

Working Paper No. 41/09

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Exploring the Role and Location of
Entrepreneurial Ventures

by

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SNF-project No. 2450
“Regional Growth, Innovation and learning”

Funded by The Research Council of Norway, the DEMOREG program

INSTITUTE FOR RESEARCH IN ECONOMICS AND BUSINESS
ADMINISTRATION
BERGEN, DECEMBER 2009
ISSN 1503-2140

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JEL Classification: L25, L26, M13, R30, O18

Keywords: Firm growth, location, entrepreneurship, high growth firms, industrial sector, economic performance

Abstract

This paper reports from an ongoing study focused on Norwegian rapid-growth firms. It starts with a general discussion of the dynamics of firm growth and particularly on rapid-growth as an entrepreneurial achievement and its importance for innovative activities. The empirical data is based on accounting data for all Norwegian limited liability companies (2000 – 2006). A subgroup of rapid-growth firms is identified. The spatial distribution and economic performance of this subgroup of firms are compared with the total population of limited liability companies. The study identifies their territorial and industrial sector distribution, and analyzes their economic performance and growth patterns. The regional distribution of knowledge intensive types of growth firms is particularly emphasized. The concluding section discusses the empirical results in light of the location and cluster literature.

Acknowledgements: The paper reports from an initial study of rapid-growth firms as part of a larger project on spatial diffusion of information and networking, financed by the DEMOREG program under the Norwegian Research Council.

1. Introduction

Birth, growth and death of firms are crucial elements of the demography of firms and an essential part of economic growth in general. Firms are excluded if they perform badly, struggle with low productivity and no profit. New firm formation is a critical element in the transformation of an economy, for innovative activities and the development of new sectors of an economy. New ventures often foster new ideas for products, processes, organization or distribution or compete for market shares in existing markets. New firm formation also relates to the mindset of an entrepreneur, to a strong will for independence and control over the entrepreneur's working life. To keep the number of jobs stable in a community, many existing firms need to grow and new ventures to develop.

Generating new jobs is normally attached to the creation of economic value, and influence on the level of income and standard of living. This can explain why governments tend to focus on job creation, and industrial sectors and firms able to create many new jobs. This is particularly emphasized in regions that struggle with "sun set" industries and job losses, or the prospect of developing clusters of firms in new industries.

Organizational growth is not well understood, partly because of the heterogeneity of growth patterns on the firm level. We know that organizational patterns of growth depend of the size of the firm, its age or industry, on type of governance and relationship to other economic agents, the market potential in niche-markets and locations, or the ambitions of the entrepreneurs. We also 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 often happens once or twice in the life span of a firm.

A special interest is ascribed to the study of rapid-growth firms. Normally these firms are young, rapidly expanding SME's and central drivers in generating new jobs and wealth. They are seen as an important instrument to restructure 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. In common, 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 there is surprisingly little we know about these firms, their sectoral distribution, profitability, location etc. and the reasons behind their success.

The primary focus of this paper 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 population¹. The first part of the paper will give a review of 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. The next section discloses the research methodology used and the format of the secondary data. The third part reports from 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, these findings are discussed in the context of debates on agglomeration economies and the spatiality of economic growth and knowledge production.

¹ In other parts of this research project focus will be directed towards innovative activity in rapid-growth firms, their use of external resources in the expansion of the firm and particularly their use of external information and knowledge in building a competitive edge and the spatial structure of the network generated by these affords.

2. Literature review

2.1. Defining rapid-growth firms

Weak employment growth has been seen as an economy's incapacity to adapt to changes (OECD, 2002). 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, and especially high growth firms, are recognized as central actors in fostering employment opportunities, growth and innovation (Birch, 1987; OECD, 2002; Europe-Innova, 2006). Despite their importance in the economy, we have little systematic knowledge about the entrepreneurs (Hvide, 2005).

Different labels are used on the small group of firms that grow much faster than other firms, like "rapidly expanding firms", "high-growth firms", "gazelles", "fast flyers", "expanders" and "rapid-growth firms". These firms have attained 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 & Reuber, 2003). They are said to be market oriented, innovative, have a flexible and decentralized organization, have built a useful network with others and created a large share of new jobs in the economy (OECD, 2002). One problem with the research on this field is the diversity of findings and 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 & Sutton, 1997). From a practitioner perspective, the gap between theory and practice is even more difficult, and calls for practical tools for analysis to be used in decision making (Sims & 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 'change in amount' and for the process that leads to change (Penrose, 1959). Delmar (1997) states that there is a lack of agreement on how growth should be measured and calculated. Davidsson and Wiklund (2000) point at the difficulties of defining the unit of analysis when measuring growth.

We will show three different ways of how growth has been measured. These are growth seen as growth in employment, growth in sales or turnover, and a combination of these. Other measures are also in use, like growth in performance satisfaction and perceived

market share, but these are more subjective measures and therefore not so appropriate for our purpose (Delmar, 1997).

Employment growth has been used in some research as the unit of analysis. Dependent on how it is measured, it can have a bias towards 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 towards small firms. Small firms will have a higher percentage in growth than a large firm when they add one more employees. An absolute growth, as change in the number of employees, leads to bias towards large firms. Therefore, some argue for a combination of these measures by controlling for employment size at the beginning and the 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 argues that the new establishments which started with 20 to 499 employees or belong to an existing parent company in this size, were the firms which created most new jobs. Some studies defined high growth as adding 20 or more employees over a five-year period from initial start-up (Malizia & 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 five-year period. Gallagher and Miller (1991) combined both employment growth and turnover in measuring firms' performance. They defined "flyers", or rapid-growth firms, as firms which had reached a turnover of at least £ 3.5 million, or employed at least 50 people, from initial start around 1980 and up to 1987. The "sinkers" had only reached a turnover of £ 0.25 million or less, and also employed 10 or fewer in the same period.

