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The Growth of SMEs: An Empirical Investigation of Norwegian Exporters

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PREFACE

The last few decades have seen an expanding interest in analyzing and understanding the determinants of growth within small and medium-sized enterprises (SMEs). This development is grounded in the realization that SMEs cannot be treated as "little big firms", limiting the transferability of research findings based on large multinational corporations. The vast number of SMEs and their pivotal role in creating both jobs and technological innovations means that understanding growth in these firms is of vital importance. With this in mind, this master thesis seeks to contribute to the knowledge of growth determinants in an SME setting. This is done through tracking the development of 247 Norwegian SMEs over an eleven year period by combining financial performance data with an extensive survey. The result of this work is two articles that highlight different features of SME growth.

Article one investigates the interdependent relationships between motivation for growth, the firm's international orientation, its past growth and subsequent performance. Although these construct to a limited degree have been treated in previous literature, hardly any studies have examined their comparative and complementary effects on growth in revenue, employment and export sales. Our findings reveal a close and interdependent relationship between the motivation for growth and the international orientation of the firm: Firms with a strong motivation for growth, tend to have a high international orientation and display superior growth both domestically and abroad. The positive connection between international orientation and performance indicate that even though international involvement may be resource demanding and put additional strain on the domestic activities, a high international orientation is positive for overall firm growth. Additionally, our results also reveal that some firms were able to systematically outperform the rest throughout the whole eleven year period.

Article two takes a slightly different perspective on firm growth and investigates the importance of R&D activities during a financial crisis. Though several studies have found a positive connection between R&D and subsequent performance in periods of normal growth, existing literature provide limited guidance to managers about the particular role of R&D during a recession. As the external environment of the firm greatly differs during a recession, so may also the importance of R&D activities. Our findings reveal that firms who devoted considerable resources to R&D activities performed significantly better than the rest through the late 2000's financial crisis. The connection between R&D and performance actually turned out to be comparatively stronger during the financial crisis than in the growth period from 2004-2008. Thus, the importance of R&D activities seems to be accentuated during a financial crisis. For business managers, this implies that R&D activities can serve both to boost growth in normal times and as a way to bolster the firm for the inevitable next recession.

In empirical research, choosing the right methodological approach is of vital importance. We have tried to employ a wide range of analytical techniques, both to reveal different aspects of growth but also because the two articles call for different approaches. The objective of article one is to identify the model that best describe the set of interdependent relationships between motivation, international orientation, past and future growth. This means incorporating both latent and directly observed variables to test a set of hypotheses. Such an approach is enabled through the use of Structural Equation Modeling (SEM) which permits testing of different plausible theoretical models to find the model best suited to represent the data. SEM is able to combine observed variables, such as the development of revenue streams, with latent variables, such as international orientation, and follow

these construct through time. The approach in article two is different, as the focus is set on investigating the particular role of R&D in handling a financial crisis. We want to examine which firms experienced a decline in revenue, and which firms were able to continue to grow through the late 2000s' financial crisis. We therefore choose to use binary logistic regression, a method particularly well suited when you want to predict category membership in a dichotomous dependent variable using a set of independent predictor variables. This has the additional advantage of not requiring equal variances, covariances or multivariate normality. By using this model we hope to improve the accuracy in predicting the growth outcome of each individual firm.

In both articles we employ factor analysis in the operationalization of latent study construct to look for joint variations in response to unobserved variables and identify latent dimensions that direct analysis may not. This enables us to construct more reliable factors. The concept of "international orientation", for instance, is difficult to measure through a single survey question. However, its presence may be revealed through a set of interrelated questions relating to the firm's view of international activities. We therefore use factor analysis as it allows us to "tap into" underlying constructs and reduce the number of variables into a common factor.

The two articles share a set of similarities as they both focus on the perspective of management, their beliefs, motivation and the choices they make. Our findings demonstrate the important influence of strategic planning on realized growth outcomes: Choices made by management, such as how the firm positions itself internationally, its desire for growth, and the resources allocated to R&D activities, clearly impact the subsequent growth path. Knowledge about these constructs is therefore of vital importance for managers, and a goal of this thesis has been to provide empirical evidence that can help managers make better decisions.

Although the articles share several similarities, they also differ in some aspects: Both articles investigate growth, but they do so on slightly different premises. While the first article focuses on a period of normal growth, the second is primarily concerned with a financial crisis. This differentiation is of vital importance to future research as our findings reveal that the dynamics during a financial crisis is different from periods of normal growth. For instance, motivation is in the first article found to be closely correlated with performance when considering a period of stable growth. However, when looking solely on its influence during a financial crisis in article two, motivation did not contribute significantly to growth. This indicate that although motivation is important for firm growth in normal times, the environmental turbulence experienced during a financial crisis make other factors more prevailing in determining the firm's performance. The same can be expected to be the case for other factors: A financial crisis alters the dynamic interplay between firm and environment, changing the relative importance of various factors. This means that factors which are important in a crisis might be of lesser importance during periods of normal growth, and vice verca.

In addition to the previously mentioned implications for firm managers, our findings have also led to a set of suggestions that we hope can aid public policy makers and future research. These implications will be thoroughly treated in the respective articles, but a few selected examples may serve as illustration: A mutual implicit assumption in both public policy programs and the most commonly used firm growth models is the supposition that all firms want to grow and that only resource constraints prevents them from doing so. However, as seen from the findings in article 1, not all firms want to grow and for those who do the strength of this motivation are of great importance. For future research

this implies that motivation should be incorporated when trying to build explanatory growth models, while policy makers should direct their efforts toward firms with an actual desire to grow. Similar concerns can also be raised for R&D spending: R&D activities clearly influence the subsequent growth for firms who decide to allocate resources to innovation. Both researchers attempting to understand the relation between strategy and performance, and public policy makers trying to construct programs to increase technological development and promote economic growth should therefore take note of the findings in article two.

Research is of its greatest value when it not only examines the past, but in addition enables us to say something about the present or the future. Both articles in this thesis have therefore taken a prescriptive approach, hoping to provide managers with empirical evidence of the effect of a set of strategic choices on performance. Business performance is of course highly variable under any condition, and no particular strategy can guarantee growth, or even survival. Growth will always be subject to a range of factors outside the firm's direct volitional control. In many cases, coincidences, or even pure luck, will greatly influence the realized growth outcomes. However, our research shows that there are some factors that seem to help spur growth for many companies. Knowledge about these factors, how they work, and what their contribution is should be of great interest to researchers, business practitioners, and public policy makers. It is therefore our hope that the findings from these articles can help managers make better decisions.

SUMMARY IN NORWEGIAN

Denne masteroppgaven består av to artikler som empirisk utforsker ulike determinanter for vekst i norske små og mellomstore eksportbedrifter. Artikkel 1 undersøker de innbyrdes relasjonene mellom motivasjon for vekst, firmaets internasjonale orientering, tidligere vekst, og hvordan disse faktorene påvirker firmaets videre vekst. Dette er noe som i meget liten grad har vært behandlet i litteraturen tidligere, og få studier har undersøkt disse faktorenes komplementære og komparative effekter på vekst i omsetning, sysselsetting og eksportsalg. Våre resultater viser et nært og gjensidig forhold mellom motivasjon for vekst og firmaets internasjonale orientering: Bedrifter med en sterk motivasjon for vekst har ofte en høy internasjonal orientering og viser overlegen vekst både på eksport- og hjemmemarkedet. Artikkel 2 undersøker vekst fra et annet pespektiv ved å se på betydningen av forskning og utvikling (FoU) for hvordan bedriftene klarte seg gjennom finanskrisen. Selv om forholdet mellom FoU og vekst har vært tema for flere studier, har litteraturen i liten grad fokusert på dette forholdet i en finanskrise. Våre resultater viser at bedrifter som viet betydelige ressurser til FoU-aktiviteter greide seg bedre enn resten gjennom finanskrisen. Den positive effekten fra FoU på vekst var faktisk sterkere under finanskrisen enn den vi fant i en normal vekstperiode. På bakgrunn av dette konkluderer vi med at FoU har en positiv innvirkning på vekst til vanlig, og at denne påvirkningen er enda sterkere under en finanskrise.

article | ONE

The Positive Effect of Motivation and International Orientation on SME Growth

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Abstract

This empirical study on SME growth investigates the relationship between motivation for growth, international orientation and subsequent performance by following 247 firms over eleven years. Using a combination of regression analysis and structural equation modeling the authors find the international orientation of the firm to be a consistent predictor of growth in revenue and exports. The authors also find the international orientation of the firm to be closely interrelated with motivation for growth: Firms with a strong motivation for growth tend to have a high international orientation and display superior growth both domestically and abroad. While motivation seems independent of past performance, it has a profound positive influence on the growth in revenue. Moreover, the findings reveal that some firms are able to sustain high growth rates over an extended period of time. The authors therefore support the contention that some firms are able to systematically outperform the rest. These findings should be of interest for business practitioners, investors and public policy makers.

INTRODUCTION

As pointed out by Wiklund & Shepherd (2003) few studies have empirically investigated the link between motivation for growth and subsequent growth in SMEs. This is surprising, as a ground premise for motivational theories within psychology is that our motivation affects our behavior and subsequently the level of effort (Kanfer 1991). Further, our assessment of the literature shows that hardly any studies have been able to investigate the effect of motivation on growth in revenue, employment, and exports separately. This distinction is of major interest for both business leaders and public policy makers; while business leaders are mainly focused on growth in revenue, public policy makers are also concerned with growth in employment. For SMEs, international expansion is becoming a more and more viable growth alternative due to the revolution in communication, transportation, financing and the homogenization of markets (Oviatt & McDougall 1994). Thus, from a research perspective, focus on internationalization and overall growth in SMEs seems more and more inseparable. While previous literature has focused on the firm's international orientation and motivation independently, little consideration has been given to the shared impact of these on performance. A reason for this apparent dearth of research may be the temporal separation of motivation, international orientation and subsequent performance, making data collection an extensive and time-consuming task.

Motivational studies have frequently been criticized for the use of bivariate analysis, which does not consider the moderating effect of other variables (Wiklund & Shepherd 2003). Both Baum & Locke (2004) and Shane, Locke & Collins (2003) argue that motivational traits may affect actions indirectly through other mechanisms. Similar methodological concerns

is also found in the export performance literature, and Zou & Stan (1998, p. 341) claimed that *"To develop better theory in export performance research, researchers need to combine regression analysis with more sophisticated approaches such as path analysis and structural equation modeling so that both direct and indirect effects can be investigated"*. In addition to the use of methodologically more sophisticated analysis, McDougall and Oviatt (1996) call for more longitudinal studies in the field of internationalization. In analyzing growth this is of particular importance as growth in itself is a change process that cannot be properly evaluated by only considering a single point in time.

We seek to address the above mentioned gaps and methodological considerations with a longitudinal study of 247 Norwegian exporting SMEs. In such, the contribution of this paper is threefold: First of all we investigate the connection between motivation for growth and the subsequent growth in revenue, employment and exports. Secondly, we tie this together with the international orientation of the firm and see the comparative influence on the same factors. Thirdly, we seek to understand the influence of past performance on future growth and motivation. While these constructs have been analyzed separately in past literature, research into their connection and comparative importance on performance is nonexistent. Longitudinally exploring these constructs and their interrelation in an SME context is important, as SMEs account for over 95% of businesses and generate between 60-90% of new jobs (OECD 1997). A better understanding of the determinants of growth should therefore be of vital interest to both business practitioners and public policy makers.

This paper proceeds along the following lines: First, we review relevant literature and develop a set of hypotheses regarding the relationships between our study constructs. We then present our results before discussing these in connection with relevant theory. The article concludes with practical implications for business practitioners and public policy makers as well as suggestions for future research.

THEORETICAL BACKGROUND AND DEVELOPMENT OF HYPOTHESES

Growth motivation and subsequent firm growth

A ground premise for motivational theories is that our motivation affects our behavior, and subsequently the level of effort (Kanfer 1991). The theory of planned behavior incorporates this and predicts that as a general rule, the stronger the intention to engage in a behavior the more likely should be its performance (Ajzen 1991). Transposing this to a firm setting, we would expect a strong growth motivation to have a positive influence on subsequent firm growth. However, as pointed out by Wiklund & Shepherd (2003), the temporal separation of motivation and subsequent growth has resulted in relatively few empirical studies investigating this link. Nevertheless, of the limited studies, several have been conducted in a Scandinavian context. Kolvereid & Bullvåg (1996) looked at 173 Norwegian new businesses and found the entrepreneur's growth intention to be significantly associated with subsequent growth. In an empirical investigation of 863 Swedish small firms, Delmar & Wiklund (2008) found a positive relationship between growth motivation and growth. However, the authors argued that the relationship is weakened for two reasons: first, the environment and the organization put constraints on the managers, limiting their volitional control and ability to perform the desired tasks. Secondly, the fuzzy and complex nature of firm expansion may create conflicts with other goals and limit the manager's ability to develop suitable strategies.

A similar argument is found in Davidsson, Achtenhagen & Naldi (2006) who point out that because the environment vary across dimensions such as dynamism, heterogeneity and munificence, as described by Dess and Beard (1984), external factors rather than management motivation may largely determine how much firms grow. While all these factors can be expected to reduce the strength of the relationship, most empirical studies still indicate a positive link (Wiklund & Shepherd 2003; Baum, Locke & Smith 2001; Baum, Locke & Kirkpatrick 1998)

Among the previously mentioned studies there are considerable differences in how motivation is defined and operationalized. While Wiklund & Shepherd (2003) define a motivational factor based on the desirability of growth, Baum, Locke and Smith (2001) and Baum, Locke and Kirkpatrick (1998), see motivation as a composition of vision, self-efficacy, and goal. However, none of these studies incorporate the growth motivation of owners. Their inclusion is of particular importance in an SME setting as owners to a larger degree may be involved in the daily running of the firm. Additionally, previous studies have failed to incorporate the fact that growth motivation might be survival oriented, as pointed out by Carsrud & Brännback (2011). This means that management sometimes considers growth as a necessity for firm survival, rather than a goal in itself. Incorporating these considerations, this study see motivation for growth as a group level construct that involves the shared ambition of managers and owners, while taking both expansion and survival oriented aspects into account.

Even though the measures of motivation have differed, both the psychology literature and empirical findings suggest a positive link between motivation and subsequent firm growth. We therefore propose:

Hypothesis 1: The growth motivation of managers and owners positively affect the subsequent revenue growth of the firm

Based on the same argumentation, we would expect the same to be true for growth in employment, and propose:

Hypothesis 2: The growth motivation of managers and owners positively affect the subsequent employment growth of the firm

The increasing globalization of markets has accentuated the importance of international activities for overall firm performance. Maturing domestic markets, increased competition at home, and limited domestic opportunities increasingly force firms with an ambition for growth to look toward international markets. As pointed out by Oviatt & McDougall (1994) the opportunity to compete on a global stage is no longer reserved large MNCs due to the revolution in communication, transportation, financing, and the homogenization of markets. Thus from a research perspective, focus on internationalization and overall growth in SMEs seems more and more inseparable. We therefore want to investigate the connection between the motivation for firm growth and revenue generated from international activities, and propose that:

Hypothesis 3: The growth motivation of managers and owners positively affect the firm's subsequent growth in export revenue

International orientation, motivation and export performance

Exporting SMEs is by no means a homogenous group (Nummela, Puumalainen & Saarenketo 2005). While some firms primarily have a domestic scope with exports as a secondary focus, others operate mainly abroad and have a high international orientation. We define a high international orientation as firms that actively

seek international opportunities, see the world as their market, adapt their products to international operations, communicate their international ambitions throughout the organization and develop the resources required for international activities.

According to Knight (2001) the international entrepreneurial orientation of SMEs strongly contributes to their international performance, and is one of the most important success factors of international ventures. In a review of the determinants for export performance, Zou & Stan (1998) found the international orientation of the firm to be a consistent predictor of export performance. They concluded by stating that an internationally oriented firm better identify and benefit from emerging international opportunities. Consequently, it can be expected that a high international orientation positively influence the firm's export sales:

Hypothesis 4: Firms with a high international orientation display higher growth in export sales

As pointed out by Lu & Beamish (2001), growth through international diversification is an important strategic option for small firms as it broadens the customer base and enables the firm to achieve economies of scope and scale. Further, they note that the difference in market conditions across countries allow internationalized firms to capitalize on market imperfections and achieve higher returns on their resources. This would imply that a high international orientation would lead to increased overall performance. However, international activities also increase the environmental complexity faced by managers of SMEs and hence sets additional challenges for the firm and introduce more risk (Reuber & Fischer 2002). The resource demand of internationalization may put additional strain on the domestic activities of the business and can have adverse effects on the total growth of the firm even though sales from international activities are increasing. This is noted by McDougall & Oviatt (1996) who point out that empirical findings on the benefits of internationalization are mixed and claim that foreign expansion does not necessarily contribute positively to overall company growth. Similarly, in a large study on SME growth, Westhead, Wright, and Ucbasaran (2001) found the propensity of exporting not to be significantly related to employment growth, sales growth or even firm survival. This underlines the importance of considering growth in foreign sales in conjunction with total growth and firm survival. Despite the possible challenges connected to international activities, we still expect an international orientation to have a positive influence on overall firm growth in the long run, and propose that:

Hypothesis 5: Firms with a high international orientation display higher growth in total revenue

As noted earlier, it is reasonable to expect that firms with a strong motivation for growth want to obtain some of this in export markets. Similarly, it is likely that firms who have a strong international orientation also exhibit a desire for overall growth. We therefore expect a connection between the international orientation of the firm and its motivation for growth, and hypothesize that:

Hypothesis 6: Firms with a strong motivation for growth also exhibit a higher international orientation

Past growth and the effect on future growth and motivation

A firm accumulates resources when it grows. In principle, this increases the number of potential resource combinations (Lockett et al. 2011). As the system accumulates varied resources, the number of possible combinations will expand naturally at a combinatorial rate (Weitzman 1996). From a resource based view (Wernerfelt

1984; Barney 1991; Barney 2001) it is therefore reasonable to expect that firms who have grown and acquired resources in the past will continue to grow at an accelerating pace. However, as pointed out by Penrose (1959) the rate at which the firm can develop its managerial capabilities sets an ultimate limit to its growth. This is further elaborated by Dierickx & Cool (1989) who claim that the quicker a firm tries to grow, the more costly and less effective growth becomes. They argue that this is due to the time compression diseconomies which build on strictly convex adjustment costs. Moran & Ghoshal (1999) considers it from a slightly different perspective and argue that even though growth provides the firm with an increasing number of opportunities over time, the managers are not able or willing to access, deploy and combine them. This is echoed by Vermeulen & Barkema (2001) who claim that organic growth leads to the repeated exploitation of existing resources leading firms to be simple and inert. Thus, from a theoretical view point, past growth could have both positive and negative influences on subsequent growth rates.

