knowledge and information are relevant capabilities, with regard to these sources. Moreover, learning from 'Informative

sources' is significantly associated with the ICT sector, and to a certain degree firms with 'R&D capabilities'. The competence such firms possess might include the ability to search for and systemize information; a possible advantage when firms try to find relevant information from these sources. Each of these capabilities are accumulated through experience over time and are given the collective term 'Networking capability'.

Interacting with research- and educational institutions and public authorities are associated first and foremost by firms with analytical (R&D/branding) capabilities, but also by firms with highly educated employees, large firms and firms located in the periphery. Higher education, combined with relevant and actual experience with research and systematic development processes, probably gives these firms a better communicative platform for their interaction with research- and education institutions, as suggested by Asheim (2007). An alternative explanation is that firms with R&D focus are more in need of their services. I cannot verify a possible industry- and localization effect, and suggest that the internal capabilities of the firms and common understanding between the actors are more important for the firms' interaction with 'Public sources' than their industry structure.

The last source of information for rapid-growth firms is their general support network (distributors, consultants, financial service providers and suppliers). There is an apparent industry effect regarding the firms' support network. Other manufacturing, Retail & wholesale and Transportation industries have especially close relations with their 'Support providers' (distributors, financial service providers and suppliers), and fewer relations with 'Consultants'. My understanding is that the strength of the relations with these actors is dependent on how important these actors are to the daily operations of these industries'. As specified by Lin (2001) actors invest in relations for achieving goals. The relations to managerial experience indicate that prior experience enhances the firm's ability to provide access to and channel information between the actors. According to Bessant and Rush (1995), large firms have the ability to control and direct their interaction with consultants. Such ability is dependent on size, but my analyses indicate that it is also based on accumulated experience developed over time. Moreover, large firms have more slack resources to invest in human and managerial resources to explore and utilize external sources, especially 'Public sources' and 'Consultants'. In sum, the ability to provide access to and channel information, and control and direct the interaction, represents a firm's potency to influence its relations.

Theories of social capital contribute to our understanding of the resources available in networks of social relations. While there is a discussion of whether the strength of ties are important or not, few discuss if there are different types of ties. Economic geography identifies different 'pipelines' of knowledge flows, from relations closely located to distant connections. In this paper different types of relations and sources are identified, including more remote sources of knowledge. This result indicates that analysis of social capital can benefit from including a broader set of sources, and from distinguishing between the sources. I do not find any support that localization in remote areas is a barrier to knowledge and information from external sources. On the contrary, at least the rapid-growth firms located in the periphery are conscious of the potential of external knowledge and are active in utilizing this potential. It may be the case that this consciousness is an important explanation of why some firms in the periphery grow.

In addition to the structural dimension, theories of social capital argue that the foundations for knowledge sharing are personal relations and shared meaning. Theories of absorptive capacity expand our knowledge of the firm's capability to access and utilize the knowledge by identifying the importance of internal competencies and capabilities related to R&D. This study confirms the theory of absorptive capacity in regard to innovative capabilities. Based on the measure used in this analysis, the notion of how important the actual experience in R&D activities is strengthened.

However, theories of absorptive capacity have mainly focused on firms' and their members' innovative capabilities and knowledge. The RBV and organizational theory discuss a broader set of firm capabilities, experience, and resources, including how the internal organizing and structuring of activities in the firm influence the ability to access and utilize knowledge. By analyzing organizational structuring, this study shows that well-developed organizational capabilities (focus on reorientation, organizational culture, strategic development and structuring of activities) increase an organization's capacity to utilize knowledge and information from close cooperation with external actors. As such, we can argue that the bureaucratic cost of organizing is necessary to be able to handle close and time-consuming relations. Furthermore, theories of absorptive capacity have mainly focused on engineers' experience and knowledge. In this analysis experienced managers are identified as an important firm resource, not only as administrators and strategist. The analysis indicates that their experience and relations from previous work is important for maintaining old and identifying new relations, and for governing the relations.

From a managerial, organizational, and regional innovation policy perspective, it is important to understand from where firms access information and knowledge, and how firm capabilities facilitate the acquisition of knowledge from these sources. This study is especially relevant to better understand the importance of firm capabilities and external sources of knowledge for firms in a process of rapid growth. I find that firms' internal capabilities and competences significantly influence the scale and scope of the knowledge and information that can be generated from external sources. As such, this study contributes to a more nuanced understanding of the concept of firms' absorptive capacity by identifying how the different firm capabilities are related to these external sources of information (see Table 7). If the analytical levels discussed above are implemented in the theories of social capital and absorptive capacity, I argue that we will have a better foundation for understanding the mechanisms of firm's access to and utilization of knowledge from external relations.

Implications, Limitations and Suggestions for Future Research

The results regarding managerial experience and education indicate that these variables should also be tested as underlying variables, through mediating variables, in later research. Also, the few industrial differences found calls for more research taking into consideration firms' internally developed capabilities and not only their industrial classification. Moreover, my research shows that analysis of absorptive capacity should not solely be based on register data such as size, R&D spending and educational level.

This study has some important limitations. Firstly, only one respondent from each firm has answered the questionnaire, and even if this is the firm's CEO, they do not have a total overview of the employees' network of relations. This single-source bias should be confronted in future research, by asking a broader set of informants from each firm. Secondly, there are possible measurement errors in regard to how these capabilities are measured. More studies are needed to validate or refute my analysis. Thirdly, only rapid-growth firms are investigated. Similar comparable studies between rapid-growth firms and 'ordinary' slow-grow firms should be conducted. Fourthly, even though this paper has explored the associations between an extensive range of firm factors and external sources of knowledge and information, there is good reason to believe that future research with other and more detailed classifications can improve

our understanding of firms' absorptive capacity and social capital. A larger data set can also provide a more detailed analysis of geographical regions and other geographical indexes. Overall, I suggest that more attention should be paid to the use of multiple theoretical perspectives and methods to explore the associations between complex phenomenon such as firm capabilities, social capital, absorptive capacity, and rapid growth.

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Article 3

Growth and decline in a changing macroeconomic environment: When the rapid-growth firms met the financial crisis

GROWTH AND DECLINE IN A CHANGING MACROECONOMIC ENVIRONMENT: WHEN RAPID-GROWTH FIRMS MET THE FINANCIAL CRISIS

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ABSTRACT

The recent financial crisis represents a good opportunity to determine whether firm-specific resources and capabilities developed before the crisis can explain why firms, faced with macroeconomic change beyond their control, continue to grow in turbulent times. More than 300 Norwegian rapid-growth firms from 2003 to 2006 were followed through the initial phase of the financial crisis. The results show that financial solidity and organizational capabilities are directly and indirectly related to their performance in 2006 to 2009. International capabilities and firm-focused R&D represents mediating variables for growth. Furthermore, experienced managers are central in recognizing and exploring opportunities in the market.

INTRODUCTION

This article focuses on the capabilities and financial resources of rapid-growth firms that are suddenly confronted by a period of economic crisis. In particular, the study aims to determine whether firms' resources and capabilities developed in their period of rapid growth can explain their later development, especially during an economic decline. An examination of the growth of these firms as the macroeconomic environment changed, from growth to economic downturn, represents an important setting that helps shed light on how changes in macroeconomic conditions can influence the growth of firms. Studies exploring whether firm resources and capabilities create sources of competitive advantage across different macroeconomic conditions are scarce. It is entirely possible that firms exhibiting high growth rates in a period of economic growth fall behind their competitors in times of an economic recession. The theories used in this analysis include economic theory, the resource-based view (RBV), organizational theory, and population ecology. To some extent, these theories are in

opposition to one another, but the use of multiple perspectives can provide new insight into the phenomenon (Poole and Van de Ven, 1989).

This analysis follows the tradition of Penrose (1959) with a focus on the growth process in established firms. She understood growth as an interaction between internal processes and resources and market opportunities. The RBV, building on Penrose's work, assumes that firms contain bundles of heterogeneous resources. Firm growth results from internally developed capabilities and resources transformed into competitive advantages (Wernerfelt, 1984). 'Capabilities' are understood as internal attributes that enable a firm to coordinate and exploit all its resources (Stalk, Evans and Shulman, 1992). According to the RBV, firms exhibiting high growth rates have resources and capabilities that confer competitive advantages that help them grow faster than their competitors (Wernerfelt, 1984; Wernerfelt and Montgomery, 1988).

However, a firm's competitive advantage may be more or less customized for a specific industry. Studies of horizontal diversification (Robins and Wiersema, 1995; Rumelt, 1974) indicate that firms tend to do better when they diversify into related industries. This notion suggests that the competitive advantages that firms derive from their resources and capabilities are relatively specific to their environment.

The idea that firms' resources and capabilities are specialized to a specific environment and cause differential growth is also present in evolutionary theories of economic growth. Nelson and Winter (1982) explain technological change and economic growth with differential selections and growth patterns of firms. Firms that have a 'genetic makeup' (specific routines and capabilities) best fit the environment, survive, and grow. As firms with a better fit to the environment grow at the expense of other firms, the genetic makeup of the entire population of firms changes. Thus, in line with evolutionary theory of economic growth, firms that grow at a faster rate than their competitors should be better adapted to their environment. However, if the environment changes in important dimensions (e.g., a more structural than cyclical change), all or some of these rapid-growth firms may be ill-equipped to adapt to the changes, limiting their role as sources of new economic growth. The population level of organizational ecology seeks to explain factors affecting which organizations are born or die in a population of existing organizations (Carroll, 1984). According to population ecology the possibilities to grow depend on the capacity of the environment to supply the size of the population, called the environments 'carrying capacity' (Hannan and Freeman, 1977). Any exogenous shock which add constraints to a system can

eliminate a population or reduce the population's carrying capacity. Those firms less fit to the environmental contingencies will most likely be eliminated.

The financial crisis is a kind of natural experiment, a situation few had expected. The first signs of the macroeconomic downturn appeared in 2007. In Norway, the decline was really manifested in firms' accounts in 2008–2009. For example, bankruptcy rates rose among Norwegian firms by more than 50 percent from the fourth quarter 2008 to the first quarter 2009 (StatisticsNorway, 2014). The number of bankruptcy petitions per year increased by 76 percent from 2007 to 2009 (StatisticsNorway, 2013). Research by Lien and Knudsen (2012) shows that firms' profit margins decreased 25 percent from 2007 to 2009 and that firms with high debt-equity ratio or firms that experienced rapid growth before the crisis were more negatively affected by the crisis than others.

One aspect of the crisis was increased restriction of loans from financial institutions, resulting in both higher cost of external finance of investment and less access to finances in the market. Another aspect was the decline in consumer demand. I argue that such a crisis is a more robust test of a firm's capabilities and resources than if tested under stable conditions. The financial crisis therefore represents a suitable case to test whether internal capabilities *and/or* the firms' financial resources developed before the crisis, can explain later growth or decline in a turbulent macroeconomic environment. Thus, the question posed in this article is whether rapid-growth firms' resources and capabilities developed during a period of macroeconomic growth, can explain the firms' later success or decline in a period of economic crisis.

The article proceeds as follows: The next section begins with a description of the central theoretical constructs. Five hypotheses are then developed on the basis of the literature, after which mediating effects are suggested. The next section describes the sample, variables, and methodology. Then, the results are presented. The article concludes with a discussion of the results, their implications, limitations, and suggestions for further research.

LITERATURE RVIEW AND HYPOTHESES

This section discusses whether rapid-growth firms can sustain their growth during an economic crisis. On the basis of the literature review, I develop a basic model of the relationship between firm growth and financial resources, organizational capabilities, intangible resources, international capabilities, and managerial experience.

Financial resources

Rapid-growth firms were in a vulnerable position during the financial crisis (Lien and Knudsen, 2012). In general, rapid-growth firms can experience problems in financing their growth (Phelps, Adams and Bessant, 2007), and self-financing and loans are the most common way of obtaining finance (Moore, 1994). Rapid-growth firms tend to have lower levels of solvency and more problems with liquidity than non-high-growth firms (Moreno and Casillas, 2007). Cooper, Gimeno-Gascon and Woo (1994) found that initial financial capital is important for the survival and growth of new ventures. Opler and Titman (1994) revealed that firms with high financial leverage before a distressed period are more sensitive to economic downturns than their competitors and lose market share. McConnell and Servaes (1995) compared rapid- and slow-growth firms and found that future growth opportunities are associated with low levels of leverage for high-growth firms. Heyman, Deloof and Ooghe (2008) also claim that high-growth firms have a lower debt ratio than slow-growth firms. Bastesen and Vatne (2014) found that the share of debt is larger in rapid-growth firms compared to the rest of the population, but the differences are not dramatic. The return on equity and total assets are better for rapid-growth firms than what is expected from normal companies.

Modigliani and Miller's (1958) well-known theorem demonstrated that in perfect capital markets, capital structure and debt–equity choices are irrelevant. In perfect capital markets, profit is not dependent on equity. However, later research adjusted this assumption by specifying that low equity bears greater risks of bankruptcy, lower product prices in the market (because the market is uncertain of firms' solidity), and a probability of higher rates of interest (because of the risk of bankruptcy).

With the current economic crisis, the cost of external funding from banks increased, and the banks became more restrictive in their lending policies, leaving firms with higher debt levels with fewer funds for growth. Firms with less internal funds also had to pay higher markups and fees to access lines of credit. At the same time, "credit lines played an important role in firms' investment policies during the crisis" (Campello *et al.*, 2011, p 1975), and firms with less internal liquidity became more dependent on credit lines provided by banks. Furthermore, as the cost of external funding rises, management's incentives to grow are constrained. However, the growth rate of firms that have accumulated large amounts of financial resources was less affected by the credit crunch that characterizes this economic crisis. I use equity ratio to measure the solidity of the firm (total equity/total assets), and a low

equity ratio can indicate a higher level of debt. Thus, a low equity ratio should negatively affect the rate of growth of firms.

> *Hypothesis 1 (H1): Rapid-growth firms with a high equity ratio (of total assets) in the initial stages of a financial crisis grow at a faster rate during the crisis than those with a low equity ratio.*

Organizational capabilities

The evolutionary perspective predicts different types of structural changes as a consequence of and a cause of firm growth. For example, Scott and Bruce (1987) and Rutherford, Buller and McMullen (2003) argued that increased formalization is the prescribed response to change in the organizations environment. Rapid growth is mostly considered a positive and desirable phenomenon, but rapid-growth firms are an important case to study because rapid growth often is followed by new challenges.

Penrose (1959) focused on firm's internal factors that create and constrain a gradual growth and change of the firm. The RBV treats all resources within the firm, such as financial, physical, human, and organizational resources, as possible sources of competitive advantage (Barney, 1991). Internal processes of coordinating and combining complex social resources, such as culture, reputation, and human capital, create heterogeneous firms (Barney, 1995). Firms' capacity to renew their competences in response to changing environmental conditions, or their dynamic capabilities, is central in understanding the development of capabilities for competitive advantage and wealth creation (Teece, Pisano and Shuen, 1997).