One problem seldom recognized in these studies is the use of contingent labour (Cardon, 2003). The use of part-time workers, self-employed, contracted workers and other types of labour flexibility is more difficult to find in the statistics often used in research. Nevertheless, there are no indicators of higher tendency to use labour flexibility in high growth firms than in other firms (Smallbone, Leig, & North, 1995).

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 like 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 five year period. In the early 80s, 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 five years, the sales could not exceed \$25 million the first year of the period defined, no sales decline, and the five-year sales growth should be among the highest 200 firms. Hambrick and Crozier (1985) added some extra conditions the firms had to fulfil; they had to have a minimum of 20% sales growth every year in the period investigated, no more than 30% of the growth in the total period could be due to acquisition, and no more than 10% of the firms' growth could be due to unrelated acquisition in the period.

Most of the empirical work focuses on growth within a period of four years. Some define high growth as double its initial size in this period (Littunen & Tohmo, 2003), others focus on firms that have achieved a sales growth of at least 25% (Storey, 2001) or 20% (Tatum, 2007) in each of the 4 years. Smallbone *et al.* (1995) considered firms that have grown strongly over a ten- year period. To be defined as a high-growth firm, sales turnover had to double during the period, have reached a minimum of £ 0.5 million at the end of the period, and have a consistent profitability. The firms they selected had to be in one of eight specified manufacturing sectors (printing, instruments, pharmaceuticals, electronics, furniture, industrial plant, toys and clothing). Sims and O'Regan (2006) draw their samples from two sectors, electronic and engineering.

Most of the previous research measures growth without considering the industries the firms belong to. Moreno and Casillas (2007) define high growth in relation to the industry in which the firm operates. In a four year period of time, a high-growth firm is a firm which has more than 100% higher growth than the median of its sector. 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 (three years). Delmar (1997) claims 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, they used six categories of growth in sales and employment to define the top 10% growth firms. Based on their analysis, they indentified seven types of firm growth patterns. This clearly shows that what is defined as a rapid-growth firm is dependent on the growth measure used. In trying to make a tool for identifying gazelles, Sims and O'Regan (2006, p. 946) used 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.

2.2. Characteristics of rapid-growth firms

The research on rapid-growth firms seems to analyze the empirical material in three general categories; one is about the characteristics of rapid-growth firms, the second about the causes of why some firms grow more rapidly than others, and third, on the effects of the growth. In the literature on effects of growth some consider the internal organizational challenges to growth, others the effects on the economy as a whole. Several analyses discuss more than one of these levels of analysis simultaneously, and especially research on management of rapid-growth firms often treat the results both 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.

Most research has made clear that rapid-growth firms are small and medium sized (SME) and young firms. Sims and O'Regan (2006) found that these firms are likely to be less than 15 years old and have a CEO who is less than 50 years old. In their analysis of growth defined as growth in employment, Malizia and Winders (1999) claim that these firms exploited and serve local markets, were established in low-tech and traditional industries with low entry barriers, and were 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, Machin, & Reenen, 1993). As for "growth", "innovation" is also a fuzzy concept (Fagerberg, 2005) and lacks both a single definition and measure (Adams, Bessant, & Phelps, 2006). The results of these studies then depend on how these concepts are defined and measured, and therefore often difficult to compare.

Even though some findings indicate that rapid-growth firms mainly serve local markets, 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 (*ibid*).

In the strategic and management literature, researchers are concerned about strategic planning and management practice of the leaders. Often, the general characteristics of the leaders are considered as the main reason that some firms grow rapidly. Shuman, Shaw and

Sussman (1985) find that these firms have a short term planning horizon which is operationally oriented, their planning process is informal, and the CEOs of the firms have an active and strong involvement in the strategic planning. According to Nicholls-Nixon (2005) managers in rapid-growth firms are able to build structures that enable self-organizing behaviour to emerge in the organization. Since 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 in acting on changes. This is in line with later research claiming that self-organization and agility are the key drivers of success (Sims & O'Regan, 2006).

The lack of formal and rational planning is also reported in regard to marketing related behaviour in rapid-growth firms (Hultman & Hills, 2001). The '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 is in somewhat contrast to a British study which emphasized that high-growth firms tend to avoid developing new products and services (Parker, Storey, & Witteloostuijn, 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 few suppliers are more beneficial and more effective than several suppliers. The relational advantage seems to outperform the use of the market potential. 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 a disagreement about the role of financial resources and growth performance. Some claim that access to financial resources does not influence firm growth (Moreno & Casillas, 2007), others that firms with access to more financial capital actually grow more (Wiklund & Shepherd, 2003). 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 (physical resources), or intangible resources, like human and managerial resources (Penrose, 1959). Firms try to put these slack resources to use, and therefore 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 & Casillas, 2007).

Different theoretical "schools" focus on the importance of firms' networks in generating and getting access to critical resources (e.g. Gulati *et al.*, 2000; Maskell *et al.*, 1998; Powell *et al.*, 1996). Such resources could be knowledge or information, and a firm's network can operate as a 'screening device' for the firm (Burt, 1992, p. 14). If a firm's network gives access to new information before competitors, it can be a competitive advantage for the firm. Capaldo (2007) found that the structure of the network is important for the firms' innovative capabilities. If firms are connected to the right networks, they would probably be in a better position to grow faster (Moreno & Casillas, 2007). Jarillo (1989) also found that the fastest growing firms clearly made more use of external resources, like 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 labour. Managers with broad social networks can use their networks in finding new qualified personnel, and partnerships with other firms can at the same time lessen the need for hiring many employees (Barringer & Jones, 2004).

