



OULUN YLIOPISTO
UNIVERSITY of OULU

OULU BUSINESS SCHOOL

Jöns Tuomaranta

RESOURCE ALLOCATION OF HIGH-GROWTH FIRMS IN SCALE-UP PHASE

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Author Tuomaranta Jöns		Supervisor Sipola Sakari, Assistant Professor	
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<p>Abstract</p> <p>High-growth firms are important for economic growth and employment points of view, which have been recognized by multiple studies. The purpose of this research is to gain new knowledge of the resource allocation of high-growth firms in general and especially during their scale-up phase. The specific interest of this research is how functional resources, research & development (R&D) and marketing & sales, are allocated within Finnish high-growth firms. The world-level reference for the marketing & sales and R&D investment levels are US high-growth firms. Therefore, US high-growth firms, prior to their initial public offering, are used as a reference to compare resource allocation during the scale-up phase.</p> <p>The previous growth literature inclined to bundle all small and medium-sized enterprises (SMEs) together and to also make conclusions based on characterisation of their different growth factors. Firms internal activities during the high-growth period has received less attention on the previous growth literature. The focus on Finnish studies has been on employment impact of high-growth firms. The high-growth firms resource allocation in scale-up phase is a scarcely studied research topic.</p> <p>The marketing & sales expenses are not itemized within the commonly used profit and loss statement, i.e. layout of the profit and loss account by nature of expenses, by the firms in Finland. The exact comparison between US and Finnish firms' financial statements is currently not possible, since the Finnish SMEs do not report their marketing & sales expenses. Hence the firms' marketing & sales expense data is not publicly available, the topic has been investigated by conducting a web-based survey within Finnish high-growth firms' top management and board members. As a result, the approach of a quantitative research method was chosen for this study.</p> <p>This research contributes on the scarcely populated field of high-growth firms' resource allocation studies. Firstly, for the firms, which are currently in the scale-up phase, there is clear contradictions between budgeted resource allocation and what the allocation should be based on the survey respondents' opinion. The emphasis of resource allocation is still within R&D while it would need to be focused more to the marketing & sales, based on the results. Secondly, the assumption or expectation that most of the management and board members in Finnish high-growth firms seem to have regarding the required resourcing in the marketing & sales in the scale-up phase is inadequate, when compared to the US references. Thirdly, the board members would invest more to the marketing & sales during the scale-up phase than the operative management. The operative management would in average keep the R&D resourcing higher than marketing & sales in the scale-up phase. Additionally, venture capital and banks are in average almost as important a source for high-growth firms' financing as founders are.</p> <p>The contributions of the study can be used to guide high-growth firms' managerial attention toward importance of resource allocation decisions. Moreover, policymakers and public actors can use the contributions when they are assessing firms receiving public funding to evaluate if there is adequate balance between R&D and marketing & sales investments.</p>			
Keywords High-growth, scale-up, resource allocation, marketing & sales, R&D, venture capital			
Additional information			

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1 INTRODUCTION

High-growth firms and startups are on the top of the political agenda for multiple countries and for the European Union (European Commission 2010, p. 12) due to their thus far realized and potential impact to the economic growth and employment (Coad, Daunfeldt, Hölzl, Johansson & Nightingale, 2014) within national economies (OECD 2016, p. 98). Finland is by no means an exception to this. The Finnish government has been driven forcefully forward towards entrepreneurship and entrepreneurship-related education during its current period of rule (Valtioneuvosto 2015, pp. 10–11).

When the Nasdaq Nordic Stock Exchange and the First North initial public offerings (IPOs) in Finland, Sweden and Denmark are compared, Sweden has in average over six times more IPOs annually during last three years than Finland or Denmark (Pörssisäätiö, 2019). It is noteworthy that part of the other Nordic countries' IPOs takes place in Stockholm due to Swedish investors' focus on technology and firms' ability to raise capital there (Factset, 2019).

Why are high-growth firms not generating desired results within Finnish national economy? What slows down high-growth firms' growth during their scale-up phase? The quantity of successful IPOs or mergers and acquisitions (M&As) e.g. Rovio Entertainment Oyj, MySQL Ab and Supercell, in Finland has been relatively low compared to number of promising startups and results in peer countries like in Sweden (Autio, 2009) and Israel (Sipola, 2015, pp. 202–203), even though the situation has lately somewhat improved.