Research has shown that rapid growth leads to increased managerial complexity (Nicholls-Nixon, 2005), and managers can expect to encounter problems in several areas, such as management of employees, formalizing of systems, and operational improvements (Phelps *et al.*, 2007). As a result, rapid-growth firms typically increase their number of managers and make structural changes in the division of manager responsibilities (Smallbone, Leigh and North, 1995). Some empirical results indicate that different forms of planned strategies, like written business plans, are positively associated with rapid growth and profitability (Baker, Addams and Davis, 1993; Gundry and Welsch, 1997; Hambrick and Crozier, 1985; Shuman, Shaw and Sussman, 1985), in particular among firms operating in hostile environments (Slevin and Covin, 1997). Growth can lead to a necessity for higher levels of strategic planning and thus of delegating operational tasks. Increased delegation and

division of responsibility is necessary for creating time to manage. Division of labor typically implies formalization, coordination, and specialization (Mintzberg, 1979), and specialized functions tend to be added in growing firms (Hanks and Chandler, 1994). As firms grow, they become more specialized in response to new problems arising from such growth (Kazanjian and Drazin, 1990). Smallbone *et al.* (1995) argued the ability to structure the organization's activities is a key factor that discriminates rapid-growth firms from other firms.

Various studies indicate that rapid-growth firms' later success depends on their ability to (1) become more formalized, specialized, and better structured and (2) become more effective and strategic in their activities than firms that grow less rapidly. Formalization may be causally linked to the increase in effectiveness in the performance of firm activities. Firms that have better routines and formalize their procedures can carry out these activities faster and with the use of fewer resources. The gradual internal changes in firms may have implications for how well firms can adapt to new contingencies in their environment that require different types of formalization and specialization. Thus, firms that have many specialized functions and a high degree of formalization and internal routines should be highly effective in the area in which they have developed these capabilities. As mentioned previously, rapid-growth firms with a high degree of specialization and formalization are likely to maintain high growth rates in relatively stable environments. Moreover, in such environments their growth rates are likely to be superior to those of rapid-growth firms that develop less specialization and formalization.

In times of an economic crisis, when demand declines, I argue that the more efficient firms are likely to grow at the fastest rate. Thus, the rapid-growth firms that are better able to structure their activities should be able to sustain their growth by increasing their effectiveness and to reduce prices on their offerings.

> *Hypothesis 2 (H2): At a time of economic crisis, when demand declines, capabilities that allow for better strategic direction, governance, and routines that allow for better firm effectiveness, positively affects firm growth rates.*

Intangible resources

According to the RBV, firms' competitive advantage stems from their rent-earning resources. Research using the RBV has mostly explored the specific characteristics of resources that create sustainable competitive advantage. However, some scholars argue that certain types of

resources can explain why firms successfully diversify into related industries (Chatterjee and Wernerfelt, 1991; Montgomery, 1982). In particular, some intangible resources, such as innovative capabilities, research, patents, and branding skills, can serve as sources of success when firms diversify into related industries. Intangible resources are often intellectual or knowledge-based resources that generate no or little marginal cost. Moreover, such resources are not consumed as they are put to new uses. Zahra, Ireland and Hitt (2000) investigated new venture firm performance and identified a relationship between higher levels of performance and technological learning and innovative capabilities. Thus, a firm that possesses such resources has opportunities for growth through diversification.

Hypothesis 3 (H3): At a time of economic crisis, when demand declines, intangible resources, such as innovative capabilities, research, and branding skills, positively affect firm growth rates.

International capabilities

Research based on the knowledge-based view (KBV) argues that firms' main sources of competitive advantage are their unique capabilities based on their internal knowledge and skills (Grant, 1996). The KBV treats the human capital of individual managers and workers within a firm as the most strategically important firm resource. Chandler and Hanks (1994) argued that firms need a greater variety of resource-based capabilities to grow faster than others. Such capabilities are not solely based on knowledge, financial, organizational, and physical resources. Critical human resources, such as skills and abilities to organize the creative and productive capacity, are of key importance.

International diversification allows firms to exploit their resources and competencies across markets and to access growth opportunities in foreign countries (Hitt *et al.*, 2006). Thus, firms that are able to create and renew their competence and to develop resources geared to exploring international market opportunities should also be more effective in exploring international market opportunities during downturns.

Hypothesis 4 (H4): At a time of economic crisis, when demand declines, capabilities that allow for exploring international market opportunities positively affect firm growth rates.

Managerial experience

According to Penrose (1959), the firm contains a bundle of heterogeneous and idle resources that it can put to different productive uses. Penrose argued that firm growth is determined by managerial alertness of profit opportunities. She claimed that even if all market constraints on growth are removed, firms are still faced with internal constraints on growth. Such constraints, however, can be overcome by the management team's ability to discover new profitable deployments of the firm's resources. The management team's ability to discover such opportunities is accumulated over time as members gradually learn how to use firm resources for productive purposes and free up managerial time by improving the efficiency of more activities. Penrose's theory predicts that rapid-growth firms are more likely to have management teams that have a relative long history and possess diverse experience in different industries, in functions, or with products.

The resource dependency perspective is even more specific on firms' dependence on contingencies in the external environment (Pfeffer and Salancik, 1978). This perspective argues that managers with past experience and networks outside the firm can reduce uncertainty by sharing information, giving advice, providing access to resources, and so on. Previously successful organizations may be trapped by structural inertia when confronted by a crisis (Hannan and Freeman, 1984). They need to unlearn their beliefs, traditions and environmental understanding and reorient themselves (Starbuck, 1983). Although Starbuck (1983, p. 100) argued for a "wholesale replacement of the top managers" in such structural inert and bureaucratic organizations that have recently enjoyed great success to survive a crisis, it is possible that a management team with diverse experience is better able to reorient an organization than managers with long history only in the organization.

Several studies indicate that rapid-growth firms do have more experienced managers (Smallbone *et al.*, 1995) and that their managers and founders more often have past industry experience than those in in slow-growth firms (Barringer and Jones, 2004; Hambrick and Crozier, 1985). Management members' past experience and heterogeneity in industry experience are linked to higher growth (Eisenhardt and Schoonhoven, 1990). This heterogeneity in industry experience is likely to generate constructive conflict within the firm. The founders' industry-specific work experience is also positively related to firm growth (Colombo and Grilli, 2010). Past work experience is one source of valuable knowledge and information and therefore should be positively related to growth. Penrose's (1959) theory of the growth of the firm is based on successful firms in a growing economy, but her

contribution provides insights into the relationship between managerial experience and firm growth at a time of economic crisis. Thus:

> *Hypothesis 5 (H5): At a time of economic crisis, when demand declines, greater managerial diversity in terms of experience positively affects firm growth rates.*

Mediating effects

Financial solidity

Drawing on the RBV, I suggest that a firm's financial resources reflect its relative competitive advantage as well as how heavily the firm invested in growth previously. How well firms with high levels of financial resources manage during the economic crisis then depends on how well they adapt the competitive advantage gained from the developed capabilities to the new economic circumstances. As such, firms' financial resources should be tested as a mediator between their capabilities and resources and their later development.

Organizational capabilities

The strategy of lowering prices to increase market share is one way for firms to cope with declining demand. Another strategy is to explore new profit opportunities. In line with the Penrosian view, a particularly strong positive correlation should exist among diverse managerial experience, better organizational capabilities, and high growth rates. The reason is that a diverse managerial background may moderate a possible negative effect of a narrow scope of specialization on firm growth rates. Moreover, well-developed routines and formalization free up managerial time that could be used to explore new growth opportunities. The market segment in which the firm is specialized may be too narrow, or the demand will decline too much, for any firm to maintain high growth rates. This implies that increased formalization and routines can be an obstacle to further development (Van de Ven, 1986). Firms become less flexible and less able to discover and adapt to new profit opportunities. Thus, if a firm poses sufficient managerial insight into new areas, it can change its specialization into segments that allow for higher growth rates.

Managerial experience and education

Liao and Welsch (2003) argued that educational background and experience is most useful when integrated with other resources in creating advantages. At a time of economic crisis when demand declines, firms need to increase the rate at which they discover new

opportunities for deployment of their resources. According to Penrose (1959), firms with management teams that have diverse experiences should have the capability to find new product opportunities even in declining markets. Thus, firms' internally developed capabilities and resources should be tested as mediation variables between their economic development and managerial experience and educational level.

R&D/intangible resources

According to Lieberman and Montgomery (1988), one of the mechanisms behind first-mover advantages is technological leadership, in which firms gain advantages through their experience and a head start in patents and R&D of products or services. To succeed, there must be a market for the new products or services. Firms operating in smaller markets with few competitors could indicate that they found a market potential. Thus, I test for a relationship among such market potential, experienced managers, a focus on patents, branding and R&D, and later growth.

International capabilities

When expanding to foreign markets, firms often experience a reduction in returns in the initial phases, labeled as a liability of foreignness (Zaheer, 1995). When they gain more experience, further foreign direct investment leads to increased profits. Small and young firms have limited resources and capabilities and thus are more sensitive to liabilities of foreignness than large and older firms (Lu and Beamish, 2001). These liabilities could be overcome in young firms by managers with past international experience (Sapienza *et al.*, 2006). I test whether age, size, managerial experience, and educational level have an indirect effect on later growth through international capabilities.

Ownership

The determinants of diversification are important issues in the strategy literature (e.g., Montgomery and Wernerfelt, 1988; Rumelt, 1974). Product and international diversification are widely used strategies for expansion, and according to Hautz, Mayer, and Stadler (2013), family ownership concentration has a positive impact on product diversification and a negative impact on international diversification, while the opposite is true for institutional and state ownership. They argue that family firms have stronger local and weaker international networks, and their motivation for diversification is ensuring firm survival, increasing involvement, retaining family identity, and reducing risk. Institutional owners have access to capital and international networks, and their motivation is effectiveness of firm strategy and

they have less need to diversify firm risk. I therefore test whether ownership is related to growth through international capabilities and focus on R&D/intangibles.

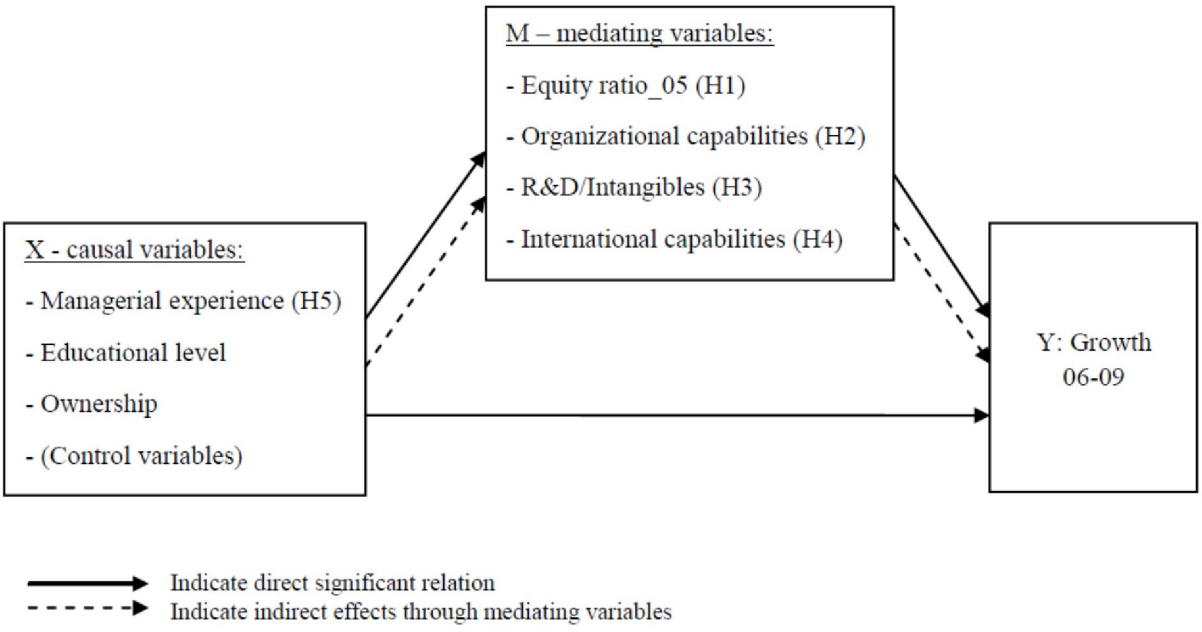
Control

When measuring growth, several researchers have emphasized the importance of controlling for profitability, educational level, ownership, age, size, the market situation, industry, and localization. I explain the control variables in the method section.

RESEARCH MODEL

On the basis of the theoretical review and hypotheses, a general research model is developed (Figure 1). The study posits that firm financial resources and firm-specific capabilities and resources (equity ratio, organizational capabilities, R&D/intangibles, international capabilities, and managerial experience, H1–H5) are positively related to later firm growth (Y). The study also suggests mediating effects of the causal variables, X, mediated through M, on the dependent variable, Y.

Figure 1. Research model with mediating effects. The five hypotheses (H1–H5) are first analyzed as independent variables (X) on the dependent variable (Y). Second, I test mediating effects (X through M on Y) as displayed in the figure.



DATA, METHOD, AND VARIABLES

Sample and data collection

The empirical material in this study is based on registered data of Norwegian rapid-growth firms for the period of 2003–2009, combined with survey data. A rapid-growth firm describes a firm with a growth in sales income of at least 100 percent over a four-year period, in the current case 2003–2006. The firm must have a turnover of at least NOK 1 million ($167,000) the initial year, a positive operating profit over these years, and no negative growth of income in any year in the period. Growth is a multidimensional phenomenon (Delmar, Davidsson and Gartner, 2003), and there is a lack of agreement on how growth should be measured and calculated (Delmar, 1997). There is no authorized definition of a rapid-growth firm. My definition follows a conventional approach, uses growth in turnover (sales growth) as the most relevant[1] growth indicator (Davidsson, Steffens and Fitzsimmons, 2009; Davidsson and Wiklund, 2000; Delmar, 1997), and has a bias towards young and small firms because I use proportional growth as identification.

The initial database used to identify the population contains accounting data for the years 2003–2006 for all Norwegian companies. After adjustments[2], a total population of 94,473 companies was identified. From this population, 3,650 companies were deemed rapid-growth firms, representing 3.8 percent of the total population.

In the next step, a survey was initiated. From methodological recommendations (Bradburn, Sudman and Wansink, 2004), the questionnaire was pretested on managers of rapid-growth firms, managers of 'ordinary' firms, and academics and then revised to ensure that it was easy to read and the questions understandable. The questionnaire was sent to 1,466 rapid-growth companies[3] in 2009. In total, 400 companies responded; five were rejected for

[1] Norwegian firms report labor costs and social expenses to the authorities, not number of employees. Sales (operating revenue) are used in this analysis because they are the most reliable measures using registered data.