Considering the empirical evidence, Baum & Locke (2004) found a significant positive correlation between past and subsequent venture growth in a study of 229 North American architectural woodworking firms. However, in a related study Baum, Locke, and Kirkpatrick (1998) found no significant correlation. Decomposing growth into organic and acquisitional, Lockett et al (2011) found a direct and negative relationship between previous and current organic growth in a longitudinal study of 11525 Swedish manufacturing firms. They concluded by supporting Penrose, claiming that firms that have expanded organically in the past will find it more difficult to expand organically in the current period. However, they also found that previous aquisitional growth could have a positive impact on future organic growth. Thus, empirical evidence seems contradictory. To investigate the relationship between past and current growth we propose:

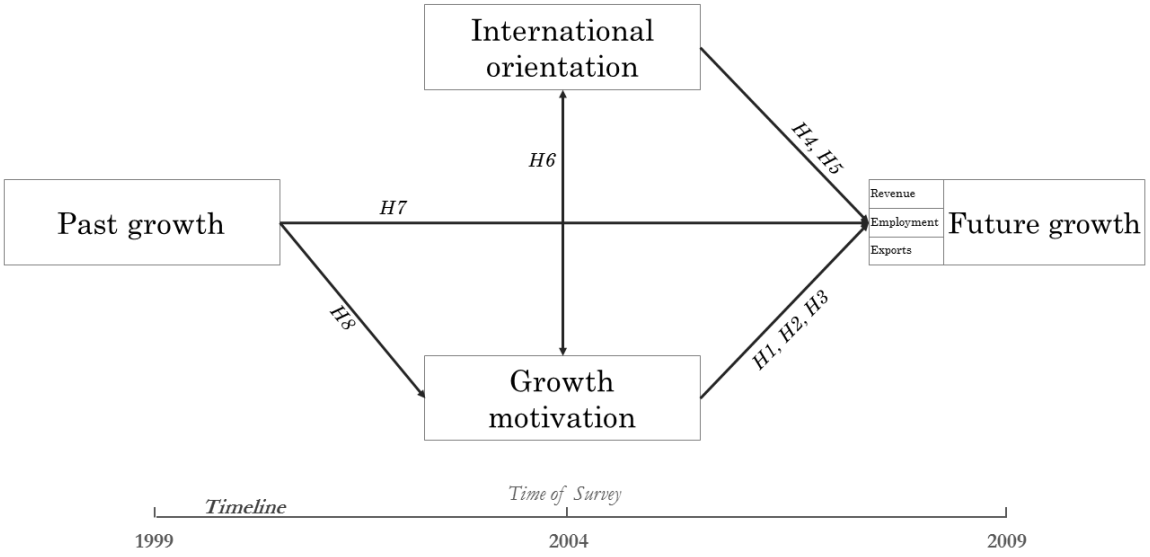
Hypothesis 7: Above average growth in the past will lead to below average growth in the future

Previous growth may also have an influence on the motivation for further growth. Wiklund and Shepherd (2003) point out that it appears plausible that the experience of realized growth could affect future firm growth aspirations. In the psychology literature, Bagozzi & Kimmel (1995) noted that the connection between past performance and future motivation is positive and reinforcing on the personal level. They claimed that motivational theories often fail to take this into account even though it has profound effects. Assuming that this also hold for firm managers and owners, we would expect a positive reinforcement of motivation for firms which in the past have experienced substantial growth. However, simply aggregating these results to a firm environment may not be entirely valid. These studies are limited to personal motivation and the external validity does not necessarily hold for firm growth as managers' motivation is affected by a variety of internal and external factors.

Another possible factor affecting the motivation for future growth is that growth adds complexity which can be difficult to manage (Covin & Slevin 1997). This was noted by Penrose (1959) who claimed that the development of managerial resources takes time and sets a limit to how fast firms can grow. Thus it seems plausible that periods of high past growth can lead to a lower motivation for growth in order to enable the organization to catch up.

Regarding the empirical evidence, few studies have investigated the effect of past growth on the motivation for future growth in SMEs. One

Figure 1: Hypothesized relationships among study constructs



notable exception is a study by Delmar & Wiklund (2008), which found that past growth positively affects growth motivation, proposing the existence of "feedback-loops". This may be seen in conjunction with Wiklund and Shepherd's (2003) suggestion of growth motivation as an "acquired taste", meaning that managers who have experienced considerable growth may have seen the benefits of expansion and have higher motivation for future growth. These findings support the notion of past performance as a positive and reinforcing influence on motivation, as noted in the psychology literature. We therefore propose:

Hypothesis 8: Past growth positively affects the motivation for growth for managers and owners

Hypothesis relationships

Throughout this chapter we have developed eight hypotheses. Figure 1 shows the hypothesized relationships among the study constructs. While all of these have been analyzed separately in the past, they have not been seen directly in conjunction with each other as our model enables us to do. Among the eight proposed hypotheses, two hypotheses regard past growth, and its effect on motivation and future growth. One hypothesis describe the relationship between the international orientation and growth motivation, while five hypotheses regard the connection between international orientation, growth motivation, and growth in revenue, employment, and exports.

METHODOLOGY

The hypothesized relationships will be investigated in a quantitative manner by using time series data for Norwegian SMEs covering the period 1999-2009. The data is centered on a survey distributed to managers in 2004, enabling us to see motivational variables in conjunction with financial performance data, both preceding and anteceding the survey. As a result cause and effect chains between a firm's past, its current situation, and its future performance can be investigated. In analyzing the data we follow the recommendations of Zou and Stan (1998) and apply both regression analysis and structural equation modeling (SEM) to understand both direct and moderating effects. As SEM assumes linearity, combining it with regression analysis enables us to investigate possible non-linear relationships.

Table 1: Descriptive statistics of the firms in the sample

Factor		Mean	Median	Max	Min	Standard Deviation
Year of establishment		1968.74	1980	2004	1853	28.00
Revenue 2004**		85.78	35.97	1309.83	0.71	144.61
Employment 2004		50.78	28.00	351.00	1.00	60.30
Exports 2004**		33.24	7.39	668.16	0.01	71.84
Export share of revenue 2004	[%]	31.27	22.90	98.00	0.10	29.23
Growth Revenue 04-09	[%]	44.69	20.07	971.62	* -91.64	117.85
Growth Employment 04-09	[%]	7.51	0.00	269.57	* -91.30	53.37
Growth Export 04-09	[%]	3.00	-12.06	221.80	* -99.49	78.71

* Excluding bankruptcies

** All currency quoted in million Norwegian Krone

The dataset

The recipients of the survey were senior managers of Norwegian small and medium sized exporting manufacturers. Most of the questions in the survey were based on a seven point Likert Scale, and developed from internationally published scales. The firms were identified from the Kompass Norway database, a commercial address list supplier. In total 2415 questionnaires were distributed, out of which 205 were returned due to address error. Of the remaining 2210, 308 surveys were returned yielding a response rate of 13.94%.

In 2011 accounting and employment figures were retrieved from Statistics Norway, covering the period from 1999 to 2009. To ensure validity, the data was manually inspected. Some firms had merged in the period, and these were deleted. The same was also done with firms where the financial figures could not be verified against publicly available sources. This left 247 valid responses. To ensure that the firms removed did not differ in a systematic manner from the rest, a t-test of the year of establishment, mean firm revenue in 2004, mean number of employees in 2004, and growth rate 2004-09 was conducted. No significant differences between the two groups were found. We therefore conclude that the removed firms do not differ in a systematic manner from the rest.

The existence of outliers may have a large influence on regression coefficients and significance levels. In order to control for the impact of this, an outlier detection test in SPSS was used for the relative growth in revenue, employment and exports. The limit was set at 1.5 interquartile range (IQR), as described by Kinnear & Gray (2009). This revealed the existence of 17 outliers in the relative growth rates in exports, constituting 95% of the variance. A closer inspection of these cases revealed that all had a relatively moderate absolute growth in exports, but due to their very low initial exports they exhibited an extreme relative growth rate. Thus, firms who had barely increased their exports in absolute terms had a large impact on the mean and variance of the sample. When these growth rates were removed, the standard deviation of export growth was reduced from 1463.75% to 79.01%. The removal also reduced the skewness in the sample bringing the mean closer to the median.

The characteristics of the remaining firms are presented in table 1. As the table shows the sample has a distribution of both new and old firms, with a skewness toward newer firms. The export figures show considerable variations in the degree of internationalization, with the export share ranging from marginally above 0% to 98%, with a mean of 31%.

Table 2: Factor analysis

Motivation for growth*	**Load**	**Cronbach's alpha**
Growth is a strong desire for the firm's management[1]	0.943	
Growth is a strong desire for the firm's owners[1]	0.927	
Growth is a necessity for the firm's survival[1]	0.792	
		0.861
International orientation*		
The firm see the world, not just Norway, as its market[1]	0.784	
The firm's culture is characterized by actively seeking possibilities in export markets[1]	0.887	
The firm is able to develop and adjust new and existing products and services to international markets[1]	0.830	
The importance of succeeding in exports is emphasized towards all employees[1]	0.885	
Developing human and other resources that contribute to successful export is emphasized[1]	0.863	
[1]On a scale from 1 to 7 where 1 was "totally disagree" and 7 was "totally agree"		**0.903**

*The questions presented here are here translated from Norwegian

Motivational and growth measures

To ensure reliable measures for motivation for growth and international orientation, two new constructs were created using factor analysis. A large sample is needed when conducting factor analysis, and according to Comrey & Lee (1992) 200 cases is fair and 300 is good. Our sample of 247 firms is thus deemed satisfactory. Extraction of the factors was performed using principal component analysis with varimax as the rotating method. To assess the reliability of the combined factor we used Cronbach's Alpha. A high Cronbach's Alpha indicates reliability and the existence of a strong internal consistency within the questions (Zinbarg et al. 2005). The motivation for growth variable was constructed using three questions related to the growth desire of management and owners, as seen in table 2. The international orientation of the firm variable was constructed from five questions relating to the firm's focus on international activities, as seen in table 2. Both factors have a Cronbach's Alpha exceeding the limit of 0.700 suggested by Nunnally (1978).

In some cases, motivation and international orientation was divided into three categories; 'weak', 'moderate', and 'strong'. This was done to increase the number of elements in each subset, and thus enabled more reliable statistical analysis. From the 7-point Likert scale, the strong category was classified as all firms with a motivation for growth or international orientation above 5.5. The lower limit was set at 2.5. It will be explicitly stated when this grouping is used.

In growth studies an important decision to be made is the choice of growth indicator. In his review of 55 empirical growth studies, Delmar (1997) found that the most used indicators were growth in employment and sales revenue. These are easily available and may be seen as non-controversial from a research perspective. Sales are the most general indicator and are especially useful in cross-industrial studies. It is also the indicator that small firm owners and managers use themselves (Barkham et al. 1996). As pointed out by Delmar (1997), sales are a precursor of other growth indicators. While growth in employment is rarely seen as a goal in itself by management (Robson & Bennet 2000, p. 194), it might be the main point of interest for public policy makers. However,

Table 3: Pearson correlations between study constructs

Factors		Relative growth		Absolute growth	
		Correlation	p<	Correlation	p<
Motivation	Revenue growth	0.205	*0.002	0.111	0.100
Motivation	Employment growth	0.113	0.144	-0.025	0.744
Motivation	Export growth	0.128	0.105	0.143	0.056
International orientation	Revenue growth	0.227	*0.001	0.275	*0.000
International orientation	Export growth	0.183	*0.019	0.234	*0.001
International orientation	Export share growth	0.045	0.587		
International orientation	Motivation	0.389	*0.000		
Past revenue growth 99-03	Revenue growth 04-09	0.163	0.059	0.552	*0.000

*significant relationship at the 0.05 level

employment is not always highly correlated with sales growth as some of the growth in sales can be achieved through partnering and outsourcing. As revenue and employment clearly highlight different aspects of growth, we choose to use both indicators separately.

Growth can be measured both in absolute and relative terms. As Davidsson et al (2006, p. 367) state: *"Relative (percentage) measures tend to "favor" small firm growth while the reverse is true for absolute growth measures"*. In the case of our dataset the firm size varies considerably, demonstrated by the fact that the largest company in 2004 had the same revenue as the 104 smallest combined. Because of this we will use relative growth as our main indicator, but complement this with absolute growth to get the full picture.

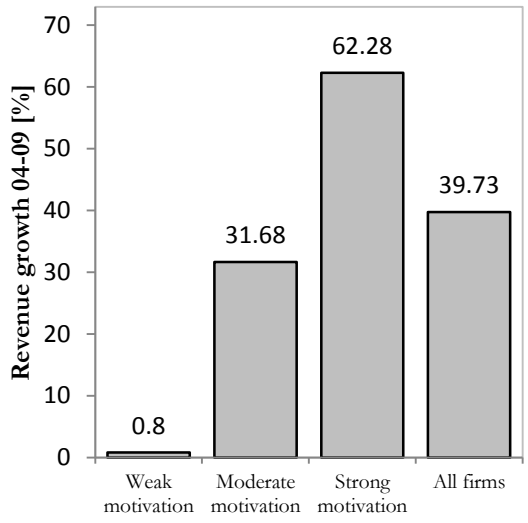
RESULTS

Growth motivation and subsequent firm growth

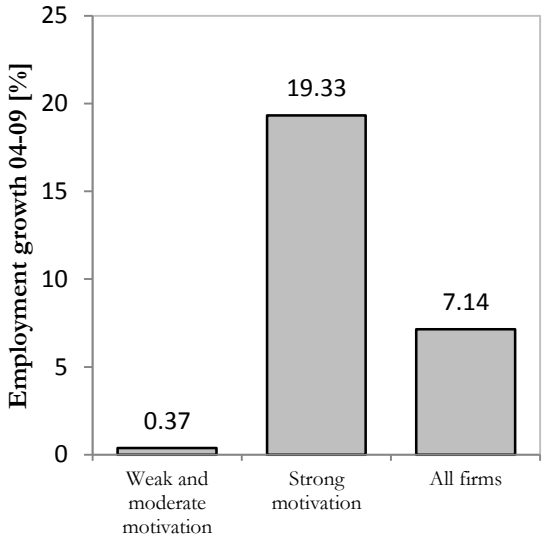
Hypothesis 1 suggests a positive connection between motivation for growth and subsequent revenue growth. To investigate this, the Pearson correlation between motivation for growth and revenue growth in the period 2004-2009 was calculated. This revealed a positive significant relationship ($r(220) = 0.205$, $p<0.002$), as seen in table 3. However, performing the same calculations using absolute growth yielded no significant connection. To further explore the relationship we divided the firms into three groups, 'weak', 'moderate', and 'strong motivation', as described in the methodology chapter. Figure 2 display the growth rate in the different motivational groups. An independent sample t-tests yielded a significant difference in mean growth of 61.48% ($p<0.036$) between the 'weak' and 'strong motivation' categories. The same was true for absolute growth (difference: 42.94MNOK, $p<0.001$). Investigating the difference between the 'moderate' and 'high-motivation' category a Welch's had to be used due to homoscedasticity. This yielded a significant difference of 30.60% ($p<0.045$). In total, the significant positive correlation and the fact that the firms in the 'strong motivation' group performed significantly better than the rest indicate the existence of a connection between motivation and subsequent growth. *Thus hypothesis 1 is supported: A strong motivation for growth positively affect the subsequent revenue growth of the firm.*

Next, to investigate the hypothesized positive relationship between motivation for growth and subsequent growth in employment, we applied a similar approach as for revenue growth. The Pearson correlation showed a positive, but non-significant relationship ($r(168) = 0.113$, $p<0.144$) as seen in table 3. We then divided the firms into three motivational groups. However, due to the low number of firms in

Figure 2: Growth in revenue(left) and employment(right, binned) in each motivational group



	Weak motivation	Moderate motivation	Strong motivation	All firms
N	17	128	75	220
σ	50.25	79.07	116.02	93.21