Birch (1979) has 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 are followed up by Acs and Mueller (2008) in a recent study. 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. The major universities and research facilities are located here, and therefore access to a variety of competences. Referring to Florida (2002), this also implies a concentration of people in the creative classes with creative capital (talent, technology and tolerance). The larger cities exhibit a highly competitive environment, which forces firms to grow to survive the competition. Research by Gallagher and Miller (1991) finds 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 argues that the domination of rapid growth firms in the metropolitan regions has decreased during the 1980s and 1990s. At the same time he shows that the new high-technology fast growing 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 under-representation 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, R&D and other higher-order services. In a survey of rapid growth firms in four mountainous (peripheral) areas in Southern Europe, Skuras *et al.* (2005, p. 349) claims 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)”.

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 are that rapid growth firms are small and medium sized, they are young, and few actually could be defined as rapid growth firms. 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 less hierarchically organized and more dynamic, but it is difficult to conclude if this is because of their young age, if this is a characteristic of rapid growth firms, or even if this is a reason for why they grow fast.

3. Methodology

This study of rapid-growth firms is based on data from the official Register of Business Enterprises/Register of Company Accounts of Norway². 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 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 performances and information on organizational form, owners, addresses, industry, etc.

² The Bronnoysund Register Centre, a government body under the Norwegian Ministry of Trade and Industry.

Our research analyzes the segment of private limited companies or AS (few shareholders/ Ltd/Corp.) and public limited companies or ASA (many shareholders/PLC/Inc). 97% of the companies of the population are AS. Because of the problem of many “empty” investment companies and specific regulations and organizational arrangements in the financial sector, companies in ISIC 65 “Financial intermediation” and 67 “Activities auxiliary to financial intermediation” are not included. The same counts for ISIC 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 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 have identified all companies that correspond with the criteria we set to define a rapid-growth firm;

The firm has to be active over a period of four 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% over this four 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.

This 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 analyze job creation, but also because employment data are easiest to obtain. In our data base, income data is more accurate and reliable than the data on employment. We therefore use revenues from sales as the determinant of growth.

3,650 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 salary³ or they are identified as passive holding or investment companies. For these reasons, 55 companies were removed and we ended up with 3,595 rapid-growth firms. In the forthcoming comparative analysis we will use 3,595 companies to represent rapid-growth firms, compared with a total population of 94,473 companies. Only 3.8% of the total population of firms is thereby listed as rapid-growth firms.

The unit of analysis is the firm. They could be independent or members of a company group. Our focus is on the legal company; thereby each legal company in a company group is treated as a separate entity in the data set. One specific problem in this relation is 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 a change in ownership, a merger of companies or the reorganization of an existing company, a “going-concern” may often appear as a start up. This is particularly relevant for larger companies owned by institutional owners. In this study we have not controlled 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 existing. 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.

³ These are larger, national companies in oil exploration, energy trading, construction or manning.

4. Results

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 shares and to focus on scale economies and the advantages these economies return to an expanding company. In other words, we should expect that many of the 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 one to two million over a period of four years than it is from 100 to 200 million.

Rapid-growth could also correlate with other events of 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 markets⁴. 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 to 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. 41% of firms were first registered in the period 2000-2003 (4-7 years in 2006), 24% in the period 1996-1999 (8-11 years), 12% in the years 1992-1995 (12-15 years) and the last 23% 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 of the life cycle 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. The mean value of employees is 32 for the oldest group and 18 for the youngest.

⁴ 62% of the identified rapid-growth firms are independent, 13% are controlled by another institutional investor owning 50-99% of the shares, and 25% are a daughter company 100% owned by another company.

Table 1: Firm size class - sales revenues in million NOK, 2006.

Revenues from sales - NOK	Rapid-growth firms		All firms	
	# of firms	Percent	# of firms	Percent
< 5 mill	454	12.6	53790	56.9
> 5 mill < 10 mill	797	22.2	14524	15.4
> 10 mill < 20 mill	836	23.2	10684	11.3
> 20 mill < 50 mill	776	21.6	8920	9.4
> 50 mill < 100 mill	358	10.0	3295	3.5
> 100 mill	374	10.4	3260	3.5
<i>Total</i>	<i>3595</i>	<i>100</i>	<i>94473</i>	<i>100</i>

Table 1 illustrates the size distribution of firms. Of the total population, 57% of the firms are very small compared with only 13% of the rapid-growth firms. However, 10% of the rapid growing firms are large in the Norwegian context compared with only 3.5% 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.

Rapid-growth firms are accordingly younger and larger than the average company. This reality probably reflects the fact that rapid-growth firms are more dynamic than the average company in many aspects of their businesses.

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 are “new” or “sunrise” industries 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 suggestible 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 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* (KISA) (OECD 2006b). These knowledge intensive industries are highlighted in table 2. One could suspect that these knowledge intensive sectors would grow faster than activities in the low-tech sector of mature economies like the Norwegian.

The OECD average is not always in correspondence with the industrial structure of a specific member country, particularly not the Norwegian. In Norway the average R&D and innovation costs are 1.7% of sales revenues in 2004 for all sectors (Salte, 2007). Industries with more than 3% of sales revenues used in innovative activities can be understood as innovation intensive in the Norwegian contexts. These industries are marked with letters in italics in table 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 marked with bold font type in table 2.

A simple inspection of table 2 illustrates a couple of important issues. The first observation 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 counts 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”, “32 Radio/tele/communication equipment”, “34 Motor vehicles”, “35 Transport equipment”, “37 Recycling”, “51 Wholesale”, “60 Land transport”, “71 Renting of machinery” and “72 Computer related activities”. Most of these industries are growth industries in the Norwegian context and/or characterized as knowledge intensive activities. Many are also directly or indirectly related to the booming offshore oil and gas industry. This could indicate a certain relationship between the relative share of growth firms in a specific industry and the overall growth and innovative activity in Norway.

Table 2: Percent growth firms of total population in industrial sectors 2006.