[2] Companies in ISIC 65 "Financial intermediation" and 67 "Activities auxiliary to financial intermediation" were excluded because of the problem of empty investment companies and specific regulations in the sector. ISIC 75 "Public administration, defense, compulsory social security" and 85 "Health and social work" were excluded because these industries are dominated by the public sector in Norway and have extensive regulations. Finally, all companies with zero expenses in labor cost and social expenses were excluded.

[3] The selection criteria for the survey were as follows: First, firms with less than $83,500 in labor and social cost, less than $1.67 million in sales, and those with high values in sales income (over $83.5 million) and wage cost (over $16.7 million) were excluded, thereby excluding the smallest firms, those without a labor force, and the largest firms. Second, I decided to exclude firms involved in simple resale and operations that do not include processing of products or services or those that were subject to regulations and public licensing (ISIC 051Fishing, 221 Publishing, 41 Collection, purification and distribution of water, 50 Retail sale of automotive fuel, 52 Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods, 70 Real

incomplete answers, and four reported that they were bankrupt or sold. Thus, I ended up with 391 completed questionnaires, or 26.7 percent of the sample.

The survey asked the companies if their rapid growth in the 2003–2006 period was due to acquisition of other companies, merging with others, internally developed (organic) growth, or a combination of these. The analysis included only those that solely reported that their growth was based on internal resources. For robustness, the analysis also excluded companies that reported being bankrupt or sold or that were involved in mergers and acquisitions in the 2007–2010 period. Therefore, the remaining 307 companies included in this analysis are firms that reported that their growth in 2003–2006 was internal, organically developed; that their later performance was not affected by acquisition, demerging, or merging; and that they were still operating in 2010. The database of this analysis is the questionnaire, supplemented with register data on turnover, return on sales, equity ratio, ownership, industry, and localization.

One key informant per firm answered the questions in the survey and therefore represent a possible single-source bias (Avolio, Yammarino and Bass, 1991). The majority of the respondents represent the top management of the firms; 93.2 percent were CEOs or chairmen of the board, and 6.8 percent were department managers. In addition, 48.9 percent used a web-based questionnaire, and the rest (51.1%) filled in their answers on an identical paper version.

The firms are quite young in age; 46.6 percent were established from 1998 to 2003. Furthermore, 12.1 percent of the firms were located in the most periphery regions, and 48.2 percent in Norway's four largest city-regions. The firms are represented in a broad range of industries (32 industries by two-digit ISIC code). These could be classified more broadly into seven industrial groups (see Appendix for an overview). Although a sample of such a heterogeneous population of rapid-growth firms may increase the chance of extraneous variation, I argue that a diverse sample is useful to posit that the resources and capabilities being tested are important to a broad population of rapid-growth firms.

A t-test for nonresponse bias showed no significant differences between respondents and nonrespondents in terms of firm size, firm age, industry, and geographical localization. Furthermore, there were no differences in the cross-group comparisons between the answers on web and paper (see Vandenberg and Lance, (2000).

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estate activities, 71 Renting of machinery and equipment without operator and of personal and household goods, 73 Research and development, 80 Education, and 93 Other service activities).

Dependent variable

The research question guiding the study is whether the resources and capabilities rapid-growth firms developed during a period of macroeconomic growth can explain the firms' later success or decline in a period of economic crisis. The dependent variable in this analysis is the firms' turnover growth in percentage from 2006 to 2009. The data used are official register data. Weak signs of the crisis first appeared in 2007, but the decline really appeared in the firms' accounts in 2009, both for rapid-growth firms and for the total population of all firms.

Table 1. Descriptives of the dependent variable. N=307.

Variable	Minimum	Maximum	Mean	Median	SE of mean	Std. Dev	Skewness
Growth turnover in % 06 - 09	-92	280	21.19	13.0	3.28	57.55	1.19
Dev_Growth 06-09*	-3415.69	4966.67	0.00	-35.17	38.63	676.84	0.92

* The deviation from the mean value (percent growth) within its industry with similar location are the number used in the analysis

The dependent variable was adjusted for two outliers. As Table 1 shows, growth ranges from –92 percent to +280 percent, and the mean growth is +21.19 percent in the 2006–2009 period. I also wanted to control for possible industry and localization differences and therefore constructed the dependent variable, such that each firm's performance is its deviation from the mean value of growth within its industry and within similar localization. This can be expressed as $X_i^{DEV} = X_i - (\frac{1}{k}\sum_{n=1}^{k} X_n)$, where k is the firm's industry by its localization. The cross-tabulation in the Appendix shows that there are, for example, no IT firms in the periphery region. The construction industry has 14 firms in the periphery region, seven of which are performing better and seven of which are performing worse than the mean in that region. The reason for including localization is that firms' performance could be related to the size of and the demand in their market, and not controlling for this could risk later results being due to a localization or industry effect.

Independent variables

23 questions from the survey were related to organizational capabilities, R&D/intangible resources, international operations, and the management's experience, the phenomena of

theoretical interest in this article. These questions are constructed on the basis of the theories and empirical work presented in the literature review.

The 23 items of resources and capabilities were randomly ordered among 55 (of 147) items in the survey to ensure that respondents' interpretation of a question's intended meaning was not influenced by the context in which the question was presented (Bradburn *et al.*, 2004). Of the items, 21 reported high correlation on at least one other item ($r > 0.40$, $p < 0.001$). Each item included a five-point rating scale, ranging from 1 ('not at all') to 5 ('to a very large extent'). The questions asked the extent to which a following statement had been important for the firm's development in its period of rapid growth (2003–2006), with one exception (i.e., if their most important market was abroad). A factor analysis with Varimax rotation was retained on all 21 items. Items loading greater than 0.40 were retained as long as they did not produce cross-loadings of 0.30 or greater. Five items were excluded, and thus the final factor analysis includes 16 items, presented in Table 2.

Table 2. Summary of factor analysis for competitive advantage and experience (N=307). Extraction method: Principal Axis Factoring. Rotation method: Varimax with Kaiser Normalization.

	Rotated Factor Loadings			
Component	*1*	*2*	*3*	*4*
Items (important for the firms' growth 2003-2006)	*Organizational capabilities (ORGcap)*	*R&D/ Intangibles (R&D)*	*International capabilities (INTcap)*	*Managerial experience (MANexp)*
Our ability to develop and follow-up strategic choices	**0.75**	0.16	0.12	0.19
Our internal organizing of the firm	**0.69**			0.16
The culture and cooperative spirit in the firm	**0.66**			
Our ability to handle changes, increase our capacity and use flexible production	**0.53**			
Our focus on economic government and control	**0.53**			0.10
Experience from previous work with research and development processes		**0.72**	0.16	0.13
Experience from previous work with patents or branding		**0.71**		0.13
Our experience with R&D of new products or services within the firm	0.18	**0.62**	0.25	
Our patents and licenses		**0.56**		
Our ability to operate in international markets		0.26	**0.94**	
Our most important market is abroad			**0.72**	
Our managers international work experience		0.27	**0.58**	0.29
Experience from other fast growing firms	0.16		0.12	**0.75**
Experience with establishing other firms	0.15			**0.68**
Experience as board members in other organizations/firms		0.11		**0.58**
Experience from firms in other industries		0.21		**0.47**
Eigenvalues	2,12	1,96	1,86	1,76
% of variance	13,23	12,25	11,63	11,00
Cronbach's α	0.77	0.76	0.80	0.72

Factor loadings above 0.40 appears in bold, and those below 0.10 are removed.

The first group of independent variables is therefore the 16 items about the firms' self-reported competitive advantages and the management's past experience compared with other firms'. The factor analysis resulted in four new components: 'Organizational capabilities' 'R&D/intangibles,' 'International capabilities,' and 'Managerial experience.'

The five items that cluster on the same component all pertain to structuring of activities in the firm, such as strategic processes, internal organizing, cooperation, change management, and control mechanisms. This first component represents the firm's capabilities to organize its internal activities and is labeled 'Organizational capabilities' (ORGcap). The second component consists of four items related to the firm's experience with patents, branding, licenses, and R&D and is labeled 'R&D/intangibles' (R&D). The third component represents the firm's capability to operate in international markets and is labeled 'International capabilities' (INTcap). The fourth component consists of four items measuring management's past and diverse experience from other firms and industries and is labeled 'Managerial experience' (MANexp).

All four components had sufficiently high reliability (Cronbach's $\alpha = 0.72$ or higher). Table 2 shows the factor loadings after rotation. An initial analysis was run to obtain eigenvalues for each component in the data. The convergence of the scree plot and several analyses suggested using an eigenvalue of 1.5. Four components had eigenvalues greater than Kaiser's criterion of 1.5 and, in combination, explained 48.12 percent of the variance.

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy represents the ratio of the squared correlation between variables to the squared partial correlation between variables. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. The KMO verified the sampling adequacy for the analysis (KMO = 0.736; 'good' according to Field [(2009)]), and all KMO values for individual items were greater than 0.65, which is well above the acceptable limit of 0.5 (Field, 2009). Bartlett's test of sphericity ($\chi^2(120) = 1568.58$, $p < 0.001$) indicated that correlations between items were sufficiently large for the principal axis factoring analysis.

From the factor analysis and the reported tests, I composed four new variables by calculating the means across items. These four variables represent the four independent variables measuring the firm's internal resources and capabilities. Table 3 provides a summary description of the remaining independent variable (equity ratio), including the control variables. The firm's equity ratio is the total equity to total assets and is used as a measure of the firm's solidity. A low equity ratio is an indication of a higher level of debt. For

the measure of solidity, I selected the firms' status in 2005 when analyzing their 2006–2009 growth, thereby assuming that their level of equity ratio could affect their later performance.

Table 3. Summary descriptives of equity ratio, return on sales and control variables, including a cross tabulation institutional and entrepreneurial control. N=307

Variable	*Description*	*Measure*	*Mean*	*S.D.*	*Freq.*	*%*
EqR_05[a]	Equity ratio = Total equity/total assets (in decimals)	Scale	0.24	0.15	307	100
ROS_05[a]	Return on sales = Operating result*100/turnover	Scale	0.09	0.08	307	100
Log_Age[a]	Log-transformed firm's age in 2010	Scale	2.60	0.44	307	100
Log_Size_05[a]	Log-transformed firms' turnover in 2005	Scale	4.37	0.36	307	100
Demand-driven growth*	If the firms' growth 2003-2006 is caused by cyclical upturn and growing demand in the market	Scale	3.78	0.97	307	100
Few competitors*	If the firms' growth from 2003-2006 is caused by few competitors in their market	Scale	2.26	1.12	307	100
	Majority upper secondary education or less (0)	Dichotomous			168	54.7
Educated managers**	Majority more than upper secondary education (1)	Dichotomous			139	45.3
	Independent (0)	Dichotomous			172	56.0
Institutional ownership[a]	Institutional/subsidiary company/daughter (1)	Dichotomous			135	44.0
Entrepreneurial control	Respondents owner's share ≥ 50 % (0)	Dichotomous			114	37.1
***	Respondents owner's share < 50 % (1)	Dichotomous			193	62.9
Total					*307*	*100*

Crosstab

	Independent	Institutional	*Total*
	68	46	*114*
	104	89	*193*
	172	*135*	*307*

[a] *The variables EqR_05, ROS_05, Log_Age, Log_Size and Institutional ownership are register data from the official Register of Business Enterprises (The Bronnoysund Register Centre). Age is the firms' age in 2010. The oldest firm was 62 years old in 2010, and the mean age of the firms was 15 years. The numbers displayed in the table and used in the analysis were log-transformed for correcting for unequal variance. The mean size of the firms was NOK 35.6 million in turnover in 2005, and the numbers used in the analysis are log-transformed.*

** Demand-driven growth and Few competitors are data collected in the questionnaire where the respondents had to indicate to what extent the following had been important for the firms growth in 2003-2006 on a scale from 1-5, where 1 is not important and 5 is very important. Most firms reported that growing market demand was a very important explanation for their growth, but fewer experienced low competition.*

*** Educated managers are data collected in the questionnaire were the respondents had to indicate how many percent of the managers with no education after primary school, upper secondary school, three years higher education, and five years higher education or more. A dichotomous variable was constructed on the basis of the data.*

**** Entrepreneurial control are data collected in the questionnaire where the respondents had to indicate how many percent of the shares in the company they owned themselves.*

Control variables

Profitability

The first control variable in Table 3 is the firms' return on sales (operating margin) in 2005. A high operating margin indicates that the company was profitable and had less financial risk *before* the financial crisis. Firms do not necessarily achieve high profitability as a result of their growth. Davidson *et al.* (2009) argued that high profitability indicates that firms have developed competitive advantages. They further find that high profitability is likely to foster later growth.

Age and size

According to the evolutionary perspective, rapid-growth firms may be trapped by structural and cultural inertia when the competitive environment changes (Tushman and O'Reilly, 1996). In their structural inertia theory, Hannan and Freeman (1984) argued that organizations becomes increasingly inert over time. This implies that the likelihood of organizational

change and ability to respond to external threats decreases over time. I therefore control for if the firms' age (year of establishment) affect the firms' performance.

Hannan and Freeman (1984) also argued that larger organizations are less likely to change because of the bureaucratic structure that typically accompanies larger size. However, others have argued that because of their greater access to resources, larger organizations have the resources to be able to change if necessary (Aldrich and Auster, 1986). Large firms can make a strategic choice between focusing resources on one scenario or spreading them across several scenarios when facing uncertainty (Wernerfelt and Karnani, 1987). Small firms have less resources to choose a flexible strategy and bet on several scenarios when the environment changes. I therefor control for if the firms' size (turnover in 2005) affect the firms' performance. The variables age and size are log-transformed for correcting for unequal variance, see Table 3.

Market situation

As Bastesen and Vatne (2014) show, rapid growth is related to business cycles and the demand side of the economy. Firms operating in emergent markets with few competitors might experience first-mover advantages (Lieberman and Montgomery, 1988) providing profit opportunities when other markets with greater competition decline. Such emergent markets may indicate that niches are just being explored, or that some organizations have taken advantages of the new resources in the environment, but still with sparse competition (Aldrich, McKelvey and Ulrich, 1984). Population ecology argues that if there is a great amount of unexploited capacity in the environment, then there are possibilities for faster rate of growth in the population (Hannan and Freeman, 1977). This might indicate that there is a 'carrying capacity' in the environment to supply a larger population, even though there is a macroeconomic decline. Therefore, I control for the firms' market situation—that is, the degree to which their growth is caused by high demand in the market and the degree to which they had few (or many) competitors in their market in the period before the financial crisis.

Educational level

Colombo and Grilli (2010) show that highly educated managers and founders, especially in economic and managerial fields, are positively associated with firm growth. Previous studies also report similar empirical results (e.g., Cooper *et al.*, 1994; Variyam and Kraybill, 1993). A highly educated team of managers could be more likely to have the ability to develop internal capabilities, identify and acquire important external knowledge and information, and apply it

to commercial ends (Cohen and Levinthal, 1990). In 45.3 percent of the firms in my sample, more than half the management had more than upper secondary education, indicating a highly educated team. By controlling for educational level, I can determine whether educational background has an impact on the firms' economic performance.