	Weak and moderate motivation	Strong motivation	All firms
N	102	60	162
σ	39.98	71.19	53.83

the 'weak motivation' category (N=9), we combined it with the 'moderate' category, as seen in figure 2. The two categories had almost identical mean growth in employment prior to combination (-1.42% and 0.54%). A Welch's test yielded no significant difference in growth rates between the firms in the 'strong motivation' category and the rest (difference 18.95%, p<0.061). However, it should be noted that the significance level was fairly close to our 5% rejection limit. As none of the results were significant, it would appear that hypothesis 2 should be rejected. However, it is worth noticing that even though no significant connection was found, all the tests pointed toward a weak positive relationship. *Because of these ambiguous results we are neither able to reject nor support hypothesis 2.*

Hypothesis 3 propose that the growth motivation of managers and owners positively affect the subsequent growth in export sales. The Pearson correlation between the two was 0.128 (N= 163, p<0.105), as seen in table 3. As in the previous tests we binned the firms into three motivational groups. Due to the low number of firms in the 'low motivation' category (N=8), we combined this with the 'moderate motivation' category. An independent sample t-test yielded no significant difference in growth rates between the two groups (difference = 14.27%, p<0.249). *As no significant correlation or difference was found,* we *reject hypothesis 3: The growth motivation of managers and owners does <u>not</u> contribute positively to subsequent export growth.*

International orientation, motivation and export performance

Hypothesis 4 suggests a positive relationship between international orientation and growth in export sales. As seen in table 3, international orientation is significantly correlated to export growth, both in relative (r(164)=0.183, p<0.019) and absolute terms(r(181)=0.234, p<0.001). To further confirm this relationship we divided the firms into three categories based on their international orientation, as outlined in the methodology chapter. As the 'weak international orientation' category only consisted of five firms, we combined the 'weak' and 'moderate' (N=97) categories into one. An independent sample t-test revealed a significant difference in means between the 'high international orientation' category and the rest (difference 35.33%, p<0.005). Companies with

a 'high international orientation' experienced on average a 25.14% growth in exports, while the companies with a weak or moderate international orientation had −10.20%. *Thus hypothesis 4 is supported: Firms with a high international orientation display higher export growth.*

Hypothesis 5 postulates that firms with a high international orientation display higher growth in total revenue. The Pearson correlation was significant both in relative ($r(219)=0.227$, $p<0.001$), and absolute terms ($r(219) = 0.275$, $p<0.000$). We then used the same grouping and combined the 'weak' and 'moderate international orientation' categories. The results showed a significant mean difference, with firms with a high international orientation experiencing a 33.52%($p<0.015$) higher growth than the rest. In absolute terms companies with a high international orientation displayed on average 74.61MNOK ($p<0.001$) higher growth. *Thus hypothesis 5 is supported: Firms with a high international orientation display higher revenue growth.*

Hypothesis 6 suggests a positive relationship between motivation for growth and international orientation. As seen in table 3, the correlation was 0.389 ($p<0.000$), and this represent the strongest relationship between our study constructs. *As a result hypothesis 6 is supported: Firms with a strong motivation for growth also exhibit a high international orientation.*

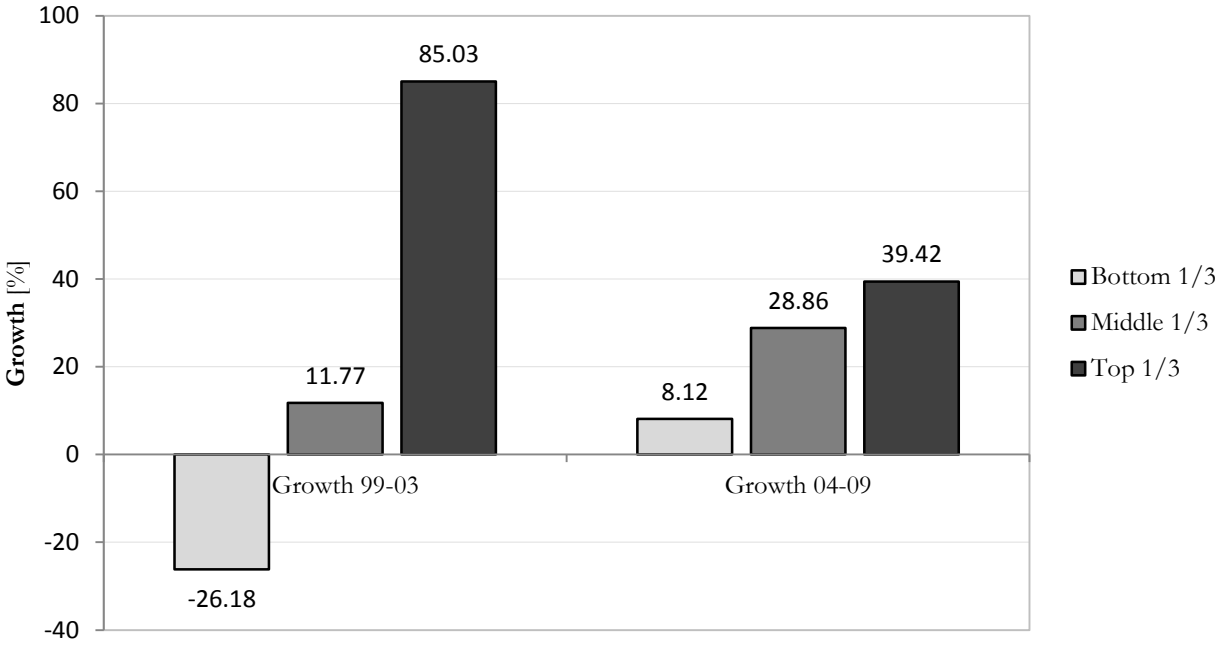
To strengthen our analysis, we further investigated the relationship between international orientation and the growth in export share. On average across all firms the mean export share declined from 33.05% in 2004 to 27.77% in 2009. There was no significant correlation between change in export share and international orientation($r(147) = 0.045$, $p<0.587$). Testing the difference in change in export share between those with a high international orientation and the rest yielded no significant difference (mean difference 10.36% $p<0.271$). Finally, growth in export share had an almost significant negative correlation with revenue growth ($r(149) = -0.138$, $p<0.094$). The implications of these findings will be elaborated in the discussion section.

Past growth and the effect on future growth and motivation

To investigate hypothesis 7 regarding the effect of past growth on future growth the dataset was divided into two periods: Before the survey (1999-2003) and after the survey (2004-2009). Testing the correlation between growth in the first and second period yielded a positive, but non-significant relationship ($r(135) = 0.163$, $p<0.059$). Although this is not significant, it is fairly close to our five percent rejection limit. This indicates the existence of a connection, implying that firms who grew in the first period were the same who grew in the second. As the correlation gave us an indication but yielded no conclusive proof, we proceeded by dividing the firms into three equally sized groups based on their growth from 1999 to 2003. This grouping and the corresponding growth in each period can be seen in figure 3. As firm growth rates may vary with age (Sousa, Martínez-López & Coelho 1998), we used ANOVA to test whether there was a difference in age between the groups. Although the top third were slightly newer, the difference was not significant ($p<0.221$).

From figure 3 it is clear that the top performers in the first period also had the highest growth in the second. Examining this using a t-test revealed that the top third had a significantly higher growth in the second period as well (difference = 31.30%, $p<0.049$). It should be noted that the top performers did not outperform the rest to the same extent as in the first period. Further, while both the bottom and middle group had a higher growth rate in the second period the top third were the only group were growth rates decreased. However,

Figure 3: Growth for each performance group



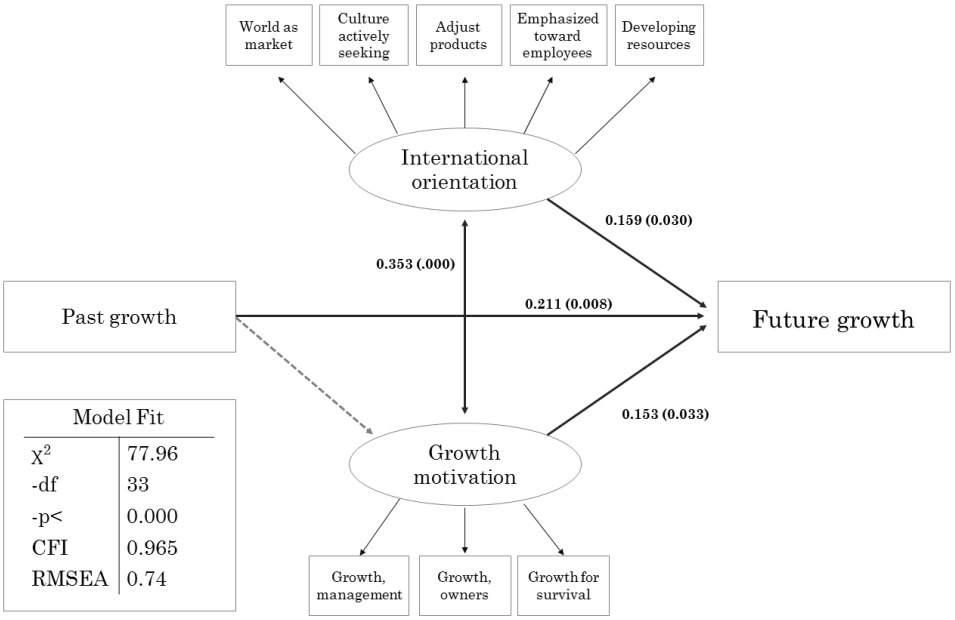
in total it is clear that the top performers from the first period also had the highest growth rates in the second, *and thus we reject hypothesis 7: Above average growth in the past will not lead to below average growth in the future.*

Hypothesis 8 suggests that past growth positively affect the motivation for future growth. To investigate this we calculated the Pearson correlation between past growth in the period 1999-2003 and the motivation for growth at the time of survey in 2004, as seen in table 3. The correlation between these indicates no significant connection ($r(140)=-0.011$, $p<0.893$), implying that motivation is independent from past growth. To verify these findings we wanted to test whether there was a difference between the extreme cases. Two groups were therefore created: Those with more than 50% growth, and those with less than 0% growth in the period 1999-2003. An independent sample t-test revealed no significant difference in motivation between these two groups (mean difference: 0.12, $N_{Growth>50\%}=55$, $N_{Growth<0\%}=31$, $p<0.739$). Given that there is no correlation between the two, and no difference between the extremes, *hypothesis 8 is rejected: Past growth does not seem to affect subsequent motivation.*

Structural equation modeling

To better understand the interaction between past growth, international orientation, motivation for growth and subsequent growth, a structural equation model (SEM) was developed using AMOS 20. In doing so we follow the recommendation of Zou & Stan (1998) to use a combination of regression analysis and SEM to reap the benefits of both approaches. Our model was estimated by applying maximum likelihood. The model fit was evaluated using Bentler's comparative fit index (CFI), root mean square error of approximation (RMSEA) and χ^2. According to Hu & Bentler (1999) a CFI above 0.95 indicate a relatively good fit between the hypothesized model and the observed data. Regarding RMSEA, Byrne (1998, p. 112) state that *"…values less than 0.05 indicate good fit, and values as high as 0.08 represent reasonable error of approximation in the population"*. In this model χ^2 equals 77.96 ($df = 33$, $p<0.000$), CFI = 0.965, and RMSEA = 0.074. We can therefore

Figure 4: Structural Equation Model



conclude that the model is a reasonable representation of the data.

The resulting model can be found in figure 4, which also report the corresponding standardized regression weights and significance levels. Firm size and age was included in the original model, but as the impact was not significant they were dropped. From the model it is evident that both motivation and the international orientation of the firm affect its subsequent performance. This strengthens hypothesis 1 and 5, regarding the influence of motivation and international orientation on subsequent growth. It is also clear that international orientation and motivation is interrelated, as seen by the strong standardized regression weight (0.353, $p<0.000$), supporting hypothesis 6. Further, their comparative influence on future growth is nearly equivalent.

Past growth positively influenced future growth, but was unrelated to international orientation and motivation. This strengthens the rejection of both hypotheses 7 and 8.

Summary

Table 4 summarize the results of each individual hypothesis.

Table 4: Summary of all hypotheses

	Hypothesis	Status
1	The growth motivation of managers and owners positively affect the subsequent revenue growth of the firm	Supported
2	The growth motivation of managers and owners positively affect the subsequent employment growth of the firm	Inconclusive
3	The growth motivation of managers and owners positively affect the firm's subsequent growth in export revenue	Rejected
4	Firms with a high international orientation display higher growth in export sales	Supported
5	Firms with a high international orientation display higher growth in total revenue	Supported
6	Firms with a strong motivation for growth also exhibit a higher international orientation	Supported
7	Above average growth in the past will lead to below average growth in the future	Rejected
8	Past growth positively affects the motivation for growth for managers and owners	Rejected

DISCUSSION

Growth motivation, international orientation and subsequent performance

In this study we have unified several constructs related to motivation, international orientation, and growth to better understand the determinants of SME performance. Our most significant finding is that firms with a strong motivation for growth tend to have a high international orientation and display superior growth both domestically and abroad. We build this conclusion on three key findings:

Firstly, our results revealed a positive and significant relationship between growth motivation and the subsequent growth in revenue. This is concurrent with previous empirical findings by Wiklund & Shepherd (2003), who revealed a positive connection between motivation and subsequent revenue growth. However, we found no significant relationship between motivation for growth and subsequent growth in employment. Although all results pointed in the same direction, and several were close to the 5% rejection limit, none were significant. This meant we were not able to conclude whether motivation for growth had an influence on employment growth. Comparing our results to the findings of Delmar & Wiklund (2008), they found only partial support in examining the relationship between motivation and growth in sales, but full support when considering employment. Although their results differ from ours when it comes to the comparative strength of the relationship, both studies agree to motivation having an effect on growth.

Secondly, the results revealed a positive connection between the international orientation of the firm and growth in both revenue and exports. Considering these findings in relation to previous empirical studies, the positive influence of an international orientation on subsequent export growth is congruent with Zou & Stan (1998), who in a thorough review of the export performance literature found the international orientation of the firm to be a consistent predictor of export performance. This is also consistent with the conclusions of Aaby & Slater (1989), and Chetty & Hamilton (1993) that factors related to management's attitudes and perceptions are potent determinants of export performance. Cavusgil & Zou (1994) pointed out that high management commitment allows the firm to aggressively go after opportunities in export markets. Similar conclusions have also been reached by Leonidou, Katsikeas, & Piercy (1998), and Knight (2001), who found that an international entrepreneurial orientation in SMEs strongly contributes to the international performance of the firm. The positive connection between the international orientation of the firm and revenue growth shows that even though international activities may be resource demanding and put additional strain on the domestic activities, a high international orientation is positive for overall firm growth. This seems to contradict the findings of Westhead, Wright & Ucbasaran (2001), who in an empirical study of SME growth found the propensity of exporting to be unrelated to sales growth. However, it should be noted that their sample size was very low, consisting of 116 firms of which only 30 were exporters. Our results show that firms who actively seek international opportunities, see the world as their market, adapt their products to international operations, communicate their international ambitions throughout the organization, and develop the resources required for international activities experience higher overall firm growth than firms with a low international orientation.

Thirdly, our results revealed a strong interconnection between the motivation for growth and the international orientation of the firm. In both the regression analysis and the structural equation model, the connection between these two study constructs turned out to be the strongest. Considering the development in export share, our results somewhat surprisingly revealed that the average export share declined from 33.05% in 2004 to 27.77% in 2009. This was independent of the international orientation of the firm. As overall growth in the period was positive and international orientation exhibited a stronger correlation with growth in revenue than with exports, it implies that the internationally oriented firms outperformed the rest not only internationally but also domestically. This is further strengthened by the SEM where international orientation had a marginally stronger impact than motivation on subsequent growth. We interpret the close connection between international orientation and motivation for growth as an indication that both factors describe an underlying aspiration for expansion. It seems that firms with a high international orientation exhibit a general desire for growth. Likewise, it indicates that firms with a strong motivation for growth consider success in international markets an important mean to fulfill their growth ambitions.

These three arguments show that firms with a strong motivation for growth tend to have a high international orientation and display superior growth both domestically and abroad. There may be several explanations for this. First, it is possible that a high international orientation and comprehensive foreign operations leads to learning and acquisition of new knowledge and capabilities as foreign markets bring different challenges. This can give them an edge compared to firms that operate solely in the domestic market, and thus lead to a potential competitive advantage. Secondly, the Norwegian economy has experienced considerable growth in this period, which may have lessened the firms' incentives for expansion in the more risky international markets. Thus even the internationally oriented firms may have focused their resources on capturing as much as possible of the domestic growth rather than venturing out in new markets. It is worth noting that while international orientation had a significant positive impact on both growth in exports and revenue, there was no significant relationship between motivation for growth and export performance. This could indicate that a strong motivation for growth alone is not sufficient for success in international markets. The firm also needs a high international orientation, meaning that the whole firm is committed and focused on the international activities.

Management has a certain degree of volitional control

Delmar & Wiklund (2008) claimed that the relationship between motivation and growth is weakened due to two factors: the fuzzy and complex nature of firm expansion, and the constraints put on managers by the organization and the environment. Similarly, Wiklund and Shepherd (2003) argued that growth outcomes are not under the total volitional control of management. This implies a weakening of the effect of motivation on subsequent growth. The standardized regression weights from our SEM were 0.153 for motivation and 0.159 for international orientation indicating that both factors influence the growth path. Hence management has a certain degree of volitional control over growth outcomes. However, the moderate strength of the coefficients also shows that this volitional control is limited. This means that the behavioral intentions of management will not directly translate into growth as other factors such as macroeconomic development, access to

resources and other external factors can be expected to have an influence on growth.