Industry	%	Industry	%
01 Agriculture	4.7	35 Transport equipment, ships etc	7.6
02 Forestry	2.8	<i>36 Furniture</i>	2.3
05 Fishing, fish farming ***	10.4	37 Recycling	11
10 Mining coal/lignite; extraction peat	0	40 Electricity, gas, steam/ hot water	2
11 Crude petroleum and natural gas	6.2	41 Collect./purific./distribut. of water	11.8
13 Mining of metal ores	25	45 Construction	6.3
14 Other mining and quarrying	8.3	50 Sale motor vehicles, auto fuel	3.3
15 Food products and beverages	4	51 Wholesale/commission trade	5.7
16 Tobacco	0	52 Retail , repair personal goods	1.7
<i>17 Manufacture of textiles **</i>	3.7	55 Hotels and restaurants	1.4
<i>18 Wearing apparel and dressing</i>	2.9	60 Land transport, pipelines	6.6
19 Leather; luggage, handbags, saddlery	0	61 Water transport	4.3
<i>20 Products of wood</i>	4.9	62 Air transport	2.6
21 Pulp, paper and paper products	1.3	63 Support transport activities	5.4
22 Publishing, printing, recorded media	1.8	64 Post and telecommunication	4.6
23 Coke, refined petro products, nucl. fuel	0	70 Real estate activities	0.4
<i>24 Chemicals and chemical products *</i>	2.9	71 Renting of machinery	6.3
<i>25 Rubber and plastic products</i>	5.9	<i>72 Computer related activities</i>	6.2
26 Non-metallic mineral products	5.3	<i>73 Research and development</i>	1.8
27 Basic metals	9.2	<i>74 Other business service activities</i>	3.4
<i>28 Fabricated metal products</i>	8.8	80 Education	4
<i>29 Machinery and equipment</i>	6.6	90 Sewage and refuse disposal	4.7
30 Office machinery and computers	0	91 Membership organizations	0
<i>31 Electrical machinery and apparatus</i>	8.7	92 Recreation, cultural, sporting	2.5
32 Radio, tele/communication equipment	7.2	93 Other service activities	1.6
33 Medical, precision/optical instr, watch	3.9	95 Private households employment	0
<i>34 Motor vehicles, trailers, semi-trailers</i>	10.2	Total	3.8

*Industries highlighted represent industries classified by the OECD as medium-high-tech/high-tech manufacturing or knowledge intensive business services (KISA).

**Industries in *italics* represent sectors in the Norwegian context with “over average” costs for R&D/innovation activities.

***Industries in **bold** font style are industries where the growth in “value added” is higher than country average in Norway.

On the other hand, 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 and commission trade” or “74 Other business service activities”. 30% of rapid-growth firms belong to industries classified by the OECD as medium-high-tech/high-tech compared to 41% for the total population. 42% of rapid-growth firms are active in industries that grow over-proportional compared to 52% of the total population. 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 much larger rapid-growth firms.

Altogether, it seems to be false to say that rapidly growing firms are particularly well represented in innovative or knowledge intensive industries even though such a tendency is present. Rapid-growth firms could be found in most sectors of the economy and seems to be a result of a mix of specific attributes of an entrepreneurial achievement and the industry in which this takes place.

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. Anyway, 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 1 confirms this relationship⁵.

The figure 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%) of new firms is also in the real estate sector. As most of these firms are ‘empty’ investment companies, 70 ‘Real estate activities’ is also excluded.

⁵Spearman correlation .848.

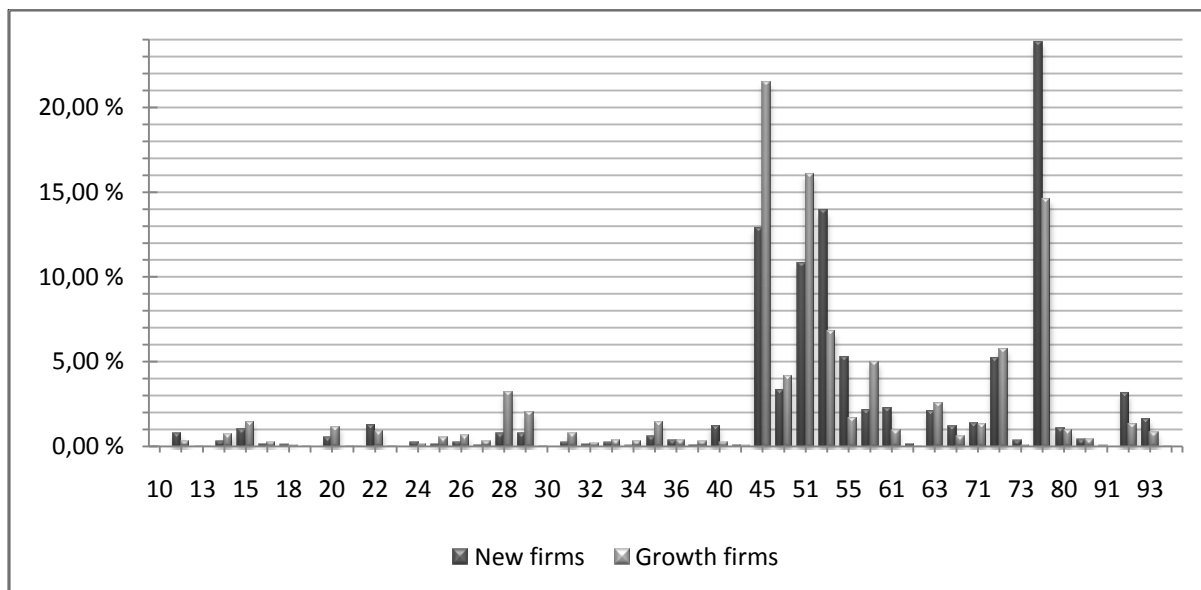


Figure 1: Industrial distribution of new firms and growth firms – percent of total and ISIC number. 2006.