Growth of the firm has been a topic of interest for scholars since the 1950s and the seminal work of Edith Penrose (1959). During the last few decades, the growth research has focused to define possible determinants for the growth (e.g. Coad et al., 2014, Audretsch, 2012, Acs, Parsons & Tracy, 2008, Wiklund & Shepherd, 2005, Becchetti & Trovato, 2002, Davidsson & Delmar, 1997). The internal dynamics of high-growth firms has received less attention and in particular, resource allocation within those firms has not been part of the growth research agenda.

A firm's resources are source for the sustainable competitive advantage when resources are valuable, rare, inimitable, and non-substitutable (Barney, 1991, Eisenhardt & Martin, 2000). The value of research and development (R&D) as a driver for growth has been recognized (García-Manjón & Romero-Merino, 2012) while the marketing & sales (M&S) role has been

studied from the origins of dynamic capabilities and competitive advantage point of view (Haapanen, Hurmelinna-Laukkanen & Hermes, 2018).

1.1 Goal of the research

The goal of this research is to gain new knowledge on what kind of priority marketing & sales activities have compared to R&D activities in high-growth firms. Secondly, what is the investment level of Finnish high-growth firms to the marketing & sales activities in general and especially during the scale-up phase. Thirdly, to compare the Finnish results to the United States (US) reference level. Fourthly, to grasp significance of how aligned the marketing & sales investment decisions are at the firm's board and top management level. Finally, to clarify the role of venture capital in Finnish high-growth firms' financing.

1.2 Research gap and research questions

The importance of research and development investment as a source for the growth is well understood among the high-growth firms (García-Manjón & Romero-Merino, 2012), but the required investment to the marketing & sales especially during the scale-up phase seems to be lagging. The need for the new competencies both in technology and marketing has been recognized and studied in some European geographies (Savarese, Orsi & Belussi, 2016). Finnish high-growth firms' investment level to the marketing & sales activities has not been widely studied based on the literature search. The focus in Finnish studies has been on the employment impact of high-growth firms (Deschryvere, 2008, Littunen & Tohmo, 2003).

The world-level reference for the marketing & sales and R&D investment levels are US high-growth firms. When a US firm is preparing for IPO, it needs to register itself to the United States Securities and Exchange Commission (SEC) with a register form (SEC, 2019). In this context, the focal point of the registration form is the selected consolidated financial data which typically includes itemized marketing and sales and R&D expenses from last three years.

The marketing & sales expenses are not itemized at the most widely used profit and loss statement, i.e. layout of the profit and loss account by nature of expenses, (Ihantola, Leppänen & Kuhanen, 2016, p. 144–147) by the firms in Finland. Therefore, the exact comparison

between US firms' data to the Finnish firms' data is currently not possible, since the Finnish small and medium-sized enterprises (SMEs) do not report their marketing & sales expenses.

As a result of unobtainable firms' marketing & sales expense data, the remaining alternative is to ask directly from the firm's representatives about the share of marketing & sales expenses in their firms.

Annually published Deloitte's Technology Fast 50 Finland (Deloitte, 2018) list focuses to the fastest growing technology companies in Finland. Deloitte's lists of high-growth Finnish firms were used as a basis to collect the data including marketing & sales expenses. The topic has been investigated by conducting a web-based survey within Finnish high-growth firms' top management and board members. The quantitative analysis method is used to analyse the survey data.

Research questions:

- 1) How resources are allocation between R&D and M&S in high-growth firms?
 - a. How resources *are allocated* between R&D and M&S in high-growth firms currently?
 - b. What is the high-growth firms' management view on how resources *should be* allocated between R&D and M&S in high-growth firms during the scale-up phase?
 - c. What is US reference level for resource allocation between R&D and M&S in scale-up phase firms?
 - d. Do the high-growth firms board members and operative management share similar views regarding needed investment level to the M&S activities during the scale-up phase?

- 2) What is the role of venture capital in Finnish high-growth firms' financing?
 - a. How Finnish high-growth firms are financed?