Davidsson, Achtenhagen & Naldi (2006) argued that because the external environment of the firm vary across dimensions such as dynamism, heterogeneity and munificence, as described by Dess & Beard (1984), external rather than internal factors may largely determine firm growth. Our results clearly show that while external factors have an impact on the firm's growth path, internal factors are also influential. We are not able to say anything about the comparative strength of these forces, but we can conclude that managers' intentions influence the strategic direction of the firm, which subsequently influence performance.

Growth in revenue does not automatically transfer into growth in employment

From the findings in this study it is also evident that growth in revenue does not automatically transfer into growth in employment. While we found a strong and significant correlation between motivation and subsequent revenue growth, the correlation with growth in employment was both weaker and not significant. Additionally, while the firms in the sample averaged a 39.73% growth in revenue, the corresponding growth in employment was only 7.14%. This discrepancy and the non-significant relationship between motivation and growth in employment indicate that even though the firms have grown, they have not realized all of this growth through the hiring of additional employees. This may be attributed to several factors: First, it is possible that increased sales have led to the utilization of prior excess capacity, or productivity increases resulting from economies of scale. This means that the firms are able to produce more with the same resources. SME manufacturers in particular, due to their small size, may benefit considerably from economies of scale as their sales increase. Hence the increased workload due to a higher number of orders may be absorbed through more efficient production. Secondly, firms may have absorbed the growth through externalization. Several studies have shown that SMEs both seek and use strategic alliances to grow (Miles, Preece & Baetz 1999; Freeman, Edwards & Schroder 2006). This can help them overcome shortages of capital, equipment, and other tangible assets through resource sharing (Lu & Beamish 2001). Strategic alliances may therefore present a viable alternative for small firms in a growth phase. Externalization may also have been achieved through the use of outsourcing, enabling growth in revenue without hiring additional employees. Thirdly, as Delmar (1997) point out, the number of employees is often lagged compared to the financial development. This may be intentional as managers wait to see whether the increased activity is permanent, or non-intentional because the hiring process takes time. Hiring new employees is a long term decision that introduces additional risk and added costs. This is especially true for SMEs, as each additional employee represent a relatively large increase compared to their total work stock.

Past growth does not affect motivation

While motivation is a strong determinant for the subsequent revenue growth of the firm, motivation itself is independent of past growth. This was evident both from the non-significant correlation and the structural equation model. Even when comparing the group with the highest past growth against the group with the lowest past growth, no significant difference in motivation was found. This is contrary to the findings of Delmar & Wiklund (2008) who found that past growth positively affected growth motivation. They suggested a mutual feedback loop where realized growth in turn leads to increased motivation for further growth. Our results, however, does not find any support for this as all findings clearly point to

the two constructs being independent of each other.

In developing hypothesis 8 we proposed that the findings of Bagozzi & Kimmel (1995) from the psychology literature were applicable on a firm level. They showed that the connection between past performance and future personal motivation was positive and reinforcing. However, as we found no connection between a firm's past growth and the motivation for future growth, it seems that the findings on personal motivation from the psychology literature are not directly transferable to a firm level. This indicates that motivation for growth in a firm setting is a complex and different phenomenon than personal motivation, as it is heavily dependent on firm specific factors and the traits and experiences of the people involved.

Past growth does not limit future growth

Our results show that some firms are able to sustain high growth rates over an extended period of time: The top performers in the first period were also the top performers in the following period. Similarly, the bottom performers also did worst in the second period. This is in concordance with Baum & Locke (2004), who found a significant positive correlation between past and subsequent venture growth in a study of American manufacturing firms. As our study cover a time span of eleven years, it seems safe to conclude that some firms inhibit a fundamental set of characteristics or factors that separate them from other firms and make them able to systematically outperform the rest.

However, it should be noted that the top performers in the first period did not outperform the rest to the same extent in the second. The average growth across all firms was nearly identical in the two periods, and although the top performers grew 3.5 times the average in the first period, they only grew 1.5 times the average in the latter. Both the bottom and middle third improved their growth rates between the two periods, while the top third was the only group that experienced lower growth rates in the second period. This indicates that very high growth rates are difficult to sustain over a long time.

Considering firm growth from a resource based view (Wernerfelt 1984; Barney 1991; Barney 2001), growth should lead to an increased number of resource combinations and thus also enable further growth. While this may be the case for moderate growth, our results show that extreme growth cannot be sustained over a long period. We are, however, not able to determine whether this is due to limitations of how fast managerial capacity can be developed as suggested by Penrose (1959), strictly convex adjustment costs as suggested by Dierickx & Cool (1989) or if it is because managers are not able or willing to access, deploy and combine the new resources as suggested by Moran & Ghoshal (1999).

IMPLICATIONS

Implications for managers, owners, investors and public policy makers

The findings presented in this study have implications for both business practitioners and public policy makers. Our results reveal that managers need to be aware of the role of motivation in achieving growth. Even though external and other internal factors reduce management's volitional control, the growth outcome is still affected by their underlying beliefs and aspirations. Managers therefore need to ensure that growth goals are aligned with the underlying growth motivation. Further, our findings reveal that firms with a high international orientation performed better both domestically and abroad. Having an international focus may therefore serve as a good strategic option for small firms for two

reasons: Firstly it broadens the firm's scope allowing them to capitalize on potential market differences when they arise. Secondly, knowledge and capabilities from international markets may be applied in the home market, giving them a competitive advantage domestically as well. To reap these benefits managers must ensure that the entire firm see the world as their market, actively seek international opportunities, adapt their products to international operations and develop the resources required for international activity.

Owners with a strong aspiration for firm growth must keep the important influence of motivation in mind when hiring managers, and find managers who share their ambition for growth. Even though this study has not investigated the consequences of a misalignment in motivation between owners and managers, it seems plausible to assume that a disconcordance of aspirations may produce suboptimal outcomes. Investors can also benefit from our results, as it is clear that some firms are able to systematically outperform the rest. Identifying these firms should be of great interest to investors, and our findings reveal that motivation and international orientation can aid them in doing so.

For public policy makers it is important to note that there is a possibility for economic growth if managers' growth aspirations can be increased. According to Delmar & Wiklund (2008) the importance of motivation has largely been overlooked in public policy programs, as most support programs implicitly assume that only the limited availability of resources constraints their growth. However, it is clear from our results that not all firms have a desire to grow. Thus, growth programs should emphasize on identifying and targeting firms who exhibit a desire for growth, but are limited by their resources. By assisting the right firms both the impact and efficiency of public policy programs can be increased.

Implications for future research

As noted by Kolvereid & Bullvåg (1996), a common weakness in most growth models is the implicit assumption that growth is always a desired objective. The findings presented here show that not all firms want to grow and that the realized growth outcome is clearly influenced by owner and manager motivations. Growth models that ignore motivation and simply assume that all firms exhibit a general desire for growth may therefore produce biased results. In addition, this study has combined constructs that previous empirical studies have treated individually. Our results show a clear connection between motivation, international orientation, past- and future performance. Ignoring these interconnections could lead to incorrect conclusions, and future research should therefore take note of this.

This investigation has been quantitative in nature, and supplementing this with qualitative data could triangulate our findings and increase the external validity and generalizability. Qualitative studies could also be useful for delving deeper into the underlying factors behind our study constructs. What drive managers' and owners' motivation? Which of the factors leading to growth does motivation primarily affect? How is management's motivation communicated throughout the organization, and how does this directly and indirectly influence the organization?

To investigate the generalizability of our results, similar studies should be conducted in different countries and different time periods. In this regard the relationship between international orientation and performance is of special interest, to see whether this is a phenomenon found primarily in manufacturing industries in small open export oriented economies like the Norwegian. Additionally, as sales growth is not

always the main goal of the firm, future studies could also include other performance measures such as profitability, survival, or firm stability. It should be noted that the time span of this study represent one of the strongest growth periods in the Norwegian economy and it can be expected that the results are influenced by this. A similar study conducted in a recession or low growth period may supplement our results and shed more light on the study constructs.

CONCLUDING REMARKS

This study has tried to address research gaps related to the interconnection between a firm's international orientation and its motivation for growth. By examining how these factors influence each other and the subsequent growth in revenue, employment and exports, a portrait of the successful growth firm emerges: It has owners with a desire for growth which is transferred to the management team. These managers actively seek international opportunities and communicate international ambitions to the whole firm. Further, they adapt products to local demands and make sure the organization develops the resources required for international activities. In turn, this contributes to superior growth both domestically and abroad.

Research is often focused on explaining why things happened in retrospect. However, the value of this is limited unless it enables us to say something about the present or predict something about the future. We have found that some firms are able to systematically outperform others, and have identified a set of factors that can be of help when trying to predict the future growth direction of firms. By asking managers and owners about their motivation for growth, and mapping the international orientation of the firm, our results show that it is possible to identify firms that are more likely to outperform the rest. This may be a valuable tool for business practitioners, investors, and public policy makers.

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The Effect of R&D on Performance: Did R&D Intensive Firms Handle the Financial Crisis Better?

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Abstract

This empirical study investigates the effect of a high R&D intensity on performance during a financial crisis. Though the general positive connection between R&D and subsequent growth is well known, existing literature provide managers with limited guidance about the particular role of R&D in a recession. Using binary logistic regression on a sample of 247 Norwegian manufacturers we find that firms who devoted considerable resources to R&D activities performed significantly better than other firms through the late 2000s' financial crisis. This connection was even stronger than the one found during a period of normal growth, implying that the importance of R&D is accentuated during a crisis. We provide several possible explanations for this. This study also addresses gaps in the literature relating to the time lag between R&D investment and effect on revenue. We find a gap of two years, with an even stronger effect after three years.

INTRODUCTION

There seems to be a general consensus in the literature that R&D has a positive effect on firm performance. However, knowledge about the effect of R&D activities on growth during a recession is scant and offer limited guidance to managers (Lilien & Srinivasan 2010). Even though it has been argued that innovative activities are one of the main ways for firms to adapt to changing environments (Schoonhoven, Eisenardt & Lyman 1990) and that knowledge based resources are of greater importance in turbulent environments (Heeley, King & Covin 2006), hardly any studies have considered the role of R&D in handling a financial crisis. As recessions increase the environmental complexity, it means that firms constantly need to adapt to changing and unpredictable conditions. The dynamic capabilities needed to handle this and act on new opportunities are not necessarily the same as those needed to handle stable environments. Given the importance of knowledge about these matters, and the vast literature concerning the role of R&D in growth periods, this apparent gap is surprising.

In order to properly investigate the relationship between R&D activities and firm performance, it is important to first examine the time lag between R&D investment and its effect. R&D investment does not lead to immediate tangible results (Coad & Rao 2010), and as pointed out by Pakes & Schankerman (1984) lags exist both in the development and commercialization of a R&D project. For managers comparing the expected returns of R&D to other investments, the length of this gap is of great interest. Unfortunately, knowledge about the time it takes from the R&D outlay to increased revenue is scattered, limited, and usually based on US data (Kafouros & Wang 2008). Managers are therefore put in a difficult

position not knowing when that extra dollar spent on R&D can be expected to show up on the top line.

This article sets out to investigate how R&D investments helped firms cope with the late 2000's financial crisis, and whether the importance of R&D activities increase in recessions. We also want to address the gap presented by Kafouros & Wang (2008) and determine the time span managers can be expected to wait before R&D efforts makes significant contributions to revenue growth. The goal of this is to provide managers with empirical evidence of the connection between R&D and growth that can aid them in the strategic allocation of scarce resources in the face of a recession.

This article proceeds with a section outlining the theoretical background, followed by a methodology chapter. The subsequent section provides the results from our analysis, before these results are discussed in light of the theoretical background. The article concludes with practical implications for business practitioners and future research.

THEORETICAL BACKGROUND

According to the resource based view(RBV) (Wernerfelt 1984; Barney 1986; Barney 2001) a key determinant of firm performance is its ability to accumulate and apply the appropriate types of resources: Firms that possess and combine resources which are valuable, rare, immobile and difficult to imitate are more likely to sustain a competitive advantage (Barney 1991). In this perspective, R&D investments may be seen as additions to the firm's stock of knowledge, as it is an important resource both for creating innovations and developing knowledge capabilities (Somaya, Williamson & Zhang 2008). Similarly, Stam & Wennberg (2009) point out that R&D has "two faces": the conventional role of stimulating innovation and the enhancement of technology transfer by improving the firm's absorptive capacity, its ability to identify, assimilate, and exploit outside knowledge. This was investigated by Cohen & Levinthal (1990) and Griffith, Redding & Van Reenen (2004) who both found evidence that R&D improves the firm's absorptive capacity and accelerates organizational learning, subsequently improving firm performance.

As noted by Cohen & Levinthal (1990), R&D can be seen as input into the production of firm specific knowledge. R&D knowledge is intangible by nature and therefore difficult to replicate (Kostopoulos, Spanos & Prastacos 2002). As pointed out by Hitt et al (2001), intangible assets are more important from a strategic point of view as they are more likely to fulfill the requirement necessary for producing a sustainable competitive advantage. Additionally, the very nature of R&D knowledge is tacit and firm-specific. While the specific technology resulting from R&D may be traded, the idiosyncratic nature of a firm specific asset precludes its tradability in open markets (Williamson 1979). In total, R&D activities seem to lead to the development of resources which are unique, rare, immobile and difficult to imitate. Thus, investments in R&D are likely to lead to improved firm performance.

The connection between R&D activities and subsequent performance has been the subject of many empirical investigations, and studies across countries and industries seems to confirm the notion of R&D activities as a positive predictor for firm growth: In a study of 500 Italian manufacturing firms, Del Monte & Papagni (2003) found a significant difference in revenue growth rates of firms who performed R&D activities and those who did not. Lee & Shim (1995) compared the influence of R&D on firm growth in Japanese and American high-tech manufactures and

concluded that the strength of this relationship was a positive and similar for the two countries. Other empirical studies have confirmed the positive relationship for different performance indicators, such as revenue (Leonard 1971; Zhao & Li 1997; Garciá-Manjón & Romero-Merino 2012), productivity (Wakelin 2001; Klette 1996; Griliches 1985; Wang & Tsai 2004) and profits (Leonard 1971). In total, the empirical evidence clearly point to R&D as a positive influence on subsequent growth.

The effect of R&D in a financial crisis

There seems to be a general consensus in the literature, both from resource based theories and empirical findings, about the positive effect of increased R&D activities on performance. However, limited attention has been given to whether this effect is also present during a recession. Do firms with high R&D investments fare better through a financial crisis? As pointed out by Lilien & Srinivasan (2010), in an empirical investigation of expenditures during recessions, existing literature on the appropriate R&D level in recessions offer limited guidance to managers. In developing an argument we therefore have to rely on wider range of literature. Dynamic Capabilities refers to the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece, Pisano & Shuen 1997). According to Wang and Ahmed (2007, p. 18), innovation is a key component of the dynamic capabilities concept, as it "*underpins the firm's ability to integrate, reconfigure, renew and recreate its resources and capabilities in line with external change"*. The importance of dynamic capabilities may thus be accentuated during a financial crisis, as it is a time with high external change. Because R&D both is and contribute to building the firm's dynamic capabilities, R&D activities may make the firm better suited to handle a financial crisis.

Wang & Ahmed (2007) further outline adaptive capability, the firm's ability to identify and capitalize on emerging market opportunities (Miles & Snow 1978), as another main component of dynamic capabilities. This can be of great help in a recession: even though recessions entail contractions in the demand, new opportunities arise for firms who are able to identify and grasp them. Kitching, Smallbone & Xheneti (2009) pointed out that recessions create opportunities for businesses in several ways: It decreases asset prices, purchasers often switch to new suppliers, and the exit of some firms leaves the survivors to compete for their "vacant share". Schumpeter (1950) argued that recessions could provide a platform for innovation, unleashing a process of "creative destruction". This would launch new technologies, remake existing industries and give birth to entirely new ones. Thus it is clear that ample opportunities exist even during recessions, but the turbulent environment makes it more difficult to adapt and seize them. Freel (2000) noted that the presence of R&D activities creates an organization that is propitious to questioning, making them better at identifying and exploiting new opportunities, increasing the firm's adaptive capability. Hence, R&D through increased adaptive capability may make firms better equipped to exploit new opportunities arising during a crisis.

Heeley, King & Covin (2006) argue that R&D investments lead to knowledge-based resources that have greater utility in dynamic rather than stable environment. They therefore suggest that the contributions of R&D investments to a firm's competitiveness may be particularly great in dynamic environments. Dynamism represents the level of environmental volatility or unpredictability of change (Dess & Beard 1984) and dynamic environments may therefore call for many of the same qualities as those needed to handle a recession. Dynamic environments means that firms constantly need

to adapt to changing and unpredictable conditions. A firm's absorptive capacity increases the firm's ability to adapt to changing environments as it enables the firm to act proactively as opposed to reactively to industry dynamism (Abdelkader 2004). Absorptive capacity has been found to be positively influenced by R&D activities (Cohen & Levinthal 1990; Griffith, Redding & Van Reenen 2004) and thus R&D may increase the firm's ability to react to external turbulence. Welch, Liao & Stoica (2001) find absorptive capacity to be a strong predictor for organizational responsiveness among US SMEs. They conclude that this relationship is even stronger when environmental turbulence is high and state that " …*highly turbulent environments increase volume and complexity of information, which in turn calls for increasing information processing capability*" (Welsch, Liao & Stoica 2001, p. 12). This may indicate an even stronger positive influence of R&D on responsiveness through an increase in absorptive capacity. Thus, the effect of R&D may be even stronger when the firm faces turbulence, as in a financial crisis

Factors influencing the effect of R&D on growth during a financial crisis

The relationship between R&D activities and performance during a financial crisis is affected by a range of internal and external factors that can work both directly and indirectly. To properly represent this in a research setting, possible mediating factors must be included. The following section therefore present a set of relevant influences, divided into three groups: Firm, product, and market specific. They have been included based on search in relevant literature.