Source: Statistics Norway: Statbank - table 0306 and own data.

Based on this universe, figure 1 shows that rapid-growth firms, relatively speaking, seem to be better represented in manufacturing, particularly 28 “Fabricated metal products” and 29 “Machinery and equipment”, but foremost in 45 “Construction” and 51 “Wholesale and commission sales” and 60 “Land transport”. New firm formation has the highest concentration in 52 “Retail” and in 74 “Other business services”. 92 “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 same period shows that value added in constant prices has increased 17.6% in the industries included here. Relatively, the growth has been strongest in “Recycling”, “Services to oil and gas extraction”, “Transport equipment”, “Communication equipment”, “Renting of machinery” and “Electric machinery”. Some of these are small industries under rapid expansion, for example recycling. In volume, the expansion in value added has been largest in “Wholesale and retail trade”, “Telecoms”, “Hotels and restaurants”, “Land transport”, “Computer related activities” and “Services for oil and gas extraction”. Rapid-growth and larger volumes in a specific industry should indicate an arena for new firms or rapid expansion of existing firms. In sum there seems to be a good correspondence between industries with many new or rapid-growth firms and the absolute growth in value added⁶.

⁶ The correlation between absolute growth in each industry and numbers of new firms is .832, compared with .743 for rapid-growth firms. Correlated with relative growth of value added in each industry the same result is .104 and .082.

A conclusion could be that rapid-growth firms are specifically well represented in sectors of the economy where entry barriers are moderate and the industrial output is growing faster than normal. New firm formation is also highly related to absolute growth in each sector of the economy, but new firms seem to have a higher preference for industries with low entry barriers and many small firms.

The number of rapid-growth firms and new firm formation appears to correlate as seen from figure 1. The same is even truer for the regional distribution of rapid-growth firms and new firms⁷. New firm formation and rapid-growth firms also seem to correlate with the cycle of the economy as seen from figure 2. The share of the workforce unemployed is here used as an indicator of economic cycles. The growth rate of new firms is in percent of the full stock of limited liability firms. In this statistic, it has not been possible to exclude passive investment companies. The same base is used for rapid-growth firms and explains the lower rate of rapid-growth firms compared to the numbers in table 2. As seen from the figure, there is a significant and inverse relation between the unemployment rate and firm formation.⁸

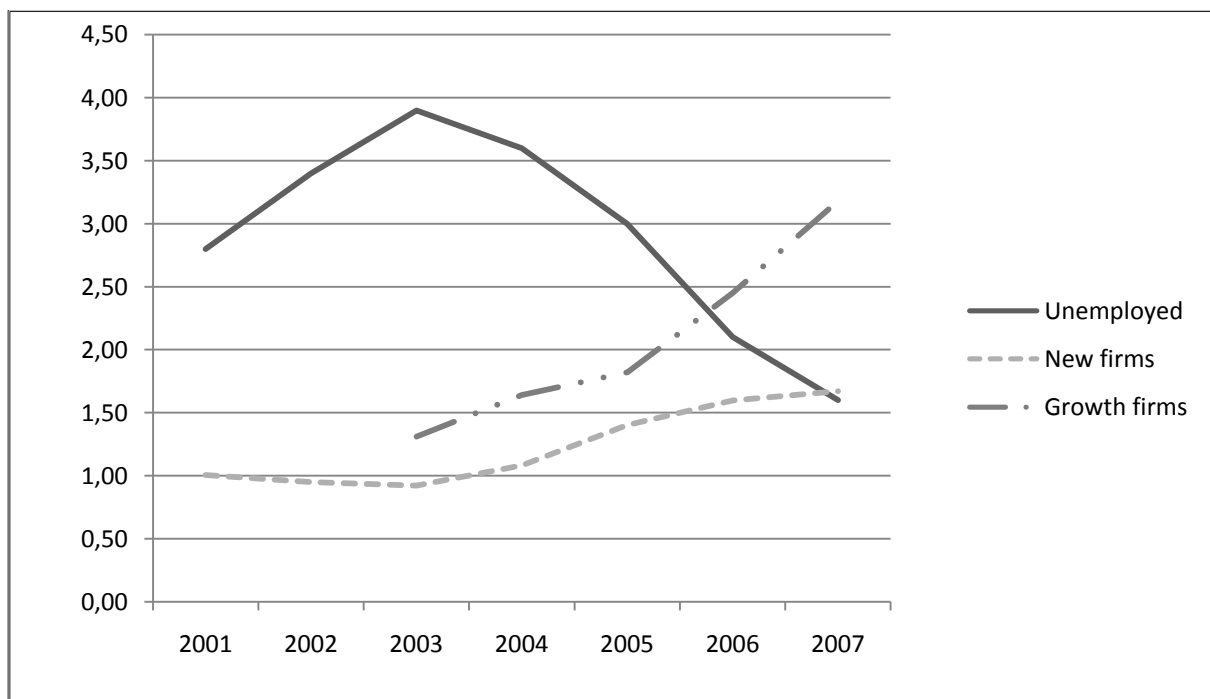


Figure 2: National unemployment rates, new firm formation* and rapid-growth firms. 2001 – 2007.

Sources: Statbank, table 04471 (unemployment), table 03206 (newly established firms) and own data (rapid-growth firms)

* 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.

⁷ Pearson's correlation .957.

⁸ Pearson's correlation .977 for rapid-growth firms and .878 for new firms.

The relation between business cycles and number of rapid-growth firms or newly established firms indicates that rapid-growth and new firm formation first of all concerns business cycles and the demand side of the economy rather than specific attributes of the specific firm.