1.3 Research structure

Introduction chapter frames the aim of the research. The next chapter, growth of business, and the chapter thereafter, resources, lays down the cornerstone theories related to the thesis. Research methodology explains a selection of methodological choices that have been made and describes the research process. The analysis of data section covers the analysis and the results section highlights the key findings in the light of the research questions. Discussion and conclusion chapter discusses results, reflects them against previous research findings, evaluates limitations and validity, and finally presents suggestions for future research.

The next chapter starts building the theoretical framework part from different growth perspectives.

2 GROWTH OF BUSINESS

This chapter reviews how growth is measured, depicts diverse modes of growth, presents different approaches to firm's growth, and ends the chapter with a short summary. Firstly, different ways to measure growth are described.

2.1 *Measuring growth and growth modes*

In the past there has been little agreement on how growth is best measured and what factors affect growth based on Delmar's (1997) review of 55 research articles on growth, which were published between 1989 to 1996. Delmar (1997) emphasized the need of the systemization of the choices related to the dependent variable of growth and the findings so that research would evolve and there would be progress on the theory development. The choice of relative versus absolute growth criteria had significant impact on the results (Delmar, 1997). In other words, the key issue of development of growth theory has been how to measure the growth, i.e. what are the measurement choices of growth studies (Shepherd & Wiklund, 2009).

A firm is a legal entity and as McKelvie & Wiklund (2010) pointed out over time firms change their legal form. The register data is a common problem with firm-level data analysis due the closures and corresponding startups as described by Delmar & Davidsson (1998).

Storey and Greene (2010, pp. 210–211) distinguished eight different measures of growth: sales, employment, profit, financial ratios, market share, the income of the entrepreneur, subjective measures and uses of multiple measures of growth simultaneously. The most commonly used measure by researchers is sales and the second one is employment (Murphy, Trailer & Hill, 1996, Wiklund & Shepherd, 2005). The sales data is used because it is easily obtainable and it's not seen as a controversial measure (Delmar, 1997). Similarly, employment data is easily accessible, and it shows the resource base of business (Storey & Greene, 2010, pp. 210–211). Wiklund and Shepherd (2005) used financial performance (gross margin, profitability and cash flow relative to competitors) and growth measures (sales and full-time employees – absolute numbers and relative to competitors) to compose a performance index of small business.

The possible disadvantage for sales as a growth measure is inflation (price changes) and for employment the structure of the sectors (labour-intensive versus non-labour-intensive industries) (Storey & Greene, 2010, pp. 210–211).

Murphy et al. (1996) points out the problem of survival bias i.e. firms' failure rate when measuring growth. Different measures e.g. employment, profit, or turnover over period of time give different results (Delmar, 1997).

Growth modes

Firm's growth can occur multiple ways. In the past research has distinguished two growth modes, organic growth and growth by acquiring another firm (Penrose, 1959, p. 43). McKelvie & Wiklund (2010) identified a hybrid forms of growth, e.g. licensing, franchising, and joint ventures/strategic alliances, as a third growth mode. Recent research has identified that the dynamic growth especially with medium-sized firms is clearly more complex and diverse than often assumed (Achtenhagen, Brunninge & Melin, 2017). As their result Achtenhagen et al. (2017) categorized a firm's growth to eight different growth modes which are organic growth, network-based growth, organic acquisitions, internalizing, organic growth with selected strategic acquisitions, combined growth, growth through acquisitions, and exit.

There have been numerous approaches developed to explain firm's growth. In the next section, the pertinent approaches of firm's growth are analysed.

2.2 Firm's growth

Many conceptual frameworks have been created to describe characteristics of small firm's growth. There is no established or dominant way in the literature how to categorize different approaches or perspectives of business growth. Categorization of these approaches varies depending on the scholars. Storey and Greene (2010, p. 223) presented six approaches to business growth: evolutionary approaches, which covers both state models and population ecology approaches, social network approaches in two forms i.e. individual and 'clusters' of businesses, resource-based view of the businesses, managerial approach, economic approach, and random approach. Other scholars have taken a somewhat different view on how to define the previous approaches to business growth. Dobbs and Hamilton (2007) categorises the approaches to six broad groups, which are stochastic, resource-based, deterministic,

evolutionary, descriptive (stage of development models), and learning. Dobbs and Hamilton (2007) categorization of approaches will be used in this research. In what follows is that each of these approaches are briefly described.