Firm specific factors

Firm size can influence both how well firms fare through a financial crisis, and their R&D expenditures. As pointed out by Smallbone et al. (1999), smaller firms often have a more limited resource base affecting their ability to scan, analyze and respond to major environmental change. However, at the same time they are generally more flexible and thus able to adapt products, processes and prices quicker. Welsch, Liao & Stoica (2001) found that smaller firms are better able to respond to changes because of less bureaucracy and hierarchical thinking. Hence, the literature offers no clear guidance on the influence of firm size on performance in a recession. The influence of firm size on R&D expenditures has also been debated in the literature, and while several studies have found a positive influence of firm size on R&D expenditure (Soete 1979; Del Monte & Papagni 2003), others studies have revealed no relationship (Audretsch & Acs 1991; Cohen, Levin & Mowery 1987).

Firm age can also mediate the importance of R&D in recessions. According to the liability of newness argument (Stinchcombe 1965), newly founded firms are particularly prone to failure. New firms typically lack a large established and loyal customer based, and this can lead to a quicker decline in sales in turbulent times as buyers seek safe and well known products. Further, older firms may to a larger degree possess complementary assets (Teece 1986) which may enhance their ability to generate new products and technology from their R&D efforts. Thus, the failure rate of young firms may be accelerated in turbulent times. At the same time however, they are to a less degree bound by established structures and may therefore perform better in identifying and developing new information (Henderson & Clark 1990).

The firm's *motivation for growth* and *international orientation* can also influence R&D spending and recession performance. Growth oriented management teams may see investment in R&D activities as a mean to achieve desired

growth outcomes. Motivation for growth has also previously been found to influence the growth rate of the firm (Delmar & Wiklund 2008; Baum, Locke & Smith 2001). Further, while the late 2000s' financial crisis was international in scope, its severity differed between markets. The consequences for firms in Norway were relatively limited compared to some other markets. Thus the international orientation of the firm had a big influence on how exposed the firms were to the crisis, and therefore how well they fared.

Product specific factors

The *uniqueness* and *complexity* of the products is likely to affect R&D activities and recession performance as well. It is clear that these two factors affect the level of R&D spending: Firms with highly complex products can be expected to spend more of their revenue on product development. The same can be said for firms with highly unique products. To maintain their unique position these firms need to have a continuous focus on product innovation, hence affecting R&D intensity. Regarding the relationship between R&D and growth, Stam & Wennberg (2009) found R&D to affect growth primarily for high-tech firms. This implies that product complexity has an influence on both R&D intensity and growth rates in normal times. When considering the influence of uniqueness and complexity in a financial crisis, little empirical evidence exists. However, it can be expected that the demand contraction of a recession may affect unique products differently than those that are less differentiated. During a crisis customers tend to switch to cheaper alternatives to save costs. However, if the product is unique the customer has fewer suitable substitutes, leading these firms to fare better. Further it might be difficult to substitute very complex products. In total, it can be expected that firms with a high R&D intensity in general have more complex and unique products, and it is possible that these firms fare better through a crisis.

Additionally, the degree to which the firm's output can be classified as a *product or a service* need to be included as a control variable, as a crisis may affect products and service to a different extent. As pointed out by Parasuraman, Zeithaml & Berry (1985) the intangibility, variability, inseparability and perishability of services relative to goods may increase the demand contraction for service firms in recessions. Thus, the effect of turbulence may differ among traditional manufacturing firms who create physical products and those who deliver a combination of products and services.

Market specific factors

Two applicable market specific factors are *market concentration* and the degree to which the firm employ a *niche strategy*. Market concentration has frequently been studied in relation to R&D (Audretsch & Acs 1991; Levin, Cohen & Mowery 1985; Artés 2009; Link 1981), but findings are contradictory. Schumpeter (1950) argued that a high concentration reduce market uncertainty and provide the necessary cash flow to allow firms to engage in costly and risky R&D investments on an efficient scale. This was echoed by Link (1981), who found R&D intensity to be positively associated with market concentration. However, neither Levin, Cohen & Mowery (1985) nor Artes (2009) found any such connection. From previous recessions, empirical evidence suggests that having a niche strategy may moderate the effect of the downturn. In a study of the 1991 US recession, Mitchell (1992) found that specialty stores in the clothing industry prospered during the crisis. Similarly, Pearce & Michael (1997) claim that companies promoting specialty rather than commodity chemicals during the same recession generated more profit. Although

these findings are not necessary applicable to all firms, they still seem to indicate that a firm's involvement in niche market possibly influence its survival and growth rate.

Time lag from R&D investment to growth

To investigate the effect of R&D on performance during a financial crisis, the time it takes between R&D investment and subsequent effect is of great importance. When does the extra dollar invested in R&D improve the top line? After 6 months, three years or even longer? Albeit the time lag should be of great interest to managers, empirical findings are limited, scattered and usually based on US data (Kafouros & Wang 2008). As pointed out by Pakes & Schankerman (1984) the time between the outlay of an R&D dollar and the resulting revenue stream consist of two lags: The time between project inception and completion and the time from completion to commercialization. Even though these lags are well known, Hall, Mairesse & Mohnen (2010), in a review of the econometric measures used to determine returns to R&D, find that lags are often neglected in studies trying to estimate the return of R&D. They point out that even though many studies have investigated the effect of R&D on firm performance, most models used implicitly assume that the impact of R&D is highest in the year it is undertaken and ignore the possible time lag. In a study that did consider the lag, Leonard (1971) investigated R&D intensity across sixteen US industries. He found that the effect of R&D upon growth begins on average in the second year after R&D investment and continues with steadily increasing influence for at least nine years after the initial input year. Based on Rapoport (1971), Pakes & Schankerman (1984) calculated lags of 1.17 years in the electronics industry, 1.72 in chemicals and 2.40 in machinery. However, two major weaknesses with these estimates is that they are built on a dataset containing only 49 innovations, and that only successfully commercialized innovations were included. Additionally the investigations of both Leonard and Rapoport are based on datasets collected in the 1950s and 1960s. It can be expected that the evolution in technology and communications over the last few decades have influenced the time to market, development time and innovation rate in many industries. As these fundamental factors have changed, so may also the time lag between R&D investment and revenue growth.

RESEARCH DESIGN

Based on the literature review it is evident that R&D has a positive influence on performance in periods of normal growth. The main purpose of this article is to establish whether this effect is also present during a financial crisis. The analysis will be structured as follows: First we want to establish whether R&D has an effect on performance in a period of normal growth. This will enable us to confirm earlier findings, and serve as a basis for comparison when we move on to the financial crisis. Secondly, we will investigate the time lag between R&D investment and effect. Both of these elements build up to the final analysis, where we investigate the relationship between R&D and performance during a financial crisis.

In the following analysis we employ financial performance data covering the period 99-09 for 247 Norwegian SMEs in combination with an extensive survey distributed to managers of these firms in 2004.

Method

When examining the influence of R&D on subsequent growth and the time lag from initial R&D investment to measurable results, we follow a similar approach as Leonard (1971) and employ correlational analysis. In addition, we use ANOVA and independent sample t-tests to gain further insight and understand

Table 1: Descriptive statistics of the firms in the sample

Factor		Mean	Median	Max	Min	Standard Deviation
Year of establishment		1968.74	1980	2004	1853	28.00
Revenue 2004**		85.78	35.97	1309.83	0.71	144.61
Employees 2004		50.78	28.00	351.00	1.00	60.30
R&D propensity	[%]	6.13	2.50	90.00	0.00	11.02
Revenue growth 04-08	[%]	57.13	31.00	786.62	* -91.60	105.98
Revenue growth 04-09	[%]	44.69	20.07	971.62	* -91.64	117.85
Revenue growth 09	[%]	-8.88	-8.07	98.90	* -91.29	25.99

* Excluding bankruptcies

** All currency quoted in million Norwegian Krone

directional effects. In this regard it is important to note that both independent sample t-tests and ANOVA assumes homoscedasticity: Welch's t-test is therefore applied when Levene's test of equality of variances reveals heteroscedasticity.

To investigate how R&D spending helped firms cope with the late 2000s' Financial Crisis, we divide the firms into two groups: those who continued to grow through 2009, and the firms whose revenue contracted. Our goal is to determine whether R&D or any of the firm, product or market specific factors can be used to predict group membership. To accomplish this, we employ binary logistic regression. This method is well suited when you have dichotomous outcomes, and want to predict category membership based on a set of independent variables, which can be both categorical or continuous (Peng, Lee & Ingersoll 2002). Further, binary logistic regression is in our case advantageous compared to linear discriminant analysis, as it does not require multivariate normality with equal variances and covariances (Press & Wilson 1978; Lei & Koehly 2003).

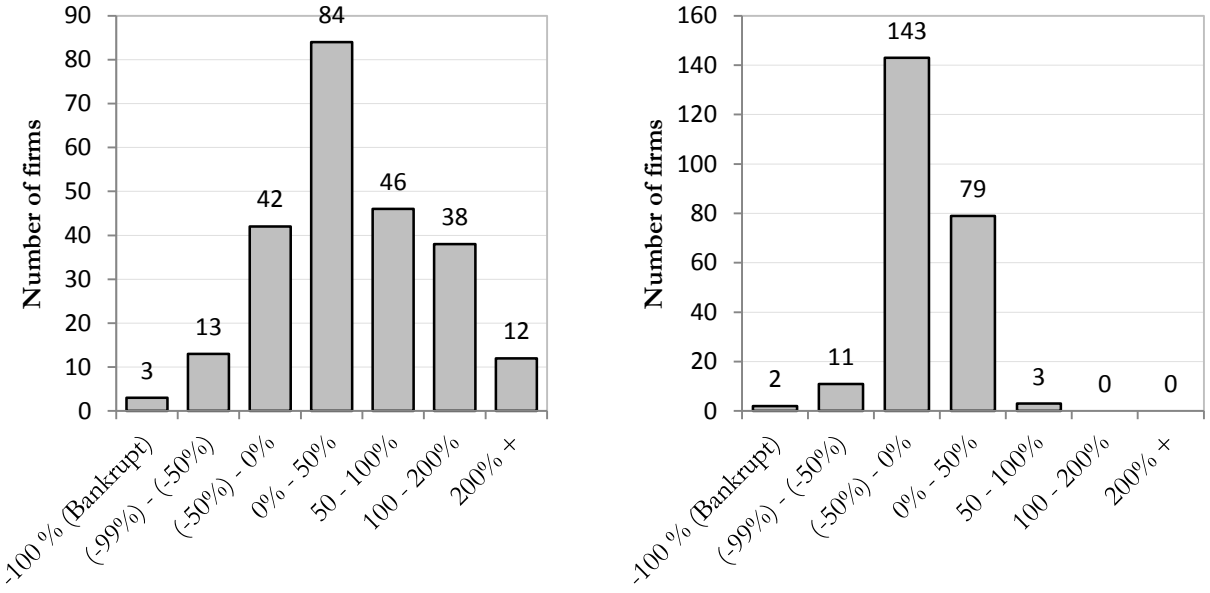
Binary logistic regression is usually initiated by developing a base case. All firms are predicted to belong in the largest category, as this gives the highest percentage correct predictions without additional knowledge. The goal of binary logistic regression is then to develop a model in which the independent variables offer an improvement in predicting group membership from the base case (Kinnear & Gray 2009). Additionally, binary logistic regression may be used to rank the relative importance of the independent variables (Chen 2008). By incorporating Nagelkerke R^2 it is also possible to estimate the variance in the dependent variable explained by the independent variables (Kinnear & Gray 2009). As a result, binary logistic regression enables us to comparatively investigate the effect of a set of factors on performance during a financial crisis.

Dataset

In 2004, a survey was distributed to senior managers of 2415 Norwegian SME manufacturing exporters. The survey consisted of 196 questions, covering different aspects of the firms' operations. The question format varied from 7-point Likert scales to numerical input. The sample was selected from the Kompass Norway database, a commercial address list supplier. Of the 2415 surveys initially distributed, 205 were returned due to address error. Out of the remaining 2210, 308 were completed yielding a response rate of 13.94 percent.

In 2011, accounting data for the firms in the sample was retrieved from Statistics Norway. The time period covered was 1999-2009, eleven

Figure 1: Growth distribution 04-08 (left) and 09 (right)



years in total. To uncover possible inconsistencies, these figures were checked against two public databases. Some firms had merged in the period, and where it was impossible to isolate the original entity following the merger the firm was deleted. For firms that went bankrupt in the period, the revenue was set as zero, with -100% growth the last year. In addition, the individual responses were checked for internal consistency, to see whether any specific questions had been misunderstood. A t-test was performed on age, size and growth rates to check whether the firms removed differed in a systematic manner from the rest. No significant differences were found. After the review, a total of 247 cases were deemed eligible for use. Descriptive statistics of these remaining firms can be seen in table 1. Figure 1 display the distribution of aggregate growth from 2004 to 2008 and the growth distribution in 2009. It is clear that the firms in the sample represent a wide range in terms of size, age, and growth. It is interesting to note that on average the firms grew 57.13% from 2004-2008, while they contracted 8.88% in 2009.

Measures

As the goal of this study is to see the effect of a set of factors on the firm's financial performance during a crisis, we choose to use an objective performance measure: Relative revenue figures. This enables us to measure growth regardless of the respondents view, and it also enables us to follow the firm's performance over an extended period of time. In this study we have calculated growth in two ways: yearly growth rate and aggregate growth with 2004 as the base year.

Firm specific factors

R&D intensity is measured as the ratio of R&D expenditure to total revenue, in line with previous studies (Leonard 1971; Wang & Tsai 2004; Garciá-Manjón & Romero-Merino 2012; Wakelin 2001). To measure *firm size*, we use the revenue from the year of the survey, 2004. *Motivation for growth* is operationalized by constructing a composite factor based on three questions regarding owner's and manager's motivation for growth. This and the other composite measures were constructed using factor analysis, as seen in table 2. Reliability for all composite factors was evaluated by Cronbach's Alpha. According to Nunnally

Table 2: Factor analysis

Motivation for growth*	**Load**	**Cronbach's alpha**
Growth is a strong desire for the firm's management[1]	0.943	
Growth is a strong desire for the firm's owners[1]	0.927	
Growth is a necessity for the firm's survival[1]	0.792	
		0.861
International orientation*		
The firm see the world, not just Norway, as its market[1]	0.784	
The firm's culture is characterized by actively seeking possibilities in export markets[1]	0.887	
The firm is able to develop and adjust new and existing products and services to international markets[1]	0.830	
The importance of succeeding in exports is emphasized towards all employees[1]	0.885	
Developing human and other resources that contribute to successful export is emphasized[1]	0.863	
		0.902
Product Uniqueness*		
Compared to your competitors, your most important product/service:		
- Exhibit unique properties[2]	0.839	
- Is based on unique technology[2]	0.796	
- Have a distinctive design[2]	0.559	
- Represent a new and innovative way to serve the customers' needs[2]	0.808	
- Is targeted towards a special need that cannot easily be met by competitors[2]	0.713	
		0.798
Product/Service*		
Your most important offering can best be described as a product[2]	0.877	
Your most important offering can best be described as a service[2]	0.877	
[1]On a scale from 1 to 7 where 1 was "totally disagree" and 7 was "totally agree"		**0.698**

[2]On a scale from 1 to 7 where 1 was "not at all" and 7 was "to a very high degree"

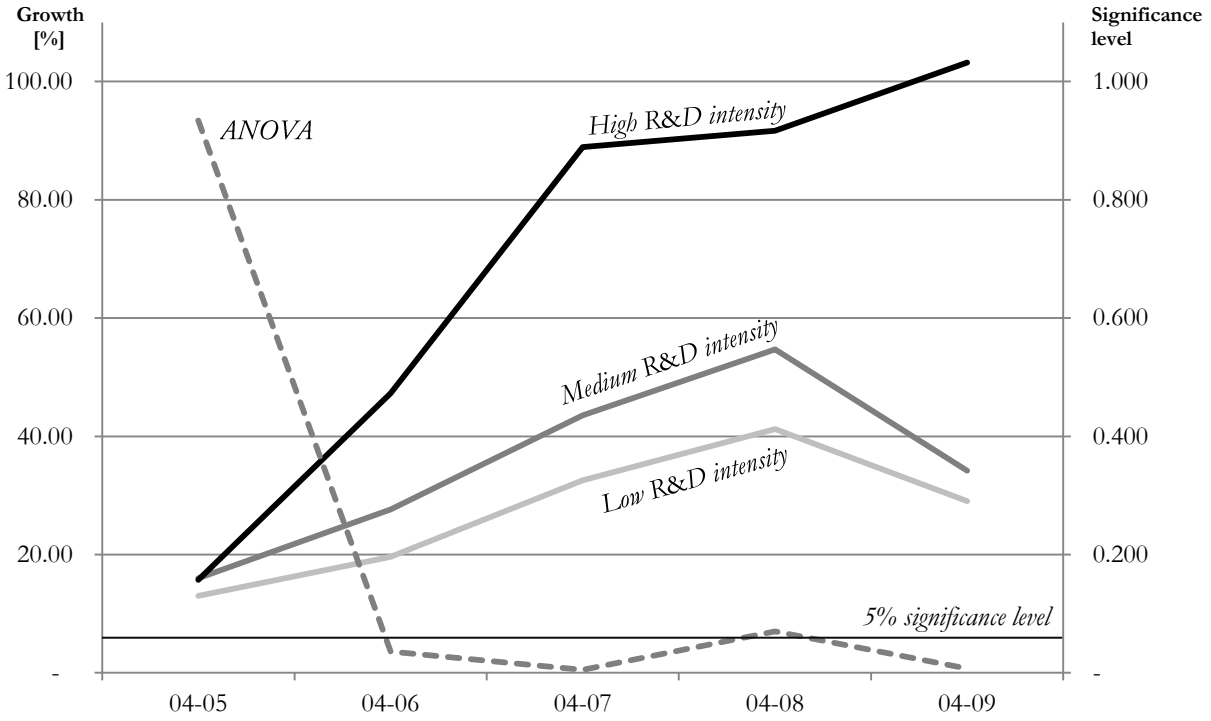
*The questions presented here are here translated from Norwegian

(1978) a Cronbach's Alpha exceeding 0.700 indicate an acceptable level of internal consistency. The resulting Cronbach's Alpha for motivation for growth was 0.861, and therefore deemed satisfactory. The *international orientation* of the firm was also composed from factor analysis, and was based on five factors. The Cronbach's Alpha of 0.902 was deemed excellent.