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 % more in sale revenues than the average firm of the total population. This is valid for most industries, but small numbers in several industries make this relation unstable. Labor productivity is higher in the total population compared to rapid-growth firms in industries with manifest scale economies like sea and air transport, electricity/water production and distribution, metal production or mining.

Rapid-growth firm, 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 sale revenues seems to correlate with better productivity compared to the total population in the same industry⁹. This does not come as a surprise as a more efficient use of resources is one important component of success in the market place and a driver of rapid-growth.

The most common measures for analyzing accounting data are listed in table 3. A normal 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 return 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 four years.

From table 3 we can read that rapid-growth firms are performing 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 of the expansion. The numbers for equity and debt-equity ratios signify that the share of debt or liabilities is larger in rapid-growth firms compared to the ‘normal’ firm. The differences are not dramatic and very few rapid-growth firms end up in the

⁹ Pearson’s correlation .515

categories of bad performance. The measure for operating profit tells us how much is left as operating profit for each unit of revenues. The result indicates 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 (positive and negative profit), rapid-growth firms perform even better.

Table 3: Performance measures. Comparing rapid-growth firms with “profitable” firms of the total population. 2006.

Performance measures	Unsatisfactory	Weak	Satisfactory	Good	Very good	N
Return on equity - 'profitable' AS/ASA	8	8.9	6.5	6.2	70.4	69 292
Return on equity- growth firms	6	3.5	2.6	3.3	84.7	3 569
Equity ratio - 'profitable' AS/ASA	7.4	6.3	20.7	37.6	28.1	69 317
Equity ratio - growth firms	3	6.7	30.2	42	18.1	3 569
Return on total assets - 'profitable' AS/ASA	2	17.7	14.3	14.8	51.2	69 240
Return on total assets - growth firms	4.7	9.1	10.5	17	61.8	3 593
Operating profit - 'profitable' AS/ASA	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 - 'profitable' AS/ASA	4.9	13.5	38.6	18.8	24.3	68 288
Working capital ratio - growth firms	1	11.2	55.8	19.6	12.4	3 525
Debt-equity ratio - 'profitable' AS/ASA	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

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, the 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.

EBITDA (earnings before interest, tax, depreciation and amortization) divided by the sum of assets is a common measure of economic performance. It says something about the cash flow created over a year as a share of the values put into the company. The higher the rate, the healthier is the economic situation of the company. In the total population we will find several companies, particularly in the service sector, with high earnings but few assets. They will return extreme values on this measure. To avoid this problem, we will use the median in comparing all ‘profitable’ firms with rapid-growth firms. Growth firms in sum report a value of 0.23 on this measure, all ‘profitable’ firms a value of 0.18. The difference is

statistically significant. In other words, growth firms seem to generate a larger cash flow compared to invested capital compared with what seems to be the case for the ‘normal’ firm. For the total population there are no significant differences between firms in high knowledge/low knowledge or high growth/low growth industries. For rapid-growth firms, the result is different. Here growth firms in knowledge intensive industries come out with 0.26 for EBITDA/sum assets and growth firms in other industries with 0.22. Firms in high growth industries report a value of 0.24 contra firms in low growth industries with a value of 0.22. These differences are also significant¹⁰. If this reflects reality, there is reason to believe that business opportunities are slightly better for rapid-growth firms in typical growth industries that also include knowledge intensity. In a few industries, firms in the total population report better scores than rapid-growth firms. Again, these are typically industries dominated by scale economies like extraction of raw oil and gas, electricity and water production and distribution and sewage and refuse disposal.

We can conclude that rapid-growth firms seem to win market shares but also to succeed in profitable operations and to develop 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 the investors compared to the “normal” and “profitable” firm. Knowledge intensive industries under rapid expansion are business environments that deliver the best economy for the rapid-growth firm.

4.4. Regional differentiation

A first presentiment could be that rapid-growth of firms is related to regional economic growth and distributed according to the expansion of the general economy. Regional economic growth could be calculated as an index consisting of data from regional accounting data¹¹. Not surprisingly, these data rank counties with the largest urbanizations in Norway on top. Number one in regional economic growth for the period 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 3rd largest conurbation). Rank three goes to Hordaland County including the Bergen-region (2nd largest conurbation) and rank four to South-Trondelag County including the Trondheim-region (4th largest conurbation), followed

¹⁰ Significance measure ANOVA - knowledge: F=31,820, sign.= .000 and growth: F=21,179, sign.=.000.

¹¹ This is measures for compensation of employees, output and value added in current prices. Statbank table 05560: Main results accounts.

by Oslo (the capital city) on rank five¹². 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.

Table 4: Regional distribution of rapid-growth firms, all firms, population and jobs. Share of growth firms according to different indexes. 2006.

County	I	II	III	IV	V	VI	VII	VIII
	# rapid- growth firms	% of rapid- growth firms	% of all active AS/ ASA	% of population in Norway	% of working population according to work place	% growth firms of all firms	Growth firms per 10.000 inhabitants	Growth firms per 10.000 jobs
01 Ostfold	175	.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	9
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 V-Agder	130	3.6	3.5	3.5	3.4	3.9	8	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&Fjord.	68	1.9	2.3	2.3	2.2	3.1	6.4	13
15 M&Roms.	233	6.5	5.6	5.3	5.1	4.4	9.5	19.4
16 S-Trond.	230	6.4	5.7	5.9	6.2	4.3	8.4	15.7
17 N-Trond.	70	1.9	2.5	2.8	2.5	3	5.4	12
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	5.7	1.4
20 Finnmark	51	1.4	1.7	1.6	1.5	3.2	7	14.6
21 Svalbard	2	0.1	0.1	...	0.1	3	...	15.8
Total	3595	100	100	100	99.9	3.8	7.7	15.2

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.