Ownership

For many firms, ownership represents a 'source of power' (Salancik and Pfeffer, 1980), in which daughter companies get access to economic resources and support from the larger parent corporation. O'Regan, Ghobadian and Gallear (2006) find that a higher proportion of high-growth than slow-growth firms are part of a larger corporation. They argue that ownership can represent a 'safety valve,' reducing risky decisions, providing more external contacts, and generating greater external visibility through the links to parent companies. The debate about whether firm performance is dependent on the distribution of ownership can be traced back to Berle and Means (1932), who highlight potential conflicts of interest between shareholders and managers without ownership interest in the firm. One argument is that an institutional owner has greater expertise and can monitor managers more efficiently (Pound, 1988). Thomsen and Pedersen (2000) show that firms owned by families or other companies prioritize sales growth, whereas institutional investors have a preference for shareholder value and diversification. Thus, I control for ownership to determine whether this has an effect on the firms' economic performance.

Ownership is distinguished with two variables. The first, called 'Institutional ownership,' measures whether the majority owner is an institutional owner or a daughter company versus an independent firm (majority owned by individual persons). Register data helped identify the share of equity belonging to the largest owner, commonly used in the literature (Thomsen and Pedersen, 2000). The second variable, called 'Entrepreneurial control,' measures whether the entrepreneur is still controlling the company, and it is based on a question in the survey.[4] In measuring ownership by asking them of the percentage of the firm that is directly or indirectly controlled, the analysis of whether ownership is important for further growth becomes more nuanced.

[4] Note that 37.1 percent of the respondents own 50 percent or more of the company. Table 3 shows that even if they own 50 percent or more, the firm could still be an 'Institutional/independent' firm. Furthermore, 46 of the 114 firms with one majority owner are defined as institutionally owned firms. These institutional owners are holding companies, an organizing tool most likely to spread risk.

Statistical analysis

Firstly, I analyze the hypotheses with linear regression to test whether the variables are significantly related to growth in 2006–2009, controlling for return on sales, age, size, market demand and competition, education, and ownership. Secondly, I use the MEDIATE macro for SPSS (Hayes and Preacher, 2014) to analyze possible total, direct, and indirect effects of the causal variables (X) on the outcome variable (Y) through a set of mediator variables (M). The method allows for dichotomous X variables, like some of the control variables, but not dichotomous M variables. It generates omnibus tests of direct and indirect effects, and 95 percent of Monte Carlo confidence intervals for indirect effects are generated from a random sampling of normal distributions, with means and standard errors defined by the point estimates and standard errors of the paths defined by the indirect effects. The indirect effect is significant if zero is outside the confidence interval.

RESULTS

Descriptive statistics

Table 4 contains descriptive statistics and the correlation matrix. The correlation coefficients are not indicating multicollinearity. When testing VIF (variance inflation factor), the VIF values are all well below 10 (no VIF values greater than 1.4). The average VIF is close to 1 (1.198), and confirms that collinearity is not a problem in this model. The tolerance statistics are well above 0.2 (ranging from 0.714 - 0.923).

Table 4. Summary statistics and correlation matrix (2-tailed). N=307.

	Mean	Std. dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Dev_Growth 06-09	0.00	676.84	1.00												
(2) EqR_05	0.23	0.15	0.11	1.00											
(3) ORGcap	3.91	0.68	0.13*	0.02	1.00										
(4) R&D	2.18	0.90	0.00	0.16**	0.12*	1.00									
(5) INTcap	2.27	1.05	0.06	0.17**	0.11	0.38**	1.00								
(6) MANexp	2.65	0.89	0.07	0.00	0.25**	0.14*	0.22**	1.00							
(7) ROS_05	0.09	0.08	0.03	0.38**	0.05	-0.02	0.14*	-0.01	1.00						
(8) Educated managers[a]	0.45	0.50	0.01	0.17**	-0.08	0.16**	0.25**	0.02	0.08	1.00					
(9) Institutional ownership[a]	0.44	0.50	-0.04	-0.06	-0.02	0.13*	0.23**	0.06	0.01	0.10	1.00				
(10) Entrepreneurial control[a]	0.63	0.48	0.01	0.15*	0.05	0.05	0.18**	0.09	0.13*	0.17**	0.06	1.00			
(11) Log_Age	2.60	0.44	-0.21**	0.12*	0.05	0.07	-0.03	-0.17**	0.06	-0.02	0.05	-0.06	1.00		
(12) Log_Size	4.37	0.36	-0.03	-0.03	0.13*	-0.07	0.17**	-0.08	0.01	0.09	0.19**	0.24**	0.13*	1.00	
(13) Demand-driven growth	3.78	0.97	-0.19**	-0.07	0.03	-0.17**	0.05	0.12*	0.03	-0.07	-0.04	0.04	0.09	0.01	1.00
(14) Few competitors	2.23	1.12	0.02	0.16**	0.03	0.27**	0.15*	0.06	0.10	0.04	0.03	0.05	-0.01	-0.08	-0.06

*p < 0.05, ** p < 0.01

[a] Dummy variables (1 else 0)

For the five variables in the hypotheses, only 'ORGcap' correlates with 'Dev_Growth 06-09'. Of the control variables, young firms ('Log_Age') and firms that believe their growth is not caused by 'Demand-driven growth' are correlated with later growth. It is also worth noting that the variable (less) 'Demand-driven growth' correlates with 'R&D'. 'Educated managers', 'Institutional ownership,' 'Entrepreneurial control,' and large size correlate with 'INTcap'. This result indicates that firms operating on the international market are larger and more professionalized firms. Young firms correlate with 'MANexp'. This result is somewhat unexpected, but could indicate that younger firms witness a need for knowledge and experience and have a strategy for recruiting experienced managers.

Linear regression

Table 5 provides the results of the linear regression. It is important to note that the dependent variable is constructed with a control for industry and localization (marked with Dev_).

Table 5. Linear regression model. Dependent variable: Dev_Growth 06-09 in percent (the deviation from the mean value within its industry with similar location). N=307

	Dev_Growth 06-09		
	B (SE)		β
Constant	802.24	(563.59)	
EqR_05	598.11*	(289.15)	0.13
ORGcap	137.28*	(58.29)	0.14
R&D	-52.13	(48.59)	-0.07
INTcap	31.02	(41.94)	0.05
MANexp	17.94	(46.09)	0.02
Control			
ROS_05	-135.97	(508.63)	-0.02
Educated managers	-12.53	(79.48)	-0.01
Institutional ownership	-33.67	(79.15)	-0.03
Entrepreneurial control	-29.96	(82.47)	-0.02
Log_Age	-308.28**	(89.51)	-0.20
Log_Size_05	-38.25	(114.41)	-0.02
Demand-driven growth	-122.54**	(39.96)	-0.18
Few competitors	0.74	(35.11)	0.00
R^2	.11		
F	2.83**		
Numbers of observations	307		

* p < 0.05, ** p < 0.01, *** p < 0.001

Standard errors in parentheses.

‘EqR_05’ is positively related to ‘Dev_Growth 06–09,’ providing support for H1, which claims that rapid-growth firms with a high equity ratio before the financial crisis grow at a faster rate than those with a low equity ratio. ‘ORGcap’ developed during their period of rapid growth (2003–2006) is also positively related to growth in the initial stages of the financial crisis (2006–2009). This result provides support for H2, which claims that a better internally organized firm leads to greater firm effectiveness, which has a positive impact on firms’ growth rate. H3, H4, and H5 are not supported by the linear regression model.

From the correlation matrix, the relationship of young firms (‘Log_Age’) and firms that believe their growth is not caused by ‘Demand-driven growth’ with ‘Dev_Growth 06–09’, is significant. Firms experiencing a less fluctuating market might be in an emerging market segment, a new market niche, or a stable market less affected by the demand side during the macroeconomic crisis. New market opportunities will attract entrepreneurial activity, but emergent market segments could also be associated with low barriers to entry. However, regardless if it is an emergent market or stable market, the result indicates that the environments capacity to supply a larger population, its ‘carrying capacity’, is higher for the firms competing in this population. Because young age, but not small size, is related to later growth, perhaps young firms are less affected by structural and cultural inertia (Hannan and Freeman, 1984; Tushman and O'Reilly, 1996) and therefore more capable of responding to changes in their environment than older firms.

Recall that when constructing the dependent variable, I included an implicit control for industry and geographical location. When running separate analysis with growth 06–09 as the dependent variable (without implicit control for industry and localization) and industry and localization as extra control variables, I observe mostly the same results, with two exceptions. In this analysis, ‘Organizational capabilities’ has no significant effect, but ‘Entrepreneurial control’ is significant at the 0.05 level. I do not find any industry or localization effects ($F = 2.64$, $p < 0.001$).

MEDIATE analysis

Other factors can explain growth in turbulent environments. Figure 1 depicts a visual overview of the hypothesized mediated effects. I therefore test whether MANexp, Educated managers, ownership (Institutional ownership and Entrepreneurial control), Log_Age, Log_Size, Demand-driven growth, and Few competitors (X) are mediated through EqR_05, ORGcap, R&D, and INTcap (M) on the dependent variable Dev_Growth 06–09 (Y).

The results of the mediating analysis appear in Table 6. Firstly, I tested the independent variables' direct relationship to Dev_Growth 06–09 (the column *total* effect). When compared with Table 5, I find exactly the same results; EqR_05 ($p < 0.05$), ORGcap ($p < 0.05$), Log_Age, and Demand-driven growth are significantly related to Dev_Growth 06–09.

Table 6. Results for total, direct and indirect effects (Monte Carlo) of MANexp, Educated managers, Institutional ownership, Entrepreneurial control, Log_Age, Log_Size, Demand-driven growth and Few competitors on Dev_Growth 06-09, through EqR_05, ORGcap, R&D and INTcap. N = 307.

	Total effect on:		**Direct effect on:**							
	Dev_Growth 06-09		EqR_05		ORGcap		R&D		INTcap	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Constant	*1020.76*	*548.68*	*0.18*	*0.12*	*1.76***	*0.54*	*2.07***	*0.69*	*-0.53*	*0.80*
MANexp	48.62	43.71	0.00	0.01	0.22***	0.04	0.15**	0.06	0.25***	0.06
Educated managers	-4.68	77.29	0.44**	0.02	-0.13	0.08	0.23*	0.10	0.41***	0.11
Institutional ownership	-61.60	77.88	-0.03	0.02	-0.09	0.08	0.19	0.10	0.33**	0.11
Entrepreneurial control	-3.19	82.09	0.04*	0.02	0.01	0.08	0.05	0.10	0.18	0.12
Log_Age	-276.54**	88.31	0.05**	0.02	0.13	0.09	0.26*	0.11	-0.01	0.13
Log_Size	13.95	111.38	-0.03	0.02	0.31**	0.11	-0.23	0.14	0.39*	0.16
Demand-driven growth	-125.46**	39.55	-0.01	0.01	-0.02	0.04	-0.16**	0.05	-0.06	0.06
Few competitors	6.83	33.98	0.02*	0.01	0.02	0.03	0.19***	0.04	0.12*	0.05
R^2	.08		.10		.11		.17		.19	
F	3.13**		4.07***		4.47***		7.52***		8.60***	

Indirect effect :	**Indirect effect on Dev_Growth 06-09 through:**							
	EqR_05		ORGcap		R&D		INTcap	
	M.C. 95 % CI		M.C. 95 % CI		M.C. 95 % CI		M.C. 95 % CI	
	LL	UL	LL	UL	LL	UL	LL	UL
MANexp - indirect effect through;	-11.01	14.16	8.10	263.91	1.28	206.91	8.51	316.79
Educated managers - indirect effect through;	0.13	61.09	-213.32	17.17	-4.31	340.32	14.19	520.48
Institutional ownership - indirect effect through;	-43.58	3.96	-187.18	32.78	-9.35	294.69	5.63	449.60
Entrepreneurial control - indirect effect through;	-0.26	63.50	-104.69	112.14	-93.08	182.47	-37.73	316.07
Log_Age - indirect effect through;	-0.04	68.79	-27.41	229.79	-1.22	387.82	-182.33	163.31
Log_Size - indirect effect through;	-56.79	12.75	2.45	421.05	-382.71	33.26	-2.77	565.01
Demand-driven growth - indirect effect through;	-21.63	3.08	-68.70	38.13	-213.63	-3.81	-127.19	31.92
Few competitors - indirect effect through;	-0.00	25.63	-30.34	57.59	6.93	237.73	-1.76	166.54

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: M.C. = Monte Carlo 95 % confidence intervals (CI) for indirect effect using 5.000 samples. LL = lower level CI. UL= Upper level CI

Mediating effects are marked with grey shade.

Secondly, in the next four columns in Table 6, I tested the *direct* effects of the X variables on the M variables (the independent variables). Educated managers, Entrepreneurial control, Log_Age, and Few competitors are significantly related to EqR_05. These four X variables are therefore positive factors influencing firms' financial solidity during their growth period in more stable times. Regarding Log_Age, young age is directly related to Dev_Growth 06–

09, but older firms are related to EqR_05 (financial solidity). One suggestion for this is that young firms invest their financial resources in growth, while older firms are more interested in securing financial solidity.

The next column show that MANexp and Log_Size (large firms) are significantly, directly related to ORGcap. Experienced managers may possible be aware of the need for better internal control and systems to manage companies effectively. Large firms might also be more complex, and therefore forced to be better structured.

MANexp, Educated managers, Log_Age, less Demand-driven growth and Few competitors are significantly related to firms focusing on R&D, patents, and branding. These are probably knowledge–intensive firms which are testing out new market opportunities.

MANexp, Educated managers, Institutional ownership, large firms, and Few competitors are significantly related to firms' capability of operating internationally (INTcap). Similar to firms focusing on R&D, they seek new market opportunities. These kinds of firms might be a subsidiary of a larger enterprise taking care of a specific market. They are among the larger firms in this population, which indicates that firms normally must reach a certain scale before they enter foreign markets.

I also tested EqR_05 as an X variable on the M variables ORGcap, R&D, and INTcap. EqR_05 was only significant related to INTcap (p = 0.020), which indicates that not only scale but also financial solidity is important when expanding internationally.