2.2.1 Stochastic approach

Stochastic approach foundation is on the Gibrat's (1931) law (as cited in Santarelli, Klomp & Thurik, 2006, pp. 41–42), which states that a firm's proportional growth rate is independent of the firm's absolute size. The law predicts that future growth of the firm cannot be predicted based on its past growth (Dobbs & Hamilton, 2007), due the random act of independent change forces (Lee 2010). Becchetti & Trovato (2002) summarizes Gibrat law as two main points: (i) any firm within the same industry has the same probability of a given rate of growth during a specific time interval; (ii) at the start of the period the rate of growth of a firm is independent from its size. Storey and Greene (2010, p. 223) pointed out that their overall view is that the role of chance is extremely important element of business growth and that it has been given too small a role in the research.

Reichstein and Dahl (2004) tested Gibrat's law with the Danish firm data and found out that firm growth is not a random walk and there are closely related variables, which may be connected to the firm's growth. The implication of Gibrat's law is that there are a large number of causes behind the growth, but none of them are dominant over time (Dobbs & Hamilton, 2007).

If the stochastic approach views firms as units to be measured, the following section covers resource-based approach which focus on firm's internal resources.

2.2.2 Resource-based approach

On her pioneering work *The Theory of the Growth of the Firm* Penrose (1959, p. 216) pointed out the critical role of the resources for the firm's growth. Penrose suggests that growth is determined by the application of managerial and entrepreneurial knowledge arranged as resources (Mcpherson & Holt, 2007). Entrepreneurial resources are required for innovation and opportunity recognition, while the management resources are requisite to deliver processes and system which enables opportunity utilization (ibid) according Penrose. The important role of management as competent individuals (Penrose, 1959, p. 34–35) and as an

efficient team with firm-specific experience (Penrose, 1959, p. 46) to drive the firm's growth is emphasized by Penrose. Moreover, insufficient existing management can limit planning, recruiting, induction of new recruits, and, in essence, firm's growth by Penrose (1959, p. 47). Overall Penrose work has had a significant impact on strategic management research, the most notable on the resource-based view (RBV) of the firm (Kor, Mahoney, Siemsen & Tan 2016) together with Barney (1986, 1991) and Teece (1980). According to Dunning and Lundan (2008, p. 120) the resource-based theory suggests that resources which are rare, valuable and difficult to imitate are the source of competitive advantages of firms.

The next section focuses on evolutionary approach, which uses the natural science analogy to describe firm's growth.

2.2.3 Evolutionary approach

The evolutionary approach originates from Aldrich (1999, pp. 20–33) work addressing the idiosyncratic nature of firm growth (Dobbs & Hamilton, 2007) and it uses basic concepts of variation (change), adaptation (adjustment), selection (most suitable) and retention (keeping). As Aldrich and Martinez (2001) adequately encapsulate it : *“An evolutionary approach studies the creation of new organizational structures (variation), the way in which entrepreneurs modify their organizations and use resources to survive in changing environments (adaptation), the circumstances under which such organizational arrangements lead to success and survival (selection), and the way in which successful arrangements tend to be imitated and perpetuated by other entrepreneurs (retention).”*

By using the natural science analogy, the evolutionary approach aspires to describe growth, an organizational change, based on its prospective to consolidate the outcomes of entrepreneurial strategies and processes with the attributes of the environment, which enables the processual results (Sipola, 2015, p. 37).

The natural science analogies are often used in organization and management accounting studies and those can be problematic (Hodgson, 2013, Nørreklit & Mitchell 2007, pp. 189–190) due the fact that in natural sciences, the wording is explicitly defined while in organizational studies that is not typically the case.

The stage of development models' approach, which is a descriptive view, is covered in the next section.

2.2.4 Descriptive/Stage of development models' approach

From 1960s to 2006 the most recurring theoretical approach to understand entrepreneurial business growth has been the stage of development models based on Levie & Lichtenstein (2010) results, which summarized a total of 104 stage of development models published in the management literature. Nevertheless, none of the stage development model has become dominant in the field even though the stages approach is by far the most favoured tool for teaching entrepreneurial business growth in entrepreneurship textbooks (ibid).

The paradigm's core assumption is