The regional distribution of rapid-growth firms on the other hand is also related to the location pattern of the industries they are part of. As we saw from table two, rapid expansion of firms is spread out between industries, some of them in industries with a rural location pattern like fish farming, some in industries traditionally clustered in urban environments like business services or computer related activities, and still others in home market related industries like retail or construction where a more even ‘per capita’ distribution of activities are present. An

¹² A considerable share of national account values are not registered on the regional level. This particularly relates to offshore extraction of oil and gas and international shipping activities. A regional distribution of these values would probably been in favor of the regions already on top.

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 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 4 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 to Sweden followed by the capital city and inner part of East-Norway before counties along the coast follow from Southern to Western Norway, Mid-Norway and North-Norway. The last county reported is the islands of Svalbard in the far North. Counties including the four largest conurbations in Norway are printed in italics.

Columns I and II report the number and share of rapid-growth firms registered in 2006. Not surprisingly, 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 (III) and the regional distribution of population (IV) and jobs (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 counts 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 a population living in the neighboring counties.

Columns VI, VII and VIII report the number of growth firms per 100 limited liability companies of each county. On the national level only 3.8% of these companies achieved rapid-growth. In Rogaland County, 5.3% of all companies grew rapidly compared to 2.5% in Hedemark County of the inner East-Norway region. All counties reporting higher values than the national average are highlighted. This measure (VI) will be influenced by the size 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 long and houses a

complete cluster of petroleum related industries. More and Romsdal includes a dynamic manufacturing sector related to ship building, 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 plus West-Agder and South-Trondelag have a larger share than expected from a "normal" distribution. 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 East Norway (Buskerud and Oppland), East-Agder and the northernmost counties represent counties with less growth firms than expected from a uniform distribution. The underperforming counties are regional economies with a slower growth 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.

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

We also use another measure to analyze the centrality of the firms' location. Norway is divided into 434 municipalities. These are classified according to their attachment to a larger, regional labor market and 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 inhabitants. *Medium town regions* include a smaller town(s) and a surrounding area with 15,000-50,000 inhabitants. *Medium city regions* include a medium sized city(ies) and a labor market of 50,000-150,000 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.

Table 5: Regional distribution of firms according to the centrality of their municipality. 2006.

Regions	Number of firms - percent		Percent of total population
	All firms	Growth firms	
Periphery region	10.0	9.2	10.1
Small town region	6.3	5.3	6.4
Medium town region	16.2	16.7	17.6
Medium city region	22.3	21.8	23.1
Larger city region	17.8	21.1	18.7
Metropolitan area	27.3	25.9	24.1
Total population	94.473	3.595	4.640.219

Source: Own data and Statbank table 03026

From table 5 we are informed that growth firms seem to be underrepresented in the periphery and in medium sized cities. One fourth is located in the capital region, but in lesser degree than all firms. They are relatively more concentrated in the second largest city regions and slightly overrepresented in medium sized town regions. One reason could be the industrial distribution of growth firms seen from table 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, where 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.

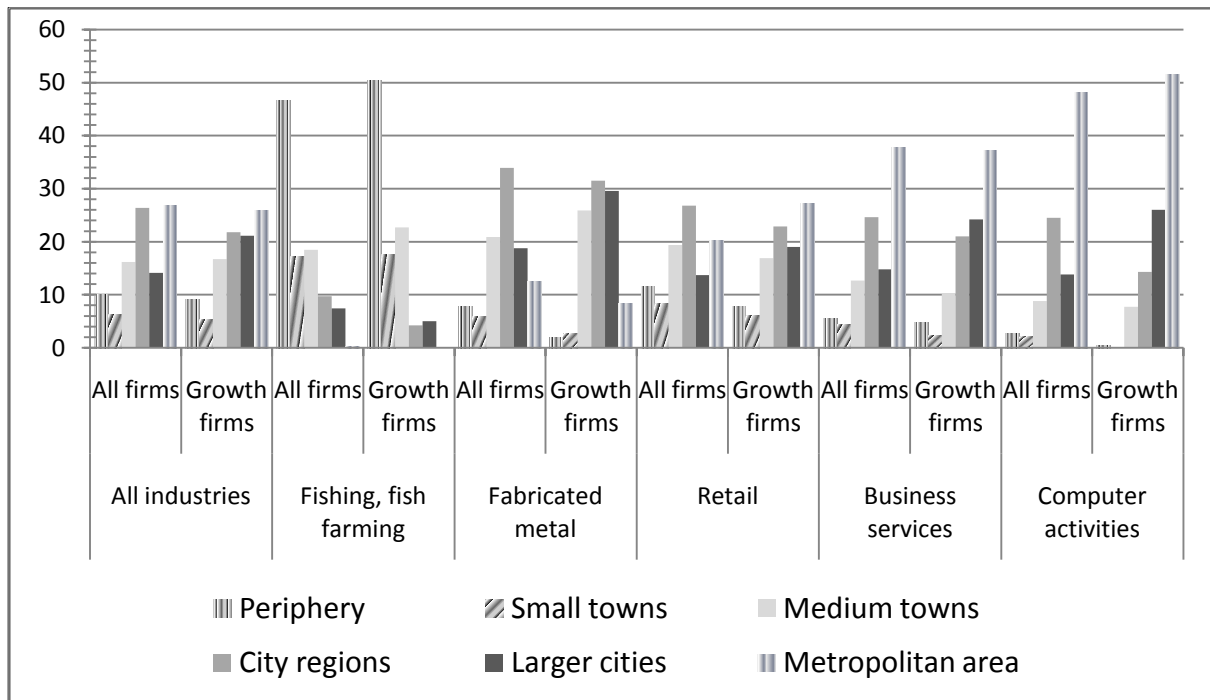


Figure 3: Regional distributions of firms according to industry. Percent of all firms and growth firms. 2006.