Indirect effects: X on Y through M

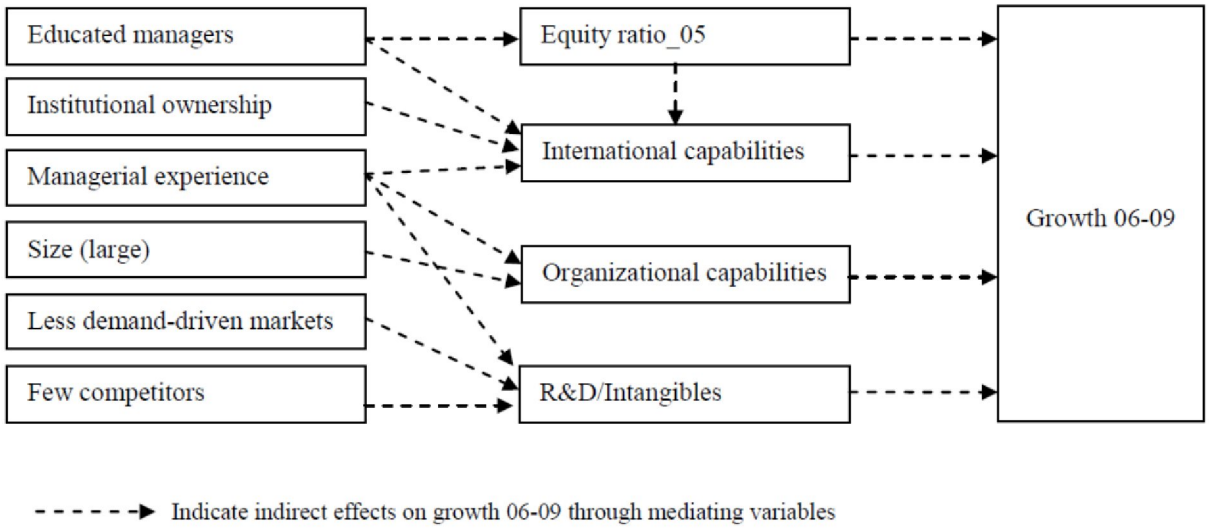
The most important results are the *indirect effects*, shown in the lower part of Table 6. The mediating effects of X through M on Y are significant if zero is outside the confidence interval LL – UL (marked with gray shadow in the table). The results of the MEDIATE analysis can only indicate if there are any significant relationships, not the strength of the relationships. The upper parts of the table show the significance level of the effects for X on M (direct effects). For example, Log_Age is significantly directly related to both EqR_05 (p < 0.01) and R&D (p < 0.05), but Log_Age has no significant *indirect* relationship to Dev_Growth 06–09 through these, or other, mediating variables.

MANexp has no direct effect on Dev_Growth 06–09 but an indirect effect on Dev_Growth 06–09 *through* ORGcap, R&D, and INTcap. Recall that management teams with past and heterogeneous experience are linked to higher growth (Eisenhardt and Schoonhoven, 1990). Here, manager experience is important when facing a turbulent

macroeconomic environment; it is not directly related, but in combination with other variables, such as ORGcap. Managers with past experience from other organizations can use their knowledge to advocate for organizational efficiency. When a firm has well-ordered internal structures and systems, managers can spend more time and effort on other resources to achieve better performance. In addition, a sole focus on R&D or international markets is not positively related to growth during the initial stages of the financial crisis, but with experienced managers on the team, these firms are more likely to growth faster.

The variable Educated managers makes no direct contribution to Dev_Growth 06–09 but does so indirectly through higher profitability (EqR_05) and INTcap. Being owned by an institutional owner or subsidiary firm is indirectly related to growth through INTcap. This relationship provides support for Hautz *et al.*'s (2013) argument that institutional owners have a positive impact on firms' international diversification through their expertise, access to capital, and international network. Large firms, with capabilities to organize their firms efficiently internally, are also able to continue their growth. Firms focusing on R&D, which operate in less demand-driven markets and/or have few competitors, are more likely to succeed with later growth. Such firms might have a first-mover advantage, and/or they operate in emergent niches with growth opportunities.

Figure 2. Result of the MEDIATE analysis. Only indirect significant effects on Dev_Growth 06-09 through mediating variables are displayed.



In testing EqR_05 as an X variable through ORGcap, R&D and INTcap as M variables, EqR_05 was significantly related to Dev_Growth 06–09 (Y) only through INTcap (LL: 5.25;

UL: 313.06). This result signals that successful international expansion demands several factors, including financial solidity, highly educated and experienced managers, and support from institutional owners (see Figure 2).

Thus, the MEDIATE statistics lend support to all five hypotheses indirectly, and provide a more complex understanding of how firm capabilities and resources developed during a period of growth can explain later success in a period of economic crisis. Figure 2 summarizes the results of the indirect significant effects from Table 6. It is important, though, to stress that this analysis does not prove causality (Hayes and Preacher, 2014). The statistics only indicate that there is an association between the variables. There are also problems of spurious relationships between variables to consider. The directions of the arrows are suggestions based on theoretical arguments outlined in the literature review. An equally good interpretation would be to argue, on the basis of the results, that certain variables *in combination* explain the firms' performance.

DISCUSSION

This analysis tested several effects: First, it tested direct effects of the independent variables on the dependent variable 'Dev_Growth 06–09' during the first stage of the financial crisis. Second, the analysis tested whether there were significant relationships between the independent variables. This test provided an overview of how these are related. Third, the analysis tested for mediating effects. In this analysis, the variables that did not show a significant relationship to growth in the first analysis, in combination with the other variables, helped explain firm growth.

Financial resources and educational level

As hypothesized, firms with higher equity ratio before the financial crisis grew faster than others in the first period of the crisis. This finding provides support for previous research claiming that lower levels of debt before distressed periods is positively associated with better performance in a downturn (Opler and Titman, 1994).

The MEDIATE analysis also suggests that a team of highly educated managers has a positive effect on the relationship between financial solidity before and growth during the downturn. High education could help managers understand the long-term consequences of

actions, evaluate appropriate risks, and realize the importance of financial buffers for an unpredictable future.

Organizational capabilities

In line with previous research, the data lend support to the suggestion that better internally organized firms grow faster than other firms (Baker *et al.*, 1993; Gundry and Welsch, 1997; Hambrick and Crozier, 1985; Shuman *et al.*, 1985; Slevin and Covin, 1997; Smallbone *et al.*, 1995), even during times of economic crises. Better-structured firms seem more efficient and better suited for competition when demand falls. Moreover, internal processes, such as formalization and specialization, may free up managerial time and allow focus on new growth opportunities. This is of specific importance when the environment and demand changes.

I also observed two indirect effects through Organizational capabilities. First, the combination of MANexp, ORGcap, and growth demonstrates Penrose's (1959) observation that there are firm-internal constraints to growth and that experienced managers are more likely to use their experience to improve internal activities and find profitable deployment of firm resources, even in declining markets.

Second, ORGcap is related to growth in large organizations. Both specialized functions (Hanks and Chandler, 1994) and structural changes (Child and Kieser, 1981) are necessary in growing firms. Furthermore, improved managerial techniques and strategies are positively associated with growth (Baker *et al.*, 1993; Child and Kieser, 1981; Hambrick and Crozier, 1985). Penrose (1959) argued that slack resources can be used to initiate improvements, innovative activities or diversification, and are critical resources when the environment changes. In contrast, population ecology argues that slack resources are used to develop and maintain formalized systems, which hinder innovation, and thereby create generalist organizations. When the environment changes rapidly, such organizations will spend most of their time and energy adjusting structure. The cost, formalization tendency, and reduced innovative capability are not favorable either in stable or unstable environments (Hannan and Freeman, 1977). The data do not provide support for a deterministic view that firms with a 'genetic makeup' (routines and capabilities) well adapted to their environment are unable to restructure when the environment changes. One interpretation of the results illustrated in Figure 2 is that 'ORGcap' (measured as strategic capabilities, economic governance, formalized systems, and so on) seems to contribute positively to better development for larger firms. Formalization, specialization, and well-organized coordination

among activities might increase their effectiveness. As this interpretation illustrate, the arrows might possible go the other direction, and the variables mutually reinforces each other's and in combination explain performance.

Managerial experience

The younger firms had better economic development than the older firms. Coase (1937) argued that efficiency tends to decrease as firms become larger and older. Furthermore, when the cost of organizing additional transactions within the firm is equal to the open market, new entrepreneurs will emerge. As such, the largest and oldest firms should decrease. However, some of the largest firms had obviously recruited experienced managers from other firms. It is possible that these managers identified opportunities not developed by their previous employers and therefore decided to search for new challenges (Hellmann, 2007). Such managers might have valuable experience, enabling them to sense profit opportunities. These experienced managers can both utilize the opportunities and reduce the cost of organizing transactions in more efficient ways, thereby creating better growth than the rest of the group of larger firms that do not have such diverse managerial experience.

The results provide support for previous research on the importance of experience for growth (e.g., Colombo and Grilli, 2010; Eisenhardt and Schoonhoven, 1990; Rosa and Scott, 1999; Smallbone *et al.*, 1995). In particular, larger (and older) firms seem to benefit from recruiting managers with experience, thereby importing ideas and knowledge from outside the firm in a process of renewal and exploration of opportunities within well-established firms.

R&D/intangible resources

This study does not suggest that a focus on R&D (including branding and patents) *on its own* increases the probability of firm growth during the first critical stage of the economic downturn. According to Barney (1995), patents provide little protection from imitation. Socially complex resources and capabilities are more difficult to imitate and therefore better sources of competitive advantage. Innovation is also not necessarily synonymous with technological development and R&D expenditures (Minniti and Lévesque, 2010). Minniti and Lévesque argue that entrepreneurs more often seek opportunities to fill a market niche and to imitate others, instead of spending a great amount on R&D. These forms of innovation normally lead to better economic performance than investment in formal R&D. That 'R&D'

is not directly related to growth may also indicate lack of skills and abilities to organize the creative and productive capacity in these firms (Chandler and Hanks, 1994).

Note that the variable 'R&D' is only related to growth in combination with the variables 'MANexp,' 'Demand-driven growth,' and 'Few competitors.' Some firms are better than others in transforming intangible resources to a competitive advantage. One might argue that firms with a combination of experienced managers and R&D focus, operating in emerging markets or niches, are 'innovative market creators.' Such capacity is characterized by superior insight and knowledge of customers' needs that enable them to recognize and implement opportunities in the market. On the other side, the apparent link to the market situation might also indicate that these firms are just lucky; they have found a new niche with sparse competition and possibilities for a fast rate of growth, with great environmental capacity to supply a larger population (Aldrich *et al.*, 1984; Hannan and Freeman, 1977).

International capabilities

'INTcap' are indirectly related to 'Dev_Growth 06–09' in combination with financial solidity (high equity ratio), highly experienced and educated managers, and institutional ownership. In particular small and medium-sized firms have limited resources and are therefore sensible to liabilities of foreignness (Lu and Beamish, 2001). Managers with international experience (Sapienza *et al.*, 2006) and firms with institutional owners might be able to overcome this liability. Firms owned by larger enterprises have the opportunity to tap into essential knowledge and possess important resources to overcome the liability of foreignness. International capabilities could be internally developed, but the link to ownership indicates that this also is a resource representing a source of power, knowledge, and experience (Salancik and Pfeffer, 1980). Such source of power also includes possible economic support from their owners. An alternative explanation is that international capabilities attract institutional ownership. The findings suggest that international expansion is a complex process that requires a solid financial resource base, knowledge, experience, and skills to perform well.

Implications

The results of this study uncover several implications for theory and managers. Firstly, macroeconomic theory has been the dominant force in the debate explaining the financial crisis and how to rebuild the economy for future growth and prosperity. The RBV, economic

theory, organizational ecology and organizational theory adopted in this analysis provide additional and informative insights into which mechanisms create successful firms and solid economic performance in global economic crisis. As the results show, growth stems from an interaction between internal processes and resources, the ability to take advantage of market opportunities, and the environmental situation and capacity to support growth. Therefore, I call for more use of multiple theoretical perspectives to explore such complex phenomena as growth and decline. Secondly, this study identifies an important capacity related to growth - the 'experienced managers' who use their past experience to recognize, explore, and create opportunities in the market. Thirdly, the results add to the comprehensive literature on innovation, demonstrating that in times of crises, a focused technological–innovative strategy is not necessarily a competitive advantage on its own. Firms with such a strategy might have neglected the crucial role in discovering opportunities and commercializing technological- or service based discoveries. Fourthly, a deterministic view of larger and older firms as unable to respond and change when the environment changes, receives no support in the analysis. Rather, a constant focus on improving internal structures and routines is especially important for larger firms to be more efficient in the market. Fifthly, it is the managers' responsibility to organize and govern firms' heterogeneous set of different types of capital (Foss *et al.*, 2007). This research indicates that a firm's human capital is at least as important as financial capital. Still, financial solidity is important, especially when firms are entering a macroeconomic downturn. Last, the future is unknown. Firms experiencing growth in one period may fall behind in the other. Growth during unstable environmental conditions has a possible element of luck or misfortune. A firm can be situated, because of human skills or because of luck, in an emergent niche with few competitors and environmental capacity to support growth, while decline may indicate the environmental constraints.

For managers, this study shows the importance of using and developing competencies and distinctive firm-specific capabilities for capturing and utilizing opportunities. Such opportunities exist, even when there is a general market decline. More specifically, an understanding of market needs and the ability to exploit market opportunities seem to be distinct and important capabilities on which firms need to have a constant focus. A focus on efficient internal systems is important as firms grow larger and also to free up time for market exploration. Incorporating highly educated managers and managers with experience from outside the firm also seems important for revitalizing and renewing firms, as well as for providing firms with valuable knowledge for exploration.

Limitations and future research

This study has some important limitations. Firstly, this study included only a relatively small number of Norwegian firms previously defined as rapid-growth firms. Future studies with a larger sample, as well as international comparisons, could provide a more nuanced picture of the complex processes investigated. Secondly, because of limited information in some of the variables, broad categories were used. Future research with more detailed classifications will improve understanding of how firms can be better organized for growth. Thirdly, this study does not use a predefined and retested questionnaire. However, the current approach allows for auxiliary explanations of the phenomenon investigated. It is important, though, to acknowledge the weakness of the measurement of the independent variables. The constructs cannot be tested with accuracy, due to problems of measurement errors and the epistemological lenses the construct provides (Cook and Campbell, 1979; Edwards and Bagozzi, 2000). Further research is necessary to validate if the phenomenon exists, if the constructs are useful, and the causality between them (Borsboom and Mellenberg, 2004). I only identify the relationships among dependent, mediating, and independent variables, representing problems of endogeneity and inferring causation. More statistically advanced analysis would help confirm or refute the model.

CONCLUSION

One of the strengths of this study is its longitudinal design. Using a unique data set comprising 307 rapid-growth firms over seven years, this study explores how financial resources, internally developed firm capabilities and characteristics, can explain firms' later success in a period of economic crisis. I argue that this crisis represents a suitable case to test the importance of these factors, because it enables testing of the robustness of capabilities and resources in unpredictable and hostile environment. By using multiple theoretical perspectives, and analyzing a broad range of independent variables, the survey provides a nuanced and informative picture of firms' internal capabilities and resources in organizing business for growth.