Product specific factors

Technological complexity was operationalized as the degree to which customers perceive the firm's products as technologically advanced, represented by a 7-point Likert scale. A measure for *product uniqueness* was constructed from five questions, with a Cronbach's Alpha of 0.798. These questions were related to whether the product represent a new way to solve the customer's needs, whether these needs are difficult to meet by competitors, and to what degree it is based on unique technology. *Product/service* is a composite factor from two complementary questions, related to the degree to which managers see their output as a product or a service. It should be noted that the Cronbach's Alpha of 0.698 is

Figure 2: Aggregate growth for each R&D intensity group



marginally below the limit suggested by Nunnally.

Market specific factors

Both market specific factors are retrieved directly from the questionnaire. The *market concentration* measure is in concordance with Audretsch & Acs (1991), describing the market share of the four largest firms. The *Niche strategy* measurement is based on a 7-point Likert scale, describing whether the firm is targeted towards a specific limited set of customers.

RESULTS

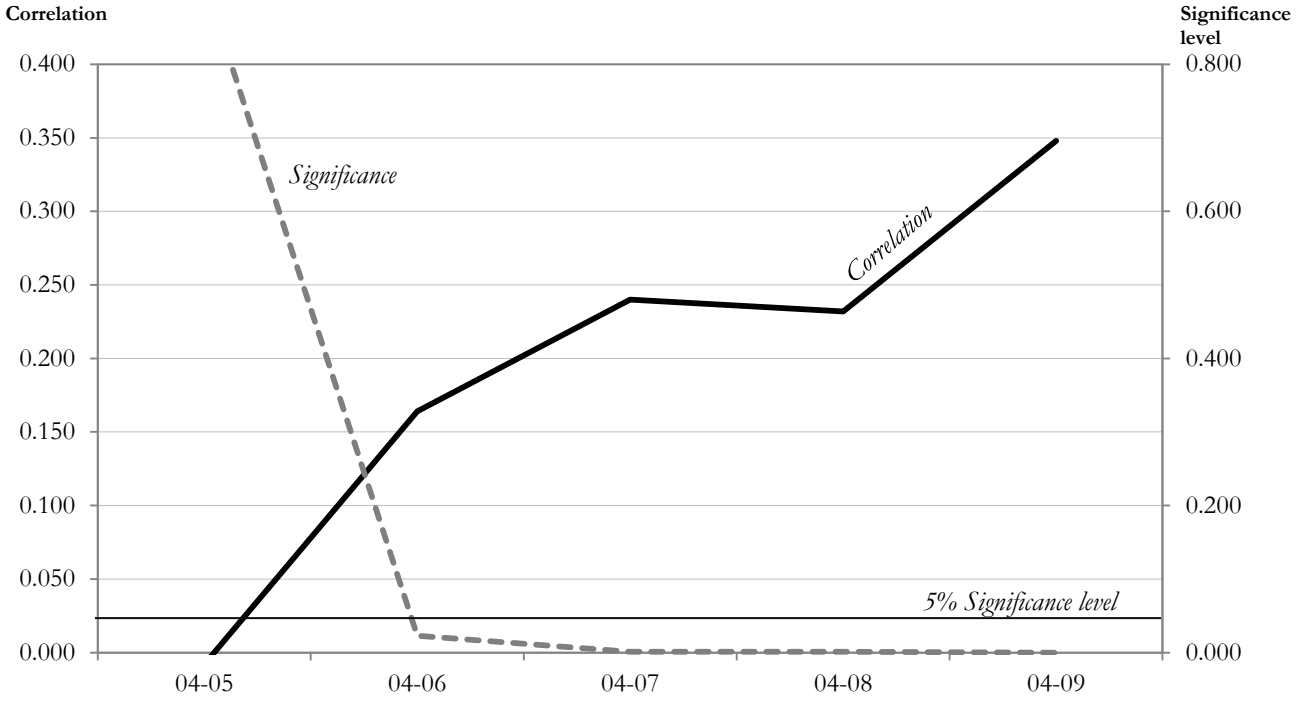
Effect of R&D intensity on performance

To investigate the influence of R&D on revenue growth for the period 2004 to 2009, we divided the firms into three groups based on whether they had a high (above 10%, N=44), normal (N=130) or low (below 1%, N=50) R&D intensity in 2004. ANOVA was used to see if there were significant differences in growth rates between the three groups. To measure firm performance we used aggregate relative growth from 2004 to each of the following years between 2005 and 2009. As seen in figure 2, there was a significant difference in growth rates between the three R&D groups for all periods except 04-05($p<0.934$) and 04-08($p<0.070$). While those with a low R&D intensity grew 29.02 percent from 2004 to 2009, those with a high R&D intensity grew an astonishing 103.22 percent. Together, these results clearly reveal a positive connection between R&D intensity and subsequent growth in revenue: The firms with a high level of R&D spending performed significantly better over the period.

Time lag from R&D investment to growth

To examine the presumed time lag between R&D investments and revenue growth, we calculated the Pearson correlations between R&D intensity and aggregate revenue growth from 2004 to each individual year. Only firms who performed R&D activities were included in these calculations. As seen in figure 3 the correlation is increasing from 2005 until 2007, while the significance level falls. It is significant as early as 2006, and after this remain less than 0.001.

Figure 3: Correlation between R&D and aggregate growth



Calculating the correlation between R&D intensity in 2004 and growth in each individual year yielded significant results for 2006 and 2009, as seen in figure 4. It is evident that the firms' R&D intensity in 2004 clearly influenced their growth rates in 2006. In total all this indicate a time lag between R&D investment and its effect on revenue growth of two years.

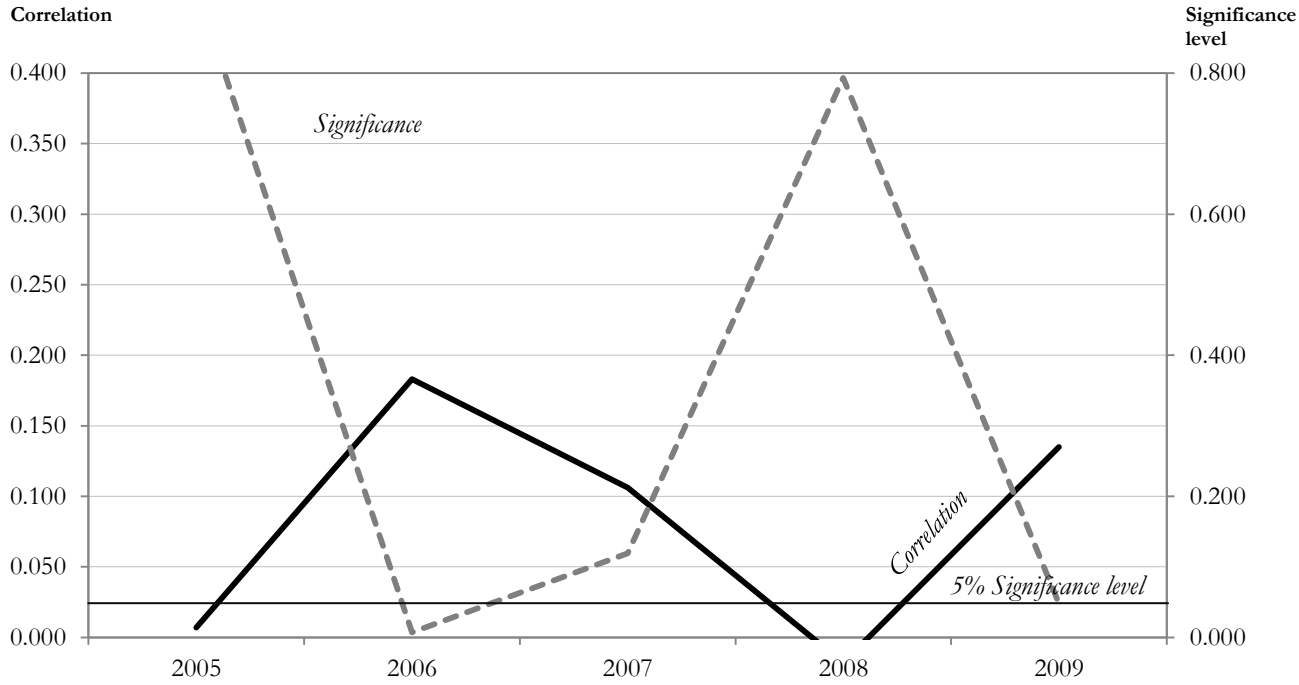
It is interesting to note that the correlation between R&D intensity and aggregate growth, as seen in figure 3, seem to level out after 2007, before there is a spike in 2009. Additionally, 2009 was one of two individual years where the yearly growth rate exhibited a significant correlation with R&D. This may be an indication that R&D has a bigger influence on revenue during a financial crisis. This will be investigated in further detail in the following section.

The effect of R&D in a financial crisis

Looking at figure 2, it is clear that the financial crisis hit Norway in 2009. While the aggregate growth across all firms was positive each year from 2004 to 2008, the firms on average declined 8.88% in 2009. In total 63 (33.0%) firms had a positive growth rate in 2009 while 128(67.0%) experienced negative growth. A Welch's test revealed a significant difference ($p<0.003$) in R&D level between these two groups: While the average R&D intensity in the declining group was 4.17%, it was 10.42% in the group that grew.

Binary logistic regression analysis was then used to see if we were able to predict whether each firm experienced growth or decline during the financial crisis. This classification was used as the dependent dichotomous variable. Based on these groups, the base case model would be able to place the firms in the correct category 67.0% of the time, and the goal of the binary logistic regression is therefore to develop a model that is able to improve on this.

Figure 4: Correlation between R&D and yearly growth



As outlined in the theory section, we included three groups of independent variables in addition to R&D intensity in the model: *Firm specific predictors* included size, age, motivation for growth and international orientation, *product specific predictors* were product complexity, uniqueness and product/service, while *market specific factors* included market concentration and niche strategy. In total ten factors were incorporated into the model. An Omnibus test of Model Coefficients for the resulting complete model against the base case, intercept-only model, was statistically significant, indicating that the predictors were able to distinguish the firms into two categories based on their growth in 2009 (χ^2= 30.24, p<0.001, df = 10). Non-significant results from the Hosmer-Lemeshow test revealed that the growth outcomes were not significantly different from those predicted by the model, and that the overall model fit was good (χ^2= 11.891, p<0.156, df = 8). Prediction success was 74.3% compared to 67.0% in the baseline, intercept-only model. To evaluate the goodness of fit, Nagelkerke's $R^2$was used (Nagelkerke 1991), with a value of 0.190. This metric imitate the coefficient of determination R-square in multiple regressions, and thus the independent variables account for approximately 19.0% of the variances in the dependent variable (Kinnear & Gray 2009). The Wald criterion demonstrated that only R&D intensity made a significant contribution to prediction (p=0.034) when all factors were included in the model. This indicates that R&D propensity was a strong predictor for the growth outcome during the period. All results from the binary logistic regression can be found in tables 3 and 4.

Table 3: Prediction accuracy Binary Logistic Model

Revenue growth 2009			
	Predicted		**Percentage Correct**
Observed	**<0**	**>0**	
<0	121*	7	94.53%
>0	42	21	33.33%
	Overall percentage		74.34%

*Correctly predicted

Multicollinearity may be an issue that should be controlled for when performing multiple regression with variables that may be internally related. To examine this, the Variance Inflation

Table 4: Result from the binary logistic regression for each independent variable

Predictor		β	SE β	Wald's χ^2	*df*	*p*<	e^{β} (odds ratio)
	R&D Intensity	0.047	0.022	4.491	1	0.034	1.048
Firm	Size	-0.001	0.002	0.406	1	0.524	0.999
	Age	0.006	0.007	0.793	1	0.373	1.006
	Motivation for Growth	0.076	0.132	0.332	1	0.565	1.079
	International Orientation	-0.162	0.140	1.340	1	0.247	0.850
Product	Product Complexity	0.086	0.116	0.543	1	0.461	1.089
	Product Uniqueness	0.077	0.135	0.327	1	0.568	1.080
	Product / Service	-0.166	0.111	2.236	1	0.135	0.847
Market	Concentration	0.201	0.102	3.832	1	0.051	1.222
	Niche	-0.177	0.109	2.658	1	0.103	0.838
Constant		-12.969	14.336	0.818	1	0.366	0.000

Factor for all independent variables was calculated. These were all in the range of 1.22 and 1.56 which is lower than the maximum value of 10 suggested by Cohen et al. (2003). Thus multicollinearity does not seem to adversely affect our results. The significant test result of the logistic model, a statistically significant coefficient when it comes to R&D, insignificant Hosmer-Lemeshow test, acceptable goodness-of-fit measures and the low multicollinearity leads us to conclude that R&D propensity positively affected growth outcomes during the financial crisis

DISCUSSION

R&D has a positive influence on performance in periods of normal growth

There is a clear connection between R&D intensity and subsequent growth. While firms with a low R&D intensity grew 29% from 2004 to 2009, firms with a high R&D intensity grew an astonishing 103%. A possible explanation for this could have been that the firms with a high R&D intensity are high growth firms that would have grown irrespective of their R&D spending. However, the low, medium and high R&D intensity groups exhibited almost identical growth rates for the first year after the survey. A closer inspection of the growth figures actually reveal that the firms with a medium R&D intensity had the highest growth the first year, albeit by a very tiny margin (15.99% vs 15.74%). Considering the time period before the survey (1999-2003), an ANOVA reveal that there was no significant difference ($p<0.916$) in growth between the three groups. Somewhat surprisingly the R&D intensive firms actually displayed slightly lower growth (10%) in the period. In total, these findings seem to discard the possibility that the firms with a high R&D intensity are high-growth firms that display superior growth regardless of R&D intensity. Thus our inference about the positive connection between R&D and subsequent growth is strengthened.

This positive relationship between R&D and performance is concordant with earlier results from Italy (Del Monte & Papagni 2003), USA (Leonard 1971; Lee & Shim 1995), China (Zhao & Li 1997), and Japan (Lee & Shim 1995). Our confirmation of these earlier findings increases the generalizability regarding country, time period and size: Firstly, all the above mentioned countries were as of 2009 among the seven largest economies in the world, while Norway was merely the 26th (IMF 2012). Secondly, all these studies used data collected from the 1950s' up till 1997, while our dataset cover the years 2004 to 2009. Thirdly, while some of the others focused primarily on large companies,

the subjects of this study has been SMEs. Regardless of these differences, all studies reach similar conclusions which indicate that the relationship between R&D and performance is profound and generalizable to a wide range of firms and environments

Considering the strength of this relationship, only Del Monte & Papagni (2003) is directly comparable. In their study, firms with no R&D grew 47.4% over a five year period, while those who performed R&D grew 56.4%, yielding a 9.0% difference in growth. If we transpose our results to the same scale, we find that firms with no R&D grew 27.0% while the firms who performed R&D grew 49.4%, yielding a difference of 22.4%. Thus, the positive effect of R&D on growth seems to be even stronger in our study.

The time lag from R&D investment to the corresponding revenue growth is two years

Having established that a high R&D level has a positive effect on performance, a major point of interest is the time frame involved. As pointed out by Pakes & Schankerman (1984), the time between project inception and completion, and time from completion to market, lead to a natural time lag between the outlay of an R&D investment and the resulting revenue stream.

As seen in figure 3, the correlation between R&D intensity in 2004 and aggregate growth increase with time, while the significance level drops. The firms with a high R&D intensity performed significantly better than the rest already from 2006, and this difference was even stronger for 2007. This indicates a time-lag on R&D spending of about two years, with an even stronger effect after three years.