In figure 3, we compare the location pattern for all firms and rapid-growth firms for a selection of industries representing decentralized and centralized location patterns and a location pattern related to the distribution of inhabitants. The bars in the first section of the figure illustrate the patterns found in table 5. “Fishing and fish farming” in the next section represents an extraction industry with a dominant decentralized location pattern. The bars show that growth firms are better represented in the preferred location of the periphery and in medium town regions than the total universe of firms in this sector. Manufacturing of “fabricated metal” is concentrated in the middle of the periphery – centrality dimension, but growth firms are more concentrated here than the universe. ‘Retail’ represents an industry where the distribution is more in line with the distribution of the population as such. 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 this time centralized location. In “other business service activities” 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 activity like ‘computer related 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 should suggest. This indicates that rapid-growth is related to locations that already seem to be “the preferred location” of the particular industries and 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 5 are given a value from 1 to 6. The higher the number, the more centralized the location pattern for the industry. Generally, the rapid-growth firms are slightly more centrally located than the total population of this study (value 4.18 compared to 4.09). In table 6, all industries with at least 10 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 2). Next follows a Norwegian peculiarity - the primary part of offshore oil and gas industry highly concentrated to Stavanger, Bergen and Oslo. The following ranking of industrial location is basically in line with an international pattern for advanced economies with the extraction industries as the activities with the most peripheral location pattern.

Table 6: Ranking industries from a central to peripheral location pattern. All firms and growth firms. 2006.

Industries	Rank all firms	Rank growth firms	Industries	Rank all firms	Rank growth firms
72 Computer related activities	1	1	29 Machinery equipment	19	24
11 Crude petroleum and gas	2	23	52 Retail , repair	20	15
51 Wholesale/commis. trade	3	5	50 Sale vehicles, fuel	21	19
22 Publish., print, record med.	4	3	55 Hotels and restaurants	22	21
74 Other business activities	5	6	36 Furniture	23	33
33 Precision/optical instrument	6	4	61 Water transport	24	32
64 Post and telecom	7	10	60 Land transp., pipelines	25	25
31 Electrical machinery	8	11	90 Sewage,refuse dispos.	26	14
80 Education	9	8	25 Rubber/plastic	27	30
92 Recreation, culture, sport	10	9	27 Basic metals	28	22
70 Real estate activities	11	2	37 Recycling	29	26
63 Support transport activities	12	12	26 Non-metallic mineral	30	29
71 Renting of machinery	13	13	35 Transp. Equipm, ships	31	28
01 Agriculture *	14	17	20 Products of wood	32	31
93 Other personal services	15	7	15 Food and beverages	33	27
34 Vehicles, trailers	16	18	14 Mining and quarrying	34	34
45 Construction	17	20	05 Fishing, fish farming	35	35
28 Fabricated metal products	18	16			

* Farms are not included. In the agricultural sector many production units are not organized as limited liability companies and therefore excluded from this analysis.

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 where the divergence between the location patterns of the rapid-growth firms and all firms are the highest, is highlighted – golden color for industries where growth firms are significantly more centralized and grey for industries where 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 service activities” followed by firms in the “sewage and refuse disposal” business. Thereafter “publishing, printing and recorded media” and “retail”, also with a significantly more centralized location pattern than the total population should suggest. On the other hand, rapid-growth firms in the “primary oil and gas sector” are much more decentralized compared to the general picture of the whole industry. Industries like “other mining and Quarrying”, “furniture”, “water transport” and “rubber and 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% annual growth over many years. The longer they have been labeled a rapid-growth firm, the higher centrality of the firm’s location.

There is a certain tendency in the data to suggest 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.

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 majority and these firms are underrepresented in rural areas. In this study we have concluded in the same way. Rapid growth firms seem to thrive in business environments with medium barriers of entry – industries where scale economies are not profound, but in industries where nice markets exist and customer-near and market-oriented behavior is rewarded. In these markets, the specific capabilities of the firm 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 e.g. Storey 1997, 1998; Malizia and Winders, 1999; Acs, Parsons and Tracy, 2008). 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 concluded 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 a better profitability and return on investment than the average firm.

Regarding the regional distribution, this study also concludes that rapid-growth firms are found in most regions with a specific underrepresentation 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 hold 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 they belong to with some deviations. In some service industries like 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 increase in the largest cities. Another observation is the distinct difference in location pattern in the extraction of crude oil and gas where the 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 towards 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 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% of firms growing) place more emphasis upon locating the boat correctly in the current than on the quality of the crew” (Storey 1998:4). In our survey of the literature on rapid-growth firms, most scholars seem to explain rapid growth of a firm with specific capabilities of “the crew” and specific qualities of the firm’s products and processes. Our analysis indicates a strong relationship between the 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” (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 is worthwhile analyzing 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 types of regions. Henrekson and Johansson (2008) conclude that all 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 drawn towards 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 could be of 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 could conclude that the average rapid-growth firm is an SME, but still larger than the average firm of 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 the previous empirical research, and again we partly join in on this conclusion. Our modification is that this is true if one only looks at high-tech industries with high expenditure on formal R&D. A broader avenue to understand innovative activities on the firm level should open up for 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 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 they operate.

In the literature on regional economic growth and job creation, more attention has been directed towards spatial clustering of economic activities; the identification of industrial districts and the concentration of dynamic SMEs in traditional sectors of the manufacturing or service industries, or agglomeration of rapidly expanding industries and new firms based on knowledge intensive resources, innovation and research activities (e.g. Karlsson, Johansson & Stough, 2005; Asheim, Cooke & Martin, 2006;). In both cases, an interest in specifically dynamic parts of the economy and geography is present.

In some sense the finding in this study indicate that rapid-growth firms flourish in environments that could be labeled spatial clusters, but they are not easy to identify as new ventures in the 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 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.

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