The results provide support for previous research on the important role of internally developed capabilities, human skills and knowledge in creating greater performance (e.g., Dimov and Shepherd, 2005). The analysis extends the relevance of these capabilities and resources to periods of macroeconomic downturns. More specifically, firms' capabilities to

explore market opportunities are important when facing a market decline. A focus on developing organizational capabilities, including strategic development and internal structuring, is positively related to growth if it frees up managerial time to explore market opportunities. For firms focusing on R&D, firms expanding internationally, and larger firms, external recruiting of experienced managers seems to be a possible source of internal renewal, reducing the danger of being trapped by inertia. In addition, managers should invest in developing such capabilities in periods of growth, even though such periods can be perceived as chaotic and complex. Focusing on financial solidity is important, but not necessarily the only recipe of later success.

Although factors such as environmental conditions can affect growth in periods of macroeconomic downturn, the broader Penrosian view still seems to explain the data fairly well. Penrose (1959) focused on growing firms in a growing economy, however, her theories are relevant even in periods of macroeconomic downturns. The later growth potential of firms that have experienced a period of rapid growth depends on human resources and firms' ability to develop these resources to gain advantageous capabilities in exploring market opportunities.

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Appendix A. Summary descriptives and cross-tabulations of industry and localization. N=307

Descriptives				Crosstab			
Variable	*Description*	Freq.	*%*	Periphery	Middle	Central	*Total*
Processing of commodities	ISIC: 01, 05, 11, 14, 15, 17, 20, 25, 26, 27, 28.	52	16.9	13	24	15	*52*
Other manufacturing	ISIC: 22, 29, 31, 32, 33, 34, 35, 36, 37, 40.	30	9.8	0	16	14	*30*
Construction	ISIC: 45.	85	27.7	14	37	34	*85*
Retail & Wholesale	ISIC: 51, 55.	41	13.4	1	19	21	*41*
Transportation	ISIC: 60, 61, 62, 63.	26	8.5	6	9	11	*26*
IT	ISIC: 72.	24	7.8	0	5	19	*24*
Other service	ISIC: 74, 90, 92.	49	16.0	3	12	34	*49*
Total		*307*	*100*	*37*	*122*	*148*	*307*
Localization periphery	Up to 15,000 inhabitants	37	12.1				
Localization middle	15,000 - 150,000 inhabitants	122	39.7				
Localization central	The 4 largest city regions in Norway	148	48.2				
Total		*307*	*100*				

Industry:	ISIC:
Processing of commodities:	01=Forestry, 05=Fishing, fish farming, 11=Crude petroleum and natural gas, 14=Other mining and quarrying, 15=Food prod. and beverages, 17= Manufacture of textiles, 20=Products of wood, 25=Rubber and plastic products, 26=Non-metallic mineral products, 27=Basic metals, 28=Fabricated metal products
Other manufacturing:	22=Publishing, printing, recorded media, 29=Machinery and equipment, 31=Electrical machinery and apparatus, 32=Radio/telecom equipment, 33=Medical, precision/optical instr., 34=Motor vehicles, trailers, semi-trailers, 35=Transport equipment, ships etc., 36=Furniture, 37=Recycling, 40=Electricity, gas, steam/hot water.
Construction:	45=Construction
Retail & Wholesale:	51=Wholesale/commission trade, 55=Hotels and restaurants
Transportation:	60=Land transport, pipelines, 61=Water transport, 62=Air transport, 63=Support transport activities.
IT:	72=Computer related activities
Other service:	74=Other business service activities, 90=Sewage and refuse disposal, 92=Recreation, cultural, sporting.

Appendix A

Cover letter

«Navn_____»
«Postadresse_____»
«Sheet1Postnr__1» «Sheet1Poststed_____1»
v/Daglig leder «Referanse_____»

En undersøkelse av hurtigvoksende foretak (gaseller)

Hvorfor skal jeg svare på dette spørreskjemaet?
1. Ditt foretak har ekspandert uvanlig fort og ble utpekt som gaselle av Dagens Næringsliv i 2007.
2. Det finnes lite systematisk kunnskap om hvorfor noen foretak vokser fort, andre ikke. Ditt bidrag inngår derfor i et forskningsprosjekt og arbeidet med en doktorgrad viss hensikt er å produsere ny kunnskap om foretaksvekst.
3. Du bidrar til at vi kan formidle ny kunnskap om vekstprosesser til dagens siviløkonomstudenter og morgendagens næringslivsledere. Slik innsikt er også viktig for mange praktiserende ledere av norske foretak og for utformingen av en virkningsfull næringspolitikk.

Hvem er vi?
Undersøkelsen er finansiert av Norges Forskningsråd. SNF er NHH-miljøets oppdragsforskningsinstitusjon og formelt ansvarlig for undersøkelsen. SNF er underlagt strenge forskningsetiske krav fra Datatilsynet. Alle opplysninger som blir gitt vil selvsagt behandles strengt konfidensielt.

Hva kreves av deg?
Vi vet at svar på all verdens spørreskjema ikke er en prioritert aktivitet i en travel hverdag. Vi håper likevel at du vil bidra. Det tar normalt 20 minutter å svare på undersøkelsen. Du kan få tilsendt de endelige resultatene i ettertid om du ønsker det.

Hvordan besvare skjemaet?
Du kan enten krysse av på vedlagte skjema og returnere det i svarkonvolutten som følger med, eller du kan svare elektronisk ved å gå inn på: **www.nhh.no/gaselle**
Vi foretrekker at du svarer elektronisk, men send oss gjerne papirversjonen om du ønsker å fylle ut skjemaet for hånd.

Vi takker for ditt bidrag!

Med vennlig hilsen

Jarle Bastesen
PhD student
Jarle.bastesen@nhh.no
Tlf: 55 95 96 44

Eirik Vatne
Professor
eirik.vatne@nhh.no
Tlf: 55 95 97 38

Appendix B

The survey

Samfunns- og næringslivsforskning,
Breiviksveien 40, 5045 Bergen
Tlf. 908 23 184/55 95 96 44
Att.: Jarle Bastesen

En undersøkelse av norske vekstforetak

INNLEDNING

1. Foretakets navn: ……. Postnr.: ……..

2. Når ble foretaket etablert? Årstall: ……..

3. Hva er din funksjon i foretaket i dag? Stilling: ……..

4. Når ble du engasjert/ansatt i foretaket? Årstall: ……..

5. Hvor stor eierandel (i prosent) har du i foretaket i dag?

Ingen	1-20 %	20-33 %	34-49 %	50-90 %	90-100 %
☐	☐	☐	☐	☐	☐

6. Hvordan ble foretaket etablert? (Kryss av for den kategorien som stemmer best.)

6.1 Startet som et nyetablert foretak av enkeltperson(er) ☐
6.2 Etablert som et nytt foretak av et eller flere eksisterende foretak (eks.vis som joint venture) ☐
6.3 Skilt ut som eget foretak fra en annen virksomhet ☐
6.4 Annet: Spesifiser ……

7. Hvis foretaket var etablert av enkeltpersoner, svar på følgende spørsmål. Hvis ikke, gå videre til spørsmål 8.

7.1 Var du blant grunnleggerne av foretaket?

Ja	Nei
☐	☐

7.2 Hvor mange personer var aktivt med som grunnlegger(e) (eier og leder) ved etableringen?

1	2	3	flere enn tre	Vet ikke
☐	☐	☐	☐	☐

FORETAKETS UTVIKLING

8. I perioden 2003 til 2006 har omsetningen i dette foretaket økt med mer enn 100 %. Hvordan har dette fremkommet? (Kryss av for den kategorien som stemmer best.)

8.1 Veksten ble primært oppnådd gjennom organisk (internt utviklet) vekst ☐
8.2 Veksten ble primært oppnådd gjennom oppkjøp av ett eller flere eksisterende foretak ☐
8.3 Veksten ble primært oppnådd ved at flere virksomheter, kontrollert av våre eiere, ble slått sammen ☐
8.4 En jevnbyrdig kombinasjon av nevnte forhold ☐

UNDERSØKELSEN FORTSETTER PÅ BAKSIDEN AV ARKET

9. Ranger følgende markedsområder etter hvor viktig de var for foretakets omsetning i perioden 2003 til 2006: (Sett ett kryss for hver regiontype. I det tilfellet foretaket ikke har hatt noen omsetning i et markedsområde, lar du denne linjen stå åpen – ingen kryss.)

	Viktigst	Nest viktigst	Tredje viktigst	Minst viktig
9.1 Nærområdet (en times kjøring fra hovedsete)*	☐	☐	☐	☐
9.2 Andre deler av vår landsdel	☐	☐	☐	☐
9.3 Resten av Norge	☐	☐	☐	☐
9.4 Utlandet	☐	☐	☐	☐

** Med nærområdet mener vi det området som kan nås med en times bilkjøring fra foretakets viktigste lokalitet (hovedkontor, største produksjonsanlegg eller lignende)*

10. I perioden 2003 til 2006 fremstår foretaket som et hurtigvoksende foretak målt etter omsetning. Det er sjelden en slik vekst er vedvarende. Hvordan fortoner vekstmønsteret seg for ditt foretak i perioden før og etter denne vekstfasen? (Kryss av i den kategorien som passer best for hver periode.)

	Hurtig vekst	Svak vekst	Stabil omsetning	Stagnerende omsetning	Nyetablert
10.1 1998-2002	☐	☐	☐	☐	☐
10.2 2007-2009	☐	☐	☐	☐	

11. Rask vekst fører gjerne til endringer i organisasjonen, behov for flere ansatte, knapphet på ressurser, markedstilpasninger m.m. På en skala fra 1 til 5 ber vi deg vurdere i hvilken grad foretaket har erfart følgende forhold i perioden 2003 og frem til i dag? (Sett ett kryss for den kategori som passer best for hvert forhold som nevnes under.)

	Ingen erfaring 1	I liten grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5
11.1 Vi har ansatt nye medarbeidere	☐	☐	☐	☐	☐
11.2 Vi har brukt innleid arbeidskraft for å dekke bemanningsbehovet	☐	☐	☐	☐	☐
11.3 Det har vært vanskelig å få tak i arbeidskraft	☐	☐	☐	☐	☐
11.4 Vi har endret på sammensetningen i ledergruppen	☐	☐	☐	☐	☐
11.5 Vi har stadig måttet hente inn ny kapital til virksomheten	☐	☐	☐	☐	☐
11.6 Vi har investert i ny produksjonskapasitet	☐	☐	☐	☐	☐
11.7 Mer av vår produksjon er satt ut til underleverandører	☐	☐	☐	☐	☐
11.8 Krav til endring har medført at vi har sagt opp medarbeidere	☐	☐	☐	☐	☐
11.9 Endringer har ført til at nøkkelpersonell har sagt opp	☐	☐	☐	☐	☐
11.10 Vanskeligere å få gehør for nødvendige endringer internt	☐	☐	☐	☐	☐
11.11 Driften har blitt mer stabil, mindre behov for endringer	☐	☐	☐	☐	☐
11.12 Ledelsens hovedfokus er langsiktig planlegging og utvikling	☐	☐	☐	☐	☐
11.13 Ledelsen deltar aktivt i de daglige beslutningene	☐	☐	☐	☐	☐
11.14 Mye av ledelsens tid går med til å løse dagens utfordringer	☐	☐	☐	☐	☐
11.15 Vi har formalisert våre systemer for gjennomføring/koordinering	☐	☐	☐	☐	☐
11.16 Vi delegerer beslutningsmyndighet til laveste nivå i foretaket	☐	☐	☐	☐	☐
11.17 Vi har prioritert kompetanseutvikling for vårt personell	☐	☐	☐	☐	☐

FORETAKETS KONKURRANSEFORTRINN

12. Foretak etablerer konkurransefortrinn ved å utvikle og kontrollere unike ressurser, kompetanse og innsikter.

Under følger noen av de mest vanlige forhold som fører til konkurransefortrinn. På en skala fra 1 til 5 ber vi deg vurdere hvor viktig følgende forhold har hatt for den veksten foretaket har opplevd i perioden 2003-2006. (Sett ett kryss for den kategori som passer best for hvert forhold som nevnes under.)

	Ikke Viktig 1	lite viktig 2	litt viktig 3	ganske viktig 4	Svært viktig 5
12.1 Våre produkter/tjenesters unike egenskaper	☐	☐	☐	☐	☐
12.2 Våre patenter og lisenser	☐	☐	☐	☐	☐
12.3 Vår kunnskap om merkevarebygging og produktbeskyttelse	☐	☐	☐	☐	☐
12.4 Vår innsikt i våre kunders spesifikke behov	☐	☐	☐	☐	☐
12.5 Vårt nettverk av leverandører/underleverandører	☐	☐	☐	☐	☐
12.6 Vår evne til å samhandle med eksterne aktører	☐	☐	☐	☐	☐
12.7 Vår erfaring med forskning/utvikling av nye produkter/tjenester	☐	☐	☐	☐	☐
12. 8 Vår evne til å operere i internasjonale markeder	☐	☐	☐	☐	☐
12.9 Vår finansielle styrke/evne til å tiltrekke oss ekstern kapital	☐	☐	☐	☐	☐
12.10 Vår tilgang til unike naturressurser	☐	☐	☐	☐	☐
12.11 Foretakets lokalisering	☐	☐	☐	☐	☐
12.12 Unike kvaliteter ved vårt produksjonsutstyr/prosessteknologi	☐	☐	☐	☐	☐
12.13 Vår produksjonsprosess/gj.føring av produksjon/leveranse	☐	☐	☐	☐	☐
12.14 Vår evne til å utvikle kundetilpassede produkter/tjenester	☐	☐	☐	☐	☐
12.15 Vår evne til å ta i bruk ny kunnskap og utvikle kompetanse	☐	☐	☐	☐	☐
12.16 Vår interne organisering av foretaket	☐	☐	☐	☐	☐
12.17 Den kultur og samarbeidsånd som råder i foretaket	☐	☐	☐	☐	☐
12.18 Vår evne til å utvikle og følge opp strategiske valg	☐	☐	☐	☐	☐
12.19 Vår evne til endring, økt kapasitet og fleksibel produksjon	☐	☐	☐	☐	☐
12.20 Vårt fokus på økonomisk styring og kontroll	☐	☐	☐	☐	☐
12.21 Fokus på rask vekst for å oppnå stordriftsfordeler/markedsmakt	☐	☐	☐	☐	☐

13. Av de nevnte forhold over, hva vil du rangere som de tre viktigste fortinn ditt foretak har:

	Viktigst	nest viktigst	tredje viktigst
13.1 Skriv inn nummer på forhold (eksempel: 12.13, 12.19 og 12.5)	……..	….....	…….

14. Vekst i omsetning kan også skyldes forhold i omgivelsene som ikke nødvendigvis er basert på spesielle konkurransefortrinn dette foretaket har i forhold til konkurrentene.

I hvilken grad har følgende forhold hatt betydning for den veksten foretaket har opplevd i perioden 2003-2006.