Based on data collected by Rapaport (1971), Pakes & Schankerman (1984) calculated a time lag of between 1.17 and 2.40 years. However, this conclusion was based on a limited dataset of 49 innovations. Additionally it only contained successfully commercialized projects. Both are factors that can be expected to influence the time lag, and our study has tried to amend these shortcomings by using a larger data set and including all investments made in R&D. Leonard (1971) found that the relation between R&D spending and sales growth appears two years after R&D spending, and increases thereafter. However, his study only investigated aggregate R&D spending on an industry level and compared this with industry growth rates, while we have been able to compare the growth and R&D investments on the individual firm level. Further, both Pakes & Schankerman (1984), and Leonard (1971) use data from the 50's and 60's, while our data cover 2004 to 2009. In the theoretical background section we postulated that the time lag may have shortened, due to the evolution in technology and communications and increasing focus on a short time to market. Despite the differences between our and the above mentioned studies, we arrive at similar conclusions: It takes about two years before the additional dollar spent on R&D activities give an effect on the top line.

It is interesting to note that the effect of R&D on revenue growth seems to level out from 2007 to 2008, three years after the survey. The effect is still strong, but not growing, indicating that in normal times it reaches its maximum level around year three. However, looking beyond 2008, there is a strong spike in correlation in 2009. This coincides with the time the financial crisis hit Norway. This may indicate that a high R&D intensity have a bigger effect during financial crises, compared to periods of normal growth. This will be discussed in the following section.

A financial crisis accentuates the importance of R&D activities

The binary logistic model improved the accuracy in predicting the growth outcome of the financial crisis for the firms in the sample from 67.0% to 74.3%. The model was significant, indicating that the set of independent factors can help predict which firms grew and who declined during the crisis. As displayed by the Nagelkerke R^2, all factors combined accounted for approximately 19.0% of the variance in growth in 2009. Although all the independent variables contributed to the overall prediction accuracy of the model, only R&D intensity was significant when considering the individual factor contribution. From this it is clear that R&D had a positive effect on growth during the financial crisis.

Having established a positive effect during the financial crisis, we seek to explore the comparative strength of this effect with periods of normal growth. Investigating the correlation between R&D intensity and individual yearly growth only yielded significant results in two years: The year the effect set in (2006), and the financial crisis (2009). Considering aggregate growth, it is clear from figure 2 that the high R&D intensity group was the only group that was able to continue to grow through 2009. The difference in growth was significant ($p<0.007$), and was actually the biggest difference between the three groups in any of the years. Finally, the correlation between aggregate growth and revenue leveled out in 2008, before it increased in 2009 to its strongest value. In total, all of this point in the same direction: While the effect of R&D in normal growth times is great, it is even stronger in challenging times. Several factors may be contributing to this:

Firstly, R&D activities might make the firms better equipped to handle change through increased absorptive capacity. A financial crisis is a time with high external turbulence that force firms to adapt to the changing environment. Turbulent environments increase the complexity, which calls for increased information processing capabilities. A higher absorptive capacity involves being better at identifying, assimilating, and exploiting knowledge, and should thus make firms better at handling external turbulence. As several studies (Cohen & Levinthal 1990; Griffith, Redding & Van Reenen 2003; Deeds 2001) have shown that R&D activities positively affect the firm's absorptive capacity, the increased absorptive capacity probably contributed to the superior performance of the R&D intensive firms through the crisis. Abdelkader (2004) found absorptive capacity to increase the firm's ability to adapt to changing environments, as it is able to act proactively instead of reactively when handling industry dynamism. Further, Welch, Liao & Stoica (2001) found the positive effect of absorptive capacity on responsiveness to be even stronger during environmental turbulence. We have shown the same to be the case for R&D as a whole. As absorptive capacity constitute one of the positive effects of R&D, increased R&D intensity put these firms in a more favorable position.

Secondly, as pointed out by Kitching et al. (2009), recessions generate significant opportunities for those who are able to identify and willing to act on them. However, the new opportunities may present themselves differently than in periods of normal growth making them more challenging to grasp. R&D intensive firms may be better equipped to exploit these new opportunities. According to Freel (2000), the presence of R&D activities creates an organization that is propitious to questioning, making them better at identifying and exploiting new opportunities. This is similar to the concept of the firm's adaptive capability, its ability to identify and capitalize on

emerging market opportunities (Miles & Snow 1978). R&D can thus be expected to increase the firm's adaptive capability, accentuating the positive effect of R&D in periods of financial turbulence.

A third argument why the importance of R&D activities is increased during a crisis could be that their product portfolio is better suited to handle a crisis. According to Baldwin & Johnson (1995) innovative firms perform more extensive R&D, and are focused on being at the leading edge of product and technological development. Baldwin & Johnson further point out that innovative firms have a broader range of products, introduce new products more frequently and have greater flexibility when fulfilling customer demands. Related to a crisis, there are two possible positive effects from this: Firstly, when the crisis hit they have a better product portfolio. Competitors will have to invest just to catch up. This can put the competitors in a difficult position, as they at the same time will face a strong pressure to reduce their costs. Secondly, R&D intensive firms are used to continuously rethinking their existing products, and developing new ones. Thus they have more flexibility in the product development process compared to more static competitors, and are able to respond faster to changes in the market. According to Hartman, Myers & Rosenbloom (2006), flexibility and rapid response to the changing environment is a key objective during periods of uncertainty. As pointed out by Voigt & Moncada-Paternò-Castello (2009), financial downturns reward firms that find more effective ways to innovate. Thus, the increased flexibility from R&D will be especially important during periods of external turbulence and might be a contributing factor to R&D having such a strong effect on performance during a financial crisis.

IMPLICATIONS

Previous literature offer limited guidance to managers about the effect of R&D activities on growth in a recession. Our findings reveal that investments in R&D have profound effects on growth rates, and that the importance of innovative activities is accentuated during a financial crisis. For managers, there are primarily three lessons that can be drawn from this:

Firstly, increased R&D investment is an important instrument for leaders looking for ways to bolster their firm for a future crisis. Our study has empirically shown a connection between R&D investments and how the firms fared through the crisis. In such, an increased R&D intensity acts as a form of insurance against future crises, and this must be incorporated when evaluating alternative investments. Even though the alternative investment options might have higher expected revenue, the increased positive effect of R&D in a crisis must be included in the evaluation.

Secondly, our findings revealed a time gap of about two years from investment in R&D till the resulting revenue stream. The effect was even stronger after three years. This gives managers an initial indication of the investment horizon of R&D projects.

Thirdly, managers should consider carefully before cutting down on R&D expenditures, even during a recession. In a crisis leaders often face pressure from investors and owners to cut operating expenses. Short term fixes are favored over long term solutions, and possibly profitable R&D investments are shelved. For credit constraint firms, survival will always be the main concern. However, for those who are not, our findings should be of great interest. As our research show, leaders should consider it carefully before cutting R&D spending. As long as short term survival is secured, they should be

focused on long term growth. Firms that do not cut R&D spending may gain an important competitive advantage when the economy starts to recover. While rivals might be still struggling to get back to their pre-crisis levels and to rebuild cut R&D capacity, the firms who maintained R&D investments can take a larger part of the post-crisis growth in demand.

From the perspective of future research, our findings have four main implications: Firstly, there is a time lag of two years between R&D investment and expected pay off. Some of the most common models used to connect R&D and firm growth implicitly assumes immediate benefits from R&D investments. This assumption is clearly wrong, and future research should make sure to incorporate the time lag in their models. Secondly, as the interplay between R&D intensity and growth is different during a financial crisis, findings from periods of normal growth are not necessarily generalizable to a financial crisis. The same is probably true the other way around. Investigating the effect from different growth related variables during a crisis can provide important knowledge about how to handle environmental turbulence. Thirdly, when considering R&D and the connection to growth during financial turmoil, it is clear that the RBV represent a viable starting point, as it may aid researchers in providing plausible explanations on the observed connections. Fourthly, it is clear that models trying to explain financial crisis performance should take into account the profound effects of R&D. Although many factors can be expected to influence firm growth during a crisis, our research shows that R&D clearly is a strong contributor that needs to be included.

We also suggest that future research should delve deeper into the nature of R&D, and for instance investigate the difference between product, process and business model innovation on financial crisis performance. How is the comparative importance of these during a recession? How should these projects be prioritized against other investments? What kind of R&D projects should be the first ones to go if cuts have to be made?

CONCLUDING REMARKS

This article has provided management with empirical evidence of the connection between R&D and growth in turbulent times. We have shown that R&D has an effect on revenue in growth periods, that the lag from investment to revenue growth is about two years and that the importance of R&D activities is accentuated in a financial crisis. These findings can aid managers in the strategic allocation of scarce resources in the face of a recession.

Business performance is highly variable under recession conditions and no particular strategy can guarantee survival and growth. In such, R&D is no universal remedy. R&D is an expense in the short term and faced with the alternative of bankruptcy, survival will always be the main concern for any manager. However, firms that are not credit constrained or those who are evaluating different cost-cutting alternatives should take note of the particular important role of R&D during turbulent times and think twice before cutting down on innovative expenditure. Shedding down potentially profitable R&D investments while competitors are doing the opposite may have severe effects on performance both in the recession and in the recovery period. In the last 67 years the US economy has experienced 12 recessions. People tend to quickly forget these when the economy is recovering. We have shown that by investing in R&D managers can increase revenue in the growth period and at the same time prepare their firm to better handle the inevitable next recession.

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APPENDIX 1: THE SURVEY

101 Hva heter bedriften? _____

102 Hvilken stilling har du i bedriften? _____

103 Omtrent hvilket år ble bedriften etablert? _____

104 Er bedriften...
- ❑ en selvstendig bedrift
- ❑ del av et konsern, datterselskap el.
- ❑ var det en knoppskyting fra en annen bedrift

104 Da bedriften ble etablert...
- ❑ var det en helt ny etablering

105 Ønsker dere tilsendt en sammenligning av egne svar med snittet av deltakende bedrifter?
- ❑ ja
- ❑ nei

Hvordan vil du vurdere betydningen av følgende "aktører" for dere som bedrift (sett ring rundt tall i skalaen):	Ikke viktige						Meget viktige
106 ..investormiljøer	1	2	3	4	5	6	7
107 ..forskningsstiftelser (eks Sintef/Teknologisk Inst.)	1	2	3	4	5	6	7
108 ..konsulentfirmaer	1	2	3	4	5	6	7
109 ..universiteter og høgskoler	1	2	3	4	5	6	7
110 ..Norges Forskningsråd	1	2	3	4	5	6	7
111 ..bransje og arbeidsgiverorganisasjoner	1	2	3	4	5	6	7
112 ..fagforeninger	1	2	3	4	5	6	7
113 ..SIVA	1	2	3	4	5	6	7
114 ..næringshager	1	2	3	4	5	6	7
115 ..det lokale/regionale næringsmiljø	1	2	3	4	5	6	7
116 ..i det som nå inngår i Innovasjon Norge:							
117 - den eksportrettede delen ("Eksportrådet")	1	2	3	4	5	6	7
118 - det tidligere SND	1	2	3	4	5	6	7

I hvilken grad har dere samarbeid med:	Ikke samarbeid						Utbredt samarbeid
119 ..universiteter/høyskoler/forskningsinstitusjoner	1	2	3	4	5	6	7
120 ..store bedrifter	1	2	3	4	5	6	7
121 ..små og mellomstore bedrifter	1	2	3	4	5	6	7
122 ..bedrifter utenfor Norge	1	2	3	4	5	6	7
123 ..leverandører	1	2	3	4	5	6	7
124 ..kunder	1	2	3	4	5	6	7

I hvilken grad har dere samarbeid om:	Ikke samarbeid						Utbredt samarbeid
125 ..markeds- og salgsarbeid	1	2	3	4	5	6	7
126 ..produktutvikling	1	2	3	4	5	6	7
127 ..innkjøp/lager	1	2	3	4	5	6	7
128 ..produksjon	1	2	3	4	5	6	7
129 ..logistikk/transport	1	2	3	4	5	6	7

I hvilken grad er du enig i følgende:	Helt uenig						Helt enig
201 Det ville være en fordel for bedriften om Norge ble med i EU	1	2	3	4	5	6	7
202 EØS avtalen gjør at dere kan konkurrere på like vilkår med andre bedrifter innen EU/EØS området	1	2	3	4	5	6	7
203 Dere har flyttet noe produksjon ut av Norge	1	2	3	4	5	6	7
204 Dere vurderer å flytte (ytterligere) produksjon ut av Norge	1	2	3	4	5	6	7
Gitt at dere skulle vurdere å flytte produksjon ut av Norge							
205 ... ville hovedmotivet være kostnadsreduksjon	1	2	3	4	5	6	7
206 ... ville hovedmotivet være å komme nærmere viktige markeder	1	2	3	4	5	6	7
207 Dere opplever de generelle ramme-betingelser for bedrifter i Norge som gode	1	2	3	4	5	6	7
208 I forhold til de behov dere har, oppleves tilgang på kapital som uproblematisk	1	2	3	4	5	6	7
209 Dere regner med at EU-utvidelsen vil medføre økt prispress også på hjemmemarkedet	1	2	3	4	5	6	7
210 Bedriften har et aktivt, krevende og kompetent styre	1	2	3	4	5	6	7
211 De fleste strategivalg er i realiteten gitt, grunnet de produkter, den teknologi og de markeder dere arbeider mot	1	2	3	4	5	6	7
Gitt at bedriften skulle ønske å vokse, hva ville være de viktigste hindringene:	Slett ikke						I meget høy grad
212 ..mangel på lånekapital	1	2	3	4	5	6	7
213 ..mangel på ekstern egenkapital (investorkapital)	1	2	3	4	5	6	7
214 ..manglende salgsmuligheter på hjemmemarkedet	1	2	3	4	5	6	7
215 ..manglende salgsmuligheter på eksportmarkedene	1	2	3	4	5	6	7
216 ..manglende produksjonskapasitet	1	2	3	4	5	6	7
217 ..manglende tilgang til kompetent personale	1	2	3	4	5	6	7
I hvilken grad er du enig i følgende påstander:							
218 ..vekst er et sterkt ønske for bedriftens ledelse	1	2	3	4	5	6	7
219 ..vekst er et sterkt ønske for bedriftens eiere	1	2	3	4	5	6	7
220 ..vekst er nødvendig for selskapets overlevelse	1	2	3	4	5	6	7
I løpet av en tiårsperiode er det sannsynlig at dere :							
221 ..blir kjøpt opp av nye eiere	1	2	3	4	5	6	7
222 ..vil kjøpe opp andre bedrifter	1	2	3	4	5	6	7
223 ..vil samarbeide stadig tettere med andre bedrifter	1	2	3	4	5	6	7
224 ..er blitt vesentlig større enn i dag	1	2	3	4	5	6	7
De personer som utgjør bedriftens ledelse, i hvilken grad har de variert sammensetning når det gjelder:	Ikke variert						Meget variert
225 ..yrkesmessig bakgrunn (tidligere jobber)	1	2	3	4	5	6	7
226 ..utdannelsestype	1	2	3	4	5	6	7
227 ..alder	1	2	3	4	5	6	7
228 ..kjønn	1	2	3	4	5	6	7
229 ..hvor lenge de har vært ansatt	1	2	3	4	5	6	7

På noen områder kan en bedrift ha mange muligheter, på andre områder er de prioriteringer og handlemåter som kan følges langt på vei gitt. Vennligst gi en vurdering av hvilken grad av handlefrihet dere har på følgende områder:

		Ingen valg-muligheter						Mange valg-muligheter
301	.. hvilke geografiske markeder dere fokuserer på	1	2	3	4	5	6	7
302	.. hvilken type kunder (kundegruppe) dere fokuserer på	1	2	3	4	5	6	7
303	.. hvilken type distribusjon (agent, direkte salg eller lignende) dere bruker	1	2	3	4	5	6	7
304	..hvilke tilleggstjenester dere yter til kundene	1	2	3	4	5	6	7
305	..mulighet for samarbeid med andre bedrifter	1	2	3	4	5	6	7
306	..innretning av salgs- og markedsarbeid	1	2	3	4	5	6	7
307	..utvikling av nye produkter og tjenester	1	2	3	4	5	6	7

Hvordan vil du beskrive markedsutviklingen (etterspørselen) og konkurransesituasjon:

		Sterk nedgang			Stabilitet			Sterk vekst
308	Markedsutviklingen i Norge er preget av...	1	2	3	4	5	6	7
309	Markedsutviklingen i det viktigste eksportmarkedet er preget av...	1	2	3	4	5	6	7
310	Den samlede etterspørsel i bransjen har de siste 3 årene vært preget av...	1	2	3	4	5	6	7
311	Dere forventer at egen omsetning de kommende 3 år vil vise...	1	2	3	4	5	6	7

Hvilken type bedrifter er for dere de viktigste konkurrenter på eksportmarkedene:		Ikke viktige						Viktige kon-kurrenter
312	..norske små- og mellomstore bedrifter	1	2	3	4	5	6	7
313	..norske, store bedrifter	1	2	3	4	5	6	7
314	..ikke-norske små- og mellomstore bedrifter	1	2	3	4	5	6	7
315	..ikke-norske store bedrifter	1	2	3	4	5	6	7

Økonomiske bakgrunnsopplysninger om bedriften:

	For to år siden (2002)	I år (2004)	Om to år (2006)
Antall ansatte, regnet i årsverk	316_____	317_____	318_____
Omsetning, løpende kroner	319_____	320_____	321_____
Eksportsalg, løpende kroner	322_____	323_____	324_____