	Ikke Viktig 1	lite viktig 2	litt viktig 3	ganske viktig 4	Svært viktig 5
14.1 Konjunkturoppgang og større økning i etterspørsel	☐	☐	☐	☐	☐
14.2 Flaks eller "på rett plass i rett tid"	☐	☐	☐	☐	☐
14.3 Få eller ingen konkurrenter i vår markedsnisje	☐	☐	☐	☐	☐

LEDELSENS BAKGRUNN OG UTDANNING

15. I foretak under rask utvikling har organisasjonens ledelse en svært viktig funksjon både som strateg og som organisasjonsutvikler. Vi er spesielt opptatt av den erfaringsbakgrunn og kompetanse som foretakets toppledelse (adm.dir, teknisk-, administrativt-, og kommersielt/ markeds- ansvarlige) hadde i perioden 2003-2006.

I hvilken grad har følgende forhold ved ledergruppens erfaringsbakgrunn og kompetanse vært viktig for foretakets hurtige vekst? (kryss av for den kategori som passer best for alle nevnte forhold. Har du ingen kunnskap om ledergruppens erfaring på et felt, krysser du av for 'Vet ikke'.)

	Ikke viktig 1	lite viktig 2	litt viktig 3	ganske viktig 4	svært viktig 5	Vet ikke 0
15.1 Kompetanse om etablering av nye foretak	☐	☐	☐	☐	☐	☐
15.2 Kompetanse om etablerte foretak i hurtig vekst	☐	☐	☐	☐	☐	☐
15.3 Kompetanse fra andre foretak innenfor samme bransje	☐	☐	☐	☐	☐	☐
15.4 Kompetanse fra foretak i helt andre bransjer	☐	☐	☐	☐	☐	☐
15.5 Kompetanse fra styrearbeid i andre foretak/organisj.	☐	☐	☐	☐	☐	☐
15.6 Internasjonal arbeidserfaring/kompetanse	☐	☐	☐	☐	☐	☐
15.7 Kompetanse om strategiutvikling	☐	☐	☐	☐	☐	☐
15.8 Kompetanse om økonomisk styring/finansiering	☐	☐	☐	☐	☐	☐
15.9 Kompetanse om salg/kundebehandling/markedsføring	☐	☐	☐	☐	☐	☐
15.10 Kompetanse om produktutvikl./teknisk problemløsning	☐	☐	☐	☐	☐	☐
15.11 Kompetanse om patentering/merkevarebeskyttelse	☐	☐	☐	☐	☐	☐
15.12 Kompetanse om forsknings- og utviklingsprosesser	☐	☐	☐	☐	☐	☐
15.13 Kompetanse om omstilling av bedrifter	☐	☐	☐	☐	☐	☐

16. Av de nevnte forhold over, hva vil du rangere som de tre viktigste kompetansefeltene for gjennomføring av hurtig vekst i ditt foretak:

	Viktigst	nest viktigst	tredje viktigst
16.1 Skriv inn nummer på forhold (eksempel: 15.7, 15.2 og 15.10)	……..	….....	…….

17. Utdanningsnivå. Gi et grovt anslag (10%, 20%, 30%) på hvor stor andel av ledergruppen og foretakets øvrige ansatte som inngår i følgende utdanningskategorier. Begge kategorier skal summeres til 100 %.

	Ledergruppe	Øvrige ansatte
17.1 Ingen utdanning utover grunnskole	…….. %	…… %
17.2 Videregående utdanning inkludert fagbrev og lignende	…….. %	…… %
17.3 Treårig høyere utdanning fra høyskole/universitet	…….. %	…… %
17.4 Fem år eller mer fra høyskole/universitet	…….. %	…… %
	100 %	100 %

OMGIVELSER

Foretakets nærmiljø er en viktig ressursbase, blant annet for rekruttering av arbeidskraft, anskaffelse av innsatsvarer og innhenting av informasjon og kunnskap. Med nærmiljø mener vi det området som kan nås med en times bilkjøring fra foretakets viktigste lokalitet (hovedkontor, største produksjonsanlegg e.l.)**. Vi vil gjerne vite litt om foretakets lokalisering og tilknytning til dette området.**

18. I hvilken grad var følgende forhold ved nærmiljøet viktig (i positiv betydning) for foretakets ekspansjon i perioden 2003-2006? (kryss av for den kategori som passer best for alle nevnte forhold. Finnes ikke de aktører vi spør om i din nærregion, krysser du av for 'ikke relevant'.)

	Ikke viktig 1	lite viktig 2	litt viktig 3	ganske viktig 4	svært viktig 5	ikke relevant 0
18.1Tilgang til kvalifisert arbeidskraft	☐	☐	☐	☐	☐	☐
18.2 Utdanningsinstitusjoner tilpasset vårt behov	☐	☐	☐	☐	☐	☐
18.3 Kunder lokalisert i regionen	☐	☐	☐	☐	☐	☐
18.4 Leverandører lokalisert i regionen	☐	☐	☐	☐	☐	☐
18.5Andre foretak i vår bransje/konkurrenter som finnes her	☐	☐	☐	☐	☐	☐
18.6 Tilgangen til forretningsmessige tjenester/service	☐	☐	☐	☐	☐	☐
18.7 Kostnadsnivået for arbeidskraft og areal/lokaler	☐	☐	☐	☐	☐	☐
18.8 Støtteordninger for å drive næringsvirksomhet	☐	☐	☐	☐	☐	☐
18.9 Kommunens tilrettelegging for økonomisk aktivitet	☐	☐	☐	☐	☐	☐
18.10 Regionens kommunikasjoner/infrastruktur	☐	☐	☐	☐	☐	☐
18.11 Regionens naturressurser/tilgang til råvarer	☐	☐	☐	☐	☐	☐
18.12 Bo-, skole- og fritidsmuligheter for våre ansatte	☐	☐	☐	☐	☐	☐

19. I hvilken grad vurderer foretaket å flytte større deler av aktivitetene fra dette nærmiljøet (en times bilkjøring fra foretakets viktigste lokalitet i dag)?

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5
19.1	☐	☐	☐	☐	☐

20. Her kommer et sett med påstander om kunnskapsutvikling og informasjonsinnhenting. I hvilken grad stemmer disse med ditt foretaks erfaringer?

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5
20.1 Vi henter mye kunnskap fra andre i nærområdet	☐	☐	☐	☐	☐
20.2 Vi deler vår kunnskap og ideer med andre i nærområdet	☐	☐	☐	☐	☐
20.3 Det er en positiv og kreativ atmosfære i nærområdet	☐	☐	☐	☐	☐
20.4 Uformell samhandling og tillit er viktig når vi deler kunnskap	☐	☐	☐	☐	☐
20.5 Impulser fra nye aktører/partnere er viktig for oss	☐	☐	☐	☐	☐
20.6 Vi får de mest nyttige impulsene fra vårt nærområde	☐	☐	☐	☐	☐
20.7 Vi henter mye kunnskap/informasjon fra andre deler av landet	☐	☐	☐	☐	☐
20.8 Vi får de mest nyttige impulsene fra andre deler av landet	☐	☐	☐	☐	☐
20.9 Vi henter mye kunnskap/informasjon fra aktører i andre land	☐	☐	☐	☐	☐
20.10 Vi får de mest nyttige impulsene fra andre land	☐	☐	☐	☐	☐

KUNNSKAPSUTVIKLING I NETTVERK

Individer og aktører som virksomheten har kontakt med (eksempelvis leverandører, kunder, banker, konsulenter, forskningsinstitutt osv.), kan være viktig for foretaket på ulike måter.

21. I hvilken grad har følgende aktører/kilder bidratt med informasjon som er viktig for ditt foretaks forståelse av markeder (informasjon/kunnskap om markeder, distribusjons-/markedsføringskanaler osv.)? (Vi tenker da på nytte både i forhold til de produkter og tjenester dere leverer, men også i forhold til nytte for den interne organiseringen og driften av foretaket.)

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5	Ikke relevant 0
21.1 Andre enheter i eget konsern/gruppe	☐	☐	☐	☐	☐	☐
21.2 Våre kunder, klienter	☐	☐	☐	☐	☐	
21.3 Våre utstyrs-/ komponent-/tjenesteleverandører	☐	☐	☐	☐	☐	
21.4 Andre foretak i vår bransje/konkurrenter	☐	☐	☐	☐	☐	
21.5 Våre nære samarbeids-/alliansepartnere	☐	☐	☐	☐	☐	
21.6 Distributører av våre eller tilsvarende produkter	☐	☐	☐	☐	☐	
21.7 Tilbydere av finansielle-/regnskapstjenester	☐	☐	☐	☐	☐	
21.8 Konsulenter og konsulentforetak	☐	☐	☐	☐	☐	
21.9 Off. myndigheter/Innovasjon Norge/OECD etc.	☐	☐	☐	☐	☐	
21.10 Konferanser, møter, messer og utstillinger	☐	☐	☐	☐	☐	
21.11 Tidsskrifter, publikasjoner og internett	☐	☐	☐	☐	☐	
21.12 Bransje- og interesseorganisasjoner	☐	☐	☐	☐	☐	
21.13 Forsknings- og utdanningsinstitusjoner	☐	☐	☐	☐	☐	

22. I hvilken grad har følgende aktører/kilder bidratt med teknisk kunnskap (kunnskap om produksjonsteknologi, IKT-systemer, produktutvikling osv) som har vært viktig for din virksomhet (viktig både i forhold til produkter/tjenester og intern organisering)?

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5	Ikke relevant 0
22.1 Andre enheter i eget konsern/gruppe	☐	☐	☐	☐	☐	☐
22.2 Våre kunder, klienter	☐	☐	☐	☐	☐	
22.3 Våre utstyrs-/ komponent-/tjenesteleverandører	☐	☐	☐	☐	☐	
22.4 Andre foretak i vår bransje/konkurrenter	☐	☐	☐	☐	☐	
22.5 Våre nære samarbeids-/alliansepartnere	☐	☐	☐	☐	☐	
22.6 Distributører av våre eller tilsvarende produkter	☐	☐	☐	☐	☐	
22.7 Tilbydere av finansielle-/regnskapstjenester	☐	☐	☐	☐	☐	
22.8 Konsulenter og konsulentforetak	☐	☐	☐	☐	☐	
22.9 Off. myndigheter/Innovasjon Norge/OECD etc.	☐	☐	☐	☐	☐	
22.10 Konferanser, møter, messer og utstillinger	☐	☐	☐	☐	☐	
22.11 Tidsskrifter, publikasjoner og internett	☐	☐	☐	☐	☐	
22.12 Bransje- og interesseorganisasjoner	☐	☐	☐	☐	☐	
22.13 Forsknings- og utdanningsinstitusjoner	☐	☐	☐	☐	☐	

23. I hvilken grad har følgende aktører/kilder bidratt med nye ideer, kreative innspill, introduksjon av innovasjoner og lignende som har vært viktig for din virksomhet (viktig både i forhold til produkter/tjenester og intern organisering)?

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5	Ikke relevant 0
23.1 Andre enheter i eget konsern/gruppe	☐	☐	☐	☐	☐	☐
23.2 Våre kunder, klienter	☐	☐	☐	☐	☐	
23.3 Våre utstyrs-/ komponent-/tjenesteleverandører	☐	☐	☐	☐	☐	
23.4 Andre foretak i vår bransje/konkurrenter	☐	☐	☐	☐	☐	
23.5 Våre nære samarbeids-/alliansepartnere	☐	☐	☐	☐	☐	
23.6 Distributører av våre eller tilsvarende produkter	☐	☐	☐	☐	☐	
23.7 Tilbydere av finansielle-/regnskapstjenester	☐	☐	☐	☐	☐	
23.8 Konsulenter og konsulentforetak	☐	☐	☐	☐	☐	
23.9 Off. myndigheter/Innovasjon Norge/OECD etc.	☐	☐	☐	☐	☐	
23.10 Konferanser, møter, messer og utstillinger	☐	☐	☐	☐	☐	
23.11 Tidsskrifter, publikasjoner og internett	☐	☐	☐	☐	☐	
23.12 Bransje- og interesseorganisasjoner	☐	☐	☐	☐	☐	
23.13 Forsknings- og utdanningsinstitusjoner	☐	☐	☐	☐	☐	

24. Virksomheter bruker en del tid til å samhandle med aktører/informasjonskilder utenfor foretaket. I hvilken grad har dere brukt tid på å pleie kontakt med disse aktørene/kildene? *Dette spørsmålet dreier seg ikke om hvor viktig du anser aktørene/kildene, men hvor mye tid du tror dere faktisk bruker på dem uansett hva den kontakten innebærer.*

	I liten grad 1	I noen grad 2	I en viss grad 3	I stor grad 4	I svært stor grad 5	Ikke relevant 0
24.1 Andre enheter i eget konsern/gruppe	☐	☐	☐	☐	☐	☐
24.2 Våre kunder, klienter	☐	☐	☐	☐	☐	
24.3 Våre utstyrs-/ komponent-/tjenesteleverandører	☐	☐	☐	☐	☐	
24.4 Andre foretak i vår bransje/konkurrenter	☐	☐	☐	☐	☐	
24.5 Våre nære samarbeids-/alliansepartnere	☐	☐	☐	☐	☐	
24.6 Distributører av våre eller tilsvarende produkter	☐	☐	☐	☐	☐	
24.7 Tilbydere av finansielle-/regnskapstjenester	☐	☐	☐	☐	☐	
24.8 Konsulenter og konsulentforetak	☐	☐	☐	☐	☐	
24.9 Off. myndigheter/Innovasjon Norge/OECD etc.	☐	☐	☐	☐	☐	
24.10 Konferanser, møter, messer og utstillinger	☐	☐	☐	☐	☐	
24.11 Tidsskrifter, publikasjoner og internett	☐	☐	☐	☐	☐	
24.12 Bransje- og interesseorganisasjoner	☐	☐	☐	☐	☐	
24.13 Forsknings- og utdanningsinstitusjoner	☐	☐	☐	☐	☐	

25. Er det andre forhold du gjerne vil kommentere?:

……
……
……
……
……
……
……
……
……

Takk for din tålmodighet og gode innsats

Spørreskjemaet er besvart av: Navn: ……..

Ønsker du å få tilsendt en kort oppsummering av studiens resultater?

Ja	Nei
☐	☐

E-post adresse vi kan sende resultatene til: …….

Appendix C

Entrepreneurship

The entrepreneurship perspective

Entrepreneurship as a scholarly domain has a long tradition in economics (Landström, 2005). The entrepreneur as an economic agent first appeared in the writings of Cantillon (1680–1734), where he distinguished between three classes of economic agents: landowners, entrepreneurs, and employees (Wennekers and Thurik, 1999). Earlier, the term "entrepreneur" was associated with a businessman, a capitalist, or a risk-taker (Landström, 2005). In Schumpeter's view, he is not merely a businessman or one who starts or invests in a business but rather an innovator. Schumpeter made a clear distinction between a manager, an economic leader, a general capitalist/shareholder, and an entrepreneur. Schumpeter argued that

> everyone is an entrepreneur only when he actually "carries out new combination" and loses that character as soon as he has built up his business, when he settles down to running it as other people run their business. (Schumpeter, 1934, p. 78)

Several scholars use his and Kirzners's (1973) work when they argue that an entrepreneur is one who identifies opportunities in the market, acts upon them internally, or starts a new business. According to Penrose (1959, pp. 28-29), the term "entrepreneur" refers to "individuals or groups within the firm providing entrepreneurial services." Entrepreneurial services relate to the introduction of new ideas (products, location, and technological changes) and the "acquisition of new managerial personnel, fundamental changes in the administrative organization of the firm, raising of capital, and making plans for expansion."

Several authors argue that entrepreneurship has a major role in shaping economic change and growth. A few examples: Thurik *et al.* (2002) claim that a wide array of research verifies the positive and statistically robust link between entrepreneurship (as opportunity creators/innovators) and economic growth. Audretsch and Keilbach (2004) suggest that entrepreneurship, defined as the start-up of a new firm, contributes to more diversity in the economy. This diversity is associated with higher growth because these firms will commercialize knowledge that otherwise would not be commercialized. In such, "entrepreneurship enhances growth" (Audretsch and Keilbach, 2004, p. 615). Van Prag and Versloot (2007) conclude that entrepreneurs have a very important and specific function in the economy. They create employment, enhance productive growth, create high-quality innovations, and generate important regional spillovers. They define entrepreneurs as firms satisfying one of the following conditions: firms with fewer than 100 employees, firms younger than seven years, or new entrants into the market.

The OECD states that "It is abundantly clear that entrepreneurship is important for economic growth, productivity, innovation and employment" (OECD, 2009, p. 5). Here,

entrepreneurship is defined as the phenomenon associated with entrepreneurial activity, which is "enterprising human action in pursuit of the generation of value through the creation and expansion of economic activity, by identifying and exploiting new products, processes or markets" (OECD, 2009, p. 6). Entrepreneurs are business owners who generate value through entrepreneurial activity. Gilbert, Audretsch, and McDougall (2004, p. 321) argue that policy, designed to promote entrepreneurial activity, emerges as "the most important policy instrument for a global and knowledge-based economy." In their view, entrepreneurial policy does not focus on big business; rather, it centers on new and small businesses. Others argue that entrepreneurial activity also happens and is important for growth in large organizations, identifying "corporate entrepreneurship" and "intrapreneurship" (Stevenson and Jarillo, 1990; Stopford and Baden-Fuller, 1994).

Defining entrepreneurship

What is entrepreneurship about and what is an entrepreneur? According to the different definitions I have come across, I find that an entrepreneur is one who starts a firm and/or is a business owner, a capitalist, a risk-taker. Entrepreneurship can be small firms and/or young firms, but also large firms (corporate entrepreneurship). Entrepreneurs can be firms or persons who have a good idea, create disequilibrium and instability in the market, are able to combine resources in new ways, locate and effectuate new ideas, search for and discover opportunities, exploit opportunities, introduce a product or new technology, relocate the company, hire new managers, change the organization, raise capital, make plans and strategies, generate value through economic activity, generate regional spillovers, expand their business, create employment, have special characteristics and traits, are charismatic, lead and inspire, have intuition and imagination, have ambitions and visions, are product-minded, and are empire-builders.

This is not the full story, of course. In the literature, we find dozens of "entrepreneurial" constructs like entrepreneurial processes ("the methods, practices, and decision-making styles managers use to act entrepreneurially") and entrepreneurial orientation (EO), defined as "the processes, practices, and decision-making activities that lead to new entry" (Lumpkin and Dess, 1996, p 136). Wiklund *et al.* (2009), on the other hand, claim that the construct EO refers to a firm's strategic orientation and reflects how it operates. They define it as a firm's willingness to innovate and take risks and that firms with EO are more proactive than competitors in the marketplace.

Defined so differently the terms “entrepreneur,” “entrepreneurship,” and “entrepreneurial” could mean anything as long as there is a person who thinks or dreams about starting some sort of business, someone who actually starts a business, or starts a firm already in business (with all it includes). When these concepts mean everything, they lose their power to define a phenomenon. It means everything, and therefore nothing. This is of course not a new discovery. Penrose (1959, p. 30) admits that “entrepreneurship” as it is sometimes called, is a slippery concept, not easy to work into formal economic analysis.”

These few examples reveal that there are several definitions of entrepreneurship. The later entrepreneurship literature, inspired by Schumpeter and Penrose, has not reached any agreement on what entrepreneurship is. In fact, researchers agree upon the fact that there is no generally a accepted definition of entrepreneurship (Gartner, 1988; Reynolds *et al.*, 2005) that the field of entrepreneurship is highly fragmented (Grégoire *et al.*, 2006; Henrekson, 2005; Landström, Harirchi and Åström, 2012; Wennekers and Thurik, 1999), and that the phenomenon lacks a conceptual framework (Shane and Venkataraman, 2000; Wiklund *et al.*, 2009). Jarillo (1989, p. 134) states that “there is not even a loose agreement on the very definition of “entrepreneurship.” Another problem with using “entrepreneurship” with all these different nuances is that it could be in conflict with what individuals, business leaders, and politicians understand is the meaning of the construct. The definition of an entrepreneur in the Oxford Dictionary is as follows: “A person who sets up a business or businesses, taking on financial risks in the hope of profit.” In other words, the basic understanding is that an entrepreneur is one who starts a business. To start a business involves risk, but you would not start a business if you had no hope of generating some sort of return. I use this definition of entrepreneurship in my research. Several others follow this definition, like Chrisman, Bauerschmidt, and Hofer (1998): entrepreneurship is the creation of new ventures, and entrepreneurs are the creators of new ventures. Gartner (1988, p. 21) defines entrepreneurship as “the creation of organizations, the process by which new organizations come into existence.”

Even though these seem like reasonable definitions, there are still questions of when the “process of creating” a venture starts and when it ends. Van Praag and Versloot (2007) include firms with fewer than 100 employees and younger than seven years. Many start-ups remain small or die young, and some argue that most start-ups disappear within two, three, or four years (Nightingale and Coad, 2014; Shane, 2009; Van de Ven, Hudson and Schroeder, 1984). I would therefore argue that the number of employees should not be part of the definition and that seven years is too long.

The first years of a new business—its planning phase and a couple of years after it has been established—form the most critical phase for a firm to establish itself in the market and survive. A definition of an entrepreneurial firm could therefore include firms younger than three years after they have been established[1]. Entrepreneurs are the creators of new ventures. When a person (or a group of people) has established a firm, he/she/they are the entrepreneurs (creators) of that firm, even 20 years after the firm was established. However, after 20 years the firm as such has changed, and it is not meaningful to talk about an "entrepreneurial" firm any longer, regardless if it is a small firm, an innovative firm, or a "gazelle." However, it could be meaningful to investigate whether there are differences between 20-year-old firms still managed by the entrepreneurs versus firms managed by managers hired for the job.

[1] I acknowledge there are more questions to be discussed and clarified. For example, different countries have different practices regarding the registration of firms, and it could therefore be difficult to define the exact "birth date" of a firm. Furthermore, one could question whether a firm started by an established firm should be defined as an entrepreneurial firm (for further discussion, see, for example, Nightingale and Coad, 2014).

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Appendix D

Test of responses for web versus paper

Test of responses for web versus paper

Table A. Test of Cronbach's alpha for Web vs. Paper for four possible constructs: Organizational capabilities, Managerial experience, R&D/branding capabilities, and Customer knowledge.

Item number	Item text		*Cronbach's alpha* All	Web	Paper
q14q	Our ability to develop and follow-up strategic choices	Organizational capabilities	0,79	0,81	0,77
q14o	Our internal organizing of the firm				
q14p	The culture and cooperative spirit in the firm				
q14s	Our focus on economic government and control				
q14r	Our ability to handle changes, increase our capacity and use flexible production				
q13k	Our focus on long-term planning and development				
q13n	We have formalized our management and control system				
q17a	Experience from other fast growing firms	Managerial experience	0,74	0,72	0,75
q17	Experience with establishing other firms				
q17d	Experience as board members in other organizations				
q17c	Experience from firms in other industries				
q17b	Experience from other firms within the same industry				
q17f	Experience with strategy development in other firms				
q17j	Experience from previous work with patents or branding	R&D/branding capabilities	0,75	0,75	0,75
q17k	Experience from previous work with research and development processes				
q14a	Our patents and licenses				
q14f	Our experience with research and development of new products or services				
q14b	Our knowledge of branding and product protection				
q14m	Our ability to develop tailor-made products or services	Customer knowledge	0,73	0,76	0,71
q14c	Our understanding of our customers' specific needs				
q14	The unique qualities of our products or services				
q14n	Our ability to apply new knowledge and develop our competence				

N = 391. Web = 202 observations, Paper = 189 observations

Table B. Feldt's test for the difference between two independent coefficient alpha

	Feldt's W-statistic
Organizational capabilities	Reliability of test 1 (7 items, 202 obs) = 0.8100 Reliability of test 2 (7 items, 189 obs) = 0.7700 *W = 0.8261 Prob > F: 0.90854*
Managerial experience	Reliability of test 1 (6 items, 202 obs) = 0.7200 Reliability of test 2 (6 items, 189 obs) = 0.7500 *W = 1.1200 Prob > F: 0.21579*
R&D/Branding capabilities	Reliability of test 1 (5 items, 202 obs) = 0.7500 Reliability of test 2 (5 items, 189 obs) = 0.7500 *W = 1.0000 Prob > F: 0.50064*
Customer knowledge	Reliability of test 1 (4 items, 202 obs) = 0.7600 Reliability of test 2 (4 items, 189 obs) = 0.7100 *W = 0.8276 Prob > F: 0.90645*

N = 391

Table C. Test of Measurement Invariance across web versus paper respondents

Measurement invariance tests:

Organizational capabilities	chisq	df	pvalue	cfi	rmsea	bic	**Mod. comparisons:**	delta-chisq	delta-df	delta-p.value	delta-cfi
Model 1: configural invariance	60,084	28	0,000	0,950	0,077	6853,288	Mod. 1 vs. mod. 2	4,707	6	0,582	-0,002
Model 2: weak invariance (equal loadings)	64,791	34	0,001	0,952	0,068	6822,183	Mod. 1 vs. mod. 3	10,274	12	0,592	-0,003
Model 3: strong invariance (equal loadings + intercepts)	70,358	40	0,002	0,953	0,062	6791,938	Mod. 2 vs. mod. 3	5,567	6	0,473	-0,001
Model 4: equal loadings + intercepts + means:	74,275	41	0,001	0,948	0,064	6789,886	Mod. 1 vs. mod. 4	14,191	13	0,361	0,002
							Mod. 3 vs. mod. 4	3,917	1	0,048	0,005

Managerial experience	chisq	df	pvalue	cfi	rmsea	bic	**Mod. comparisons:**	delta-chisq	delta-df	delta-p.value	delta-cfi
Model 1: configural invariance	62,553	18	0,000	0,903	0,115	7038,722	Mod. 1 vs. mod. 2	0,998	5	0,963	-0,009
Model 2: weak invariance (equal loadings)	63,550	23	0,000	0,912	0,097	7010,099	Mod. 1 vs. mod. 3	6,717	10	0,752	-0,007
Model 3: strong invariance (equal loadings + intercepts)	69,269	28	0,000	0,910	0,089	6986,197	Mod. 2 vs. mod. 3	5,719	5	0,335	0,002
Model 4: equal loadings + intercepts + means:	71,897	29	0,000	0,906	0,089	6982,900	Mod. 1 vs. mod. 4	9,344	11	0,590	-0,004
							Mod. 3 vs. mod. 4	2,627	1	0,105	0,004

R&D/Branding capabilities	chisq	df	pvalue	cfi	rmsea	bic	**Mod. comparisons:**	delta-chisq	delta-df	delta-p.value	delta-cfi
Model 1: configural invariance	87,219	10	0,000	0,846	0,203	5732,712	Mod. 1 vs. mod. 2	8,514	4	0,074	0,009
Model 2: weak invariance (equal loadings)	95,733	14	0,000	0,837	0,176	5717,518	Mod. 1 vs. mod. 3	10,424	8	0,237	0,005
Model 3: strong invariance (equal loadings + intercepts)	97,643	18	0,000	0,841	0,154	5695,720	Mod. 2 vs. mod. 3	1,910	4	0,752	-0,004
Model 4: equal loadings + intercepts + means:	97,660	19	0,000	0,843	0,149	5689,811	Mod. 1 vs. mod. 4	10,442	9	0,316	0,003
							Mod. 3 vs. mod. 4	0,018	1	0,894	-0,002

Customer knowledge	chisq	df	pvalue	cfi	rmsea	bic	**Mod. comparisons:**	delta-chisq	delta-df	delta-p.value	delta-cfi
Model 1: configural invariance	5,553	4	0,235	0,995	0,045	3967,679	Mod. 1 vs. mod. 2	8,398	3	0,038	0,016
Model 2: weak invariance (equal loadings)	13,950	7	0,052	0,979	0,071	3958,171	Mod. 1 vs. mod. 3	9,052	6	0,171	0,009
Model 3: strong invariance (equal loadings + intercepts)	14,605	10	0,147	0,986	0,049	3940,919	Mod. 2 vs. mod. 3	0,654	3	0,884	-0,007
Model 4: equal loadings + intercepts + means:	17,387	11	0,097	0,980	0,054	3937,732	Mod. 1 vs. mod. 4	11,834	7	0,106	0,015
							Mod. 3 vs. mod. 4	2,782	1	0,095	0,005

Appendix E

Contracting and contingent labor

Contracting and contingent labor

We followed a firm from when they established it in 1997 through their first 11 years (Bastesen and Nesheim, 2008). From interviews and analyzing their accounts over these years, we were able to find out how many individuals they had used in their production. The firm is a technical service provider of sound and light systems, including sales, installations, and productions (ISIC 77, Administrative and support service activities). They did not hire personnel from a staffing/recruitment firm but rather hired people directly for shorter contracts and used freelancers with individual enterprises. The numbers of individuals working for this firm in 1999, 2003, and 2007 can be found in Table 1. Note that some of these individuals worked several times for the firm, but we are only counting the number of individuals, not how many times or how long they worked there.

Table 1 Overview of number of permanent employees, people hired for short projects, and freelancers hired for short projects for the years 1999, 2003, and 2007. The firm's total sale is rounded up or down to the nearest million in NOK. One million NOK is about € 125.000.

	Employees	Individuals hired for projects	Freelancers with individual enterprise	Total sales
1999	2	10	1	3 mill NOK
2003	5	23	12	10 mill NOK
2007	8	31	15	17 mill NOK

Reference:

Bastesen J, Nesheim T. 2008. Bemanningsutfordringer i oppstartfasen: Fra idealistisk kunstnerverksted til formell organisasjon (Manning-challenges in the start-up phase: From idealistic artist-workshop to formal organization). *Beta* (2): 39–55.