325 Omtrent hvilket år hadde dere det **første salg** i et utenlandsk marked? _____

326 Om mulig å besvare, til hvilket land var første eksportsalg? _____

327 Hvor stor er en gjennomsnittlig salgsstørrelse/ordre? _____ NOK

328 Hvor stor del av bedriftens totale omsetning, går til forskning og utvikling? _____ %

329 Anslagsvis hvor mange ulike personer i bedriften hadde reiser i tilknytning til eksportarbeidet i løpet av 2003? _____

330 Anslag hvor mange reisedøgn knyttet til eksport hadde dere i 2003? _____

I det følgende vil vi spørre deg noen spørsmål angående deres viktigste produkt eller tjeneste:

401 Hvilken type produkt/tjeneste har omsetningsmessig størst betydning for dere? _____

402 Hvor stor del av bedriftens omsetning stammer fra dette produkt/tjeneste? _____ %

403 Av de salgsinntekter som kommer fra dette produktet eller denne tjenesten, hvor stor andel er knyttet til salg av reservedeler, vedlikehold, opplæring, service, etc. _____ %

404 Kan dette produkt/tjeneste best beskrives som...
- ❑ et ferdig produkt/tjeneste som er komplett og klar til bruk
- ❑ en komponent/tjeneste som går inn i kundens sluttprodukt

Hvordan vil du beskrive følgende forhold omkring denne type produkt/tjeneste:

		Slett ikke						I meget høy grad
405	Det kan best beskrives som et fysisk produkt	1	2	3	4	5	6	7
406	**Det kan best beskrives som en tjeneste**	1	2	3	4	5	6	7
407	Det ansees av kundene for å være teknologisk avansert	1	2	3	4	5	6	7
408	**Det er komplisert å bruke**	1	2	3	4	5	6	7
409	Det kreves stor grad av tilpasning til den enkelte kunde	1	2	3	4	5	6	7
410	**Det kreves utstrakt service og oppfølging i lang tid etter salget**	1	2	3	4	5	6	7
411	Fra den innledende kontakt med en potensiell kunde til det endelige salg går det typisk meget lang tid	1	2	3	4	5	6	7
412	**Det oppstår ofte tvil og usikkerhet under salgsprosessen**	1	2	3	4	5	6	7
413	Tildeling av ordre i denne bransjen skjer ved anbud	1	2	3	4	5	6	7
414	**For den enkelte kunde i denne bransjen har valg av leverandør langsiktige konsekvenser**	1	2	3	4	5	6	7
415	Kundene i denne bransjen oppfatter innkjøp av denne typen produkt/tjeneste som viktig og av stor økonomisk betydning	1	2	3	4	5	6	7
416	**Norske kunder har vært nølende/avvisende til å akseptere deres produkt- eller tjenesteløsninger**	1	2	3	4	5	6	7
417	Dere er spesialisert mot en avgrenset type kunder (nisje)	1	2	3	4	5	6	7
418	**Dere fokuserer mot noen få geografiske markeder (områder/land)**	1	2	3	4	5	6	7
419	I hvert enkelt land er markedet for deres viktigste produkter lite, men det finnes mange slike små markeder i verden	1	2	3	4	5	6	7
420	**Bedriftens geografiske lokalisering medfører transport- og reisekostnader som er negative for konkurranseevnen på eksportmarkedene**	1	2	3	4	5	6	7
421	Tidsaspektet har stor betydning for dere, det å nå hurtig ut i markedet er viktig for bedriften	1	2	3	4	5	6	7
422	**De fire bedrifter som omsetter mest på det europeiske markedet utgjør en stor del av bransjens samlede omsetning**	1	2	3	4	5	6	7

Sammenlignet med deres konkurrenter, vil du da si at deres viktigste produkt/tjeneste:

		Slett ikke			Til en viss grad			I meget høy grad
501	Er rettet mot spesielle behov, disse behovene er det vanskelig for konkurrentene å dekke	1	2	3	4	5	6	7
502	Representerer en ny og innovativ måte å løse kundens behov	1	2	3	4	5	6	7
503	Har et særpreget design	1	2	3	4	5	6	7
504	Er basert på unik teknologi	1	2	3	4	5	6	7
505	Har unike egenskaper	1	2	3	4	5	6	7

De påfølgende spørsmålene er rettet mot deres internasjonale aktiviteter:

506 Hvor mange land blir det eksportert til? _____

507 Hva er det viktigste eksportmarked (land)? _____

508 Om mulig å besvare - til hvor mange land utover Norge hadde bedriften salg 3 år etter etableringen? _____

Vennligst gi en anslagsvis skisse mht. hvordan bedriftens salg fordelte seg siste regnskapsår:

509 Norge _____% 512 USA_____%

510 Norden _____% 513 Øvrige verden _____%

511 Øvrige Europa _____%

I hvilken grad finner du at utsagnene nedenfor passer for deres bedrift:

		Helt uenig						Helt enig
514	Ønske om vekst er et motiv for de internasjonale aktiviteter	1	2	3	4	5	6	7
515	Muligheter for økt fortjeneste er et motiv for den internasjonale aktivitet	1	2	3	4	5	6	7
516	Dere ser på verden, ikke bare Norge, som firmaets marked	1	2	3	4	5	6	7
517	Pga usikkerheten ved arbeid på eksportmarkedene finner dere det best å utvide aktiviteten forsiktig og gradvis	1	2	3	4	5	6	7
518	Bedriftens kultur er preget av at en aktivt søker muligheter på eksportmarkedene	1	2	3	4	5	6	7
519	Dere har en god evne til å utvikle og tilpasse nye og eksisterende produkter og tjenester til internasjonale markeder	1	2	3	4	5	6	7
520	Det legges vekt på å understreke ovenfor alle ansatte hvor viktig det er å lykkes med eksport	1	2	3	4	5	6	7
521	Det legges vekt på å utvikle menneskelige og andre ressurser som kan bidra til vellykket eksport	1	2	3	4	5	6	7
522	Den økonomiske ressursinnsats knyttet til eksport har vært tilstrekkelig i forhold til de mål for salgsvolum som har vært satt	1	2	3	4	5	6	7
523	I forhold til salgsmålene har de menneskelige ressurser hjemme for å støtte distribusjonsledd og kunder vært tilstrekkelige	1	2	3	4	5	6	7
524	Beslutninger vedrørende ett eksportmarked blir koordinert med beslutninger vedrørende andre eksportmarkeder	1	2	3	4	5	6	7

Angående bruk av elektronisk kommunikasjon i det daglige arbeide:

		Slett ikke						I meget høy grad
601	Dere har en omfattende norskspråklig hjemmeside	1	2	3	4	5	6	7
602	Dere har en omfattende engelskspråklig hjemmeside	1	2	3	4	5	6	7
603	Via hjemmesiden har dere fått kontakt med nye kunder og partnere	1	2	3	4	5	6	7
604	Dere har et omfattende nyhetsbrev på Internet	1	2	3	4	5	6	7
605	Dere selger deres produkter og tjenester via Internet	1	2	3	4	5	6	7
606	Dere yter service på deres produkter via Internet	1	2	3	4	5	6	7
607	Dere kommuniserer med eksisterende kunder og partnere via Internet	1	2	3	4	5	6	7
608	Dere gjennomfører utviklingsarbeid med eksisterende kunder og partnere via Internet	1	2	3	4	5	6	7
609	Dere bruker Internet til å bygge opp og vedlikeholde kunderelasjoner	1	2	3	4	5	6	7
610	Dere bruker Internet til å skaffe kunder/partnere på geografisk fjerne markeder	1	2	3	4	5	6	7
611	For dere har Internet redusert betydningen av mellomledd (grossister, distributører, agenter o.l.)	1	2	3	4	5	6	7
612	Dere søker aktivt på Internet for å finne mulige mellomledd til deres produkter og tjenester	1	2	3	4	5	6	7
613	Dere søker på Internet for å finne informasjon om konkurrenter	1	2	3	4	5	6	7
614	Dere søker på Internet for undersøke muligheter på nye markeder	1	2	3	4	5	6	7
615	I bedriften er Internet sett på som en viktig ressurs	1	2	3	4	5	6	7

I forhold til deres forventninger, hvor tilfreds er dere med eksportresultatene med hensyn til:

		Meget utilfreds						Meget tilfreds
616	..oppnådd markedsandel	1	2	3	4	5	6	7
617	..salgsvekst	1	2	3	4	5	6	7
618	..salgsvekst i forhold til konkurrentene	1	2	3	4	5	6	7
619	..inntjening/lønnsomhet	1	2	3	4	5	6	7
620	..det image dere har opparbeidet på markedet	1	2	3	4	5	6	7
621	..kompetanseoppbygging gjennom kontakt med særlig krevende kunder	1	2	3	4	5	6	7
622	..kunnskap om konkurrenters strategi og adferd	1	2	3	4	5	6	7
623	..kunnskap om nye mulige distribusjonsformer	1	2	3	4	5	6	7
624	..adgang til nye markeder	1	2	3	4	5	6	7
625	Alt tatt i betraktning, hvordan er dere tilfreds med de totale resultatene av eksportarbeidet de siste årene?	1	2	3	4	5	6	7

Internasjonal distribusjonskanal:

701 Hvilken av de følgende beskrivelser passer best på den distribusjonskanal dere bruker på det viktigste eksportmarked? (sett kryss)

- ❑ Direktesalg
- ❑ Agent/distributør
- ❑ Joint venture
- ❑ Eget salgskontor
- ❑ 702 Annet:_____

Nedenfor er det stilt noen spørsmål angår deres forhold til deres viktigste kunde på det viktigste eksportmarkedet. Vi vil bruke betegnelsen "direkte kunde", dvs. en kunde i utlandet dere har direkte transaksjoner med (kan være forbrukere, mellomledd, industrielle kunder, detaljhandlere etc.).

Til hvilken type direkte kunde har deres størst omsetning i det viktigste eksportmarked:

703 ❑ Industriell kunde (private eller offentlige/halvoffentlige virksomheter)
❑ Et mellomledd (agent, detaljhandel eller lignende) som videreselger i deres navn
❑ Et mellomledd (agent, detaljhandel eller lignende) som videreselger i eget navn
❑ Private forbrukere (enkeltpersoner eller husholdninger)
704 ❑ Annet: _____

705 Dersom det er mulig å angi, omtrent hvor mange av den type direkte kunder nevnt ovenfor har dere i det viktigste eksport marked (dvs. dem dere har direkte transaksjoner og kontakt med)?

_____kunder

706 Hvor stor del av den totale omsetning i det viktigste eksportmarked representerer de tre største kunder?
_____%

Hvordan vil du karakterisere den måten dere arbeider sammen med denne direkte kunde:

		Helt uenig						Helt enig
707	Begge parter har vilje til å tilpasse det løpende samarbeidet best mulig til endrede betingelser	1	2	3	4	5	6	7
708	Begge parter har også evnen til å tilpasse det løpende samarbeidet best mulig til endrede betingelser	1	2	3	4	5	6	7
709	I fall en uventet situasjon oppstår foretrekker begge parter å lage en ny avtale fremfor å holde på den eksisterende avtalen	1	2	3	4	5	6	7
710	Utveksling av informasjon går uformelt og ikke bare ut fra tidligere formelle avtaler	1	2	3	4	5	6	7
711	Det forventes at fortrolig, intern informasjon gis videre dersom den kan være verdifull for partneren	1	2	3	4	5	6	7
712	Det forventes at enhver informasjon gis videre dersom den kan være verdifull for partneren	1	2	3	4	5	6	7
713	Det forventes at dere holder hverandre informert om begivenheter eller endringer som kan påvirke partneren	1	2	3	4	5	6	7
714	Problemer som oppstår i denne relasjonen behandles av begge parter som et felles problem, heller enn et individuelt problem	1	2	3	4	5	6	7
715	Partene har ikke noe i mot å skylde hverandre tjenester	1	2	3	4	5	6	7
716	Begge parter fokuserer både på den enkelte handel og på fortsettelsen av samarbeidet	1	2	3	4	5	6	7

I hvilken grad er du enig i de følgende utsagn om deres viktigste kunde:

		Helt uenig						Helt enig
801	Samarbeidet med denne direkte kunde er karakterisert ved høy grad av tillit	1	2	3	4	5	6	7
802	Når kunden gir råd, stoler dere på at det er basert på deres beste skjønn	1	2	3	4	5	6	7
803	Kunden opptrer fair og ærlig	1	2	3	4	5	6	7
804	Deres medarbeidere har tette sosiale relasjoner til kundens medarbeidere	1	2	3	4	5	6	7
805	Samarbeidet med kunden gir gjensidig positivt utbytte	1	2	3	4	5	6	7
806	Dere forventer å arbeide sammen med denne kunden i lang tid fremover	1	2	3	4	5	6	7
807	Små uoverenskomster mellom dere og kunden oppleves ikke som noen hindring for fremtidig samarbeid	1	2	3	4	5	6	7
808	Skulle dere valgt igjen ville dere velge å samarbeide med denne kunden igjen	1	2	3	4	5	6	7

Mange bedrifter anvender ulike "mellomledd". Dette kan være agenter, imortører, datterselskap eller samarbeidende bedrifter innen bransjen som forestår distribusjon. Gitt at dere har slike mellomledd – i hvilken grad ivaretar dere selv eller mellomleddet salgs- og markedsføringsoppgavene under? Dersom det er skiller mellom land – svar for det viktigste mellomledd på viktigste eksportmarked:

		Ivaretas 100% av deres mellomledd			Ivaretas i fellesskap		Ivaretas 100% av dere selv	
809	Identifisering av potensielle nye kunder	1	2	3	4	5	6	7
810	Oppsøkende salg overfor nye, potensielle kunder	1	2	3	4	5	6	7
811	Analyse av nåværende og nye kunders ønsker og behov	1	2	3	4	5	6	7
812	Informasjon om deres tilbud til nåværende og nye kunder	1	2	3	4	5	6	7
813	Konkrete forhandlinger om salg og kontrakter	1	2	3	4	5	6	7
814	Beslutning om lansering av nye produkter/tjenester	1	2	3	4	5	6	7
815	Beslutning om endelig utforming av produkter/tjenester	1	2	3	4	5	6	7
816	Fastsettelse av priser og rabatter	1	2	3	4	5	6	7
817	Beslutninger om leveringstider og ordreprioriteringer	1	2	3	4	5	6	7
818	Utforming av lokalt salgs- og reklamemateriale	1	2	3	4	5	6	7
819	Lagerføring, transport og/eller forsikring	1	2	3	4	5	6	7
820	Administrering av den løpende kontakt med kundene	1	2	3	4	5	6	7

Hvordan vil dere karakterisere mellomleddets bidrag:

		Helt uenig						Helt enig
901	Mellomleddet har hjulpet med å forbedre resultatet på dette markedet	1	2	3	4	5	6	7
902	Mellomleddet har hjulpet dere til å bli mer konkurransedyktige i form av evnen til å imøtekomme kundenes ønsker og behov	1	2	3	4	5	6	7
903	Mellomleddet har hjulpet med å bli mer konkurransedyktige i form av evnen til reagere på endrede betingelser	1	2	3	4	5	6	7
904	Mellomleddet har vært god til å utføre salgsoppgaver	1	2	3	4	5	6	7
905	Mellomleddet har vært god til å gi kundene teknisk støtte og opplæring	1	2	3	4	5	6	7
906	Mellomleddet har vært god til å utføre service og oppfølging etter salg	1	2	3	4	5	6	7
907	Mellomleddet har vært god til å sette prisene etter de lokale forhold	1	2	3	4	5	6	7
908	Mellomleddet har vært god til å samle markedsinformasjon	1	2	3	4	5	6	7
909	Mellomleddet har vært god til å finne nye markedsmuligheter	1	2	3	4	5	6	7

Avslutningsvis - hvordan vil du vurdere bedriften sammenliknet med andre bedrifter på det viktigste eksportmarked?

		Vi er meget svake			Ingen forskjell		meget	Vi er sterke
910	Innkjøp	1	2	3	4	5	6	7
911	Produksjon	1	2	3	4	5	6	7
912	Logistikk og distribusjon	1	2	3	4	5	6	7
913	Salg og markedsføring	1	2	3	4	5	6	7
914	Kundebehandling og kundeservice	1	2	3	4	5	6	7
915	Finansiering og økonomistyring	1	2	3	4	5	6	7
916	Service, vedlikehold og ettersalg	1	2	3	4	5	6	7
917	Evne til å organisere, planlegge og lede	1	2	3	4	5	6	7
918	Evne til å levere kvalitetsmessig gode produkter/tjenester	1	2	3	4	5	6	7
919	Evne til å utvikle nye produkter og tjenester	1	2	3	4	5	6	7
920	Evne til å levere de billigste produkter/tjenester	1	2	3	4	5	6	7
921	Evne til å levere raskt og pålitelig	1	2	3	4	5	6	7
922	Evne til å finne nye og kreative metoder i markedsføring	1	2	3	4	5	6	7
923	Evne til å kommunisere med markedet	1	2	3	4	5	6	7
924	Evne til personlig salg	1	2	3	4	5	6	7
925	Evne til å utvikle nye teknologiske løsninger	1	2	3	4	5	6	7
926	Evnen til å levere avansert teknologi	1	2	3	4	5	6	7
927	Evne til å utvikle spesialprodukter	1	2	3	4	5	6	7
928	Ansattes produktivitet	1	2	3	4	5	6	7
929	Ansattes engasjement i bedriftens utvikling	1	2	3	4	5	6	7
930	Tilstedeværelse i nye, innovative markeder	1	2	3	4	5	6	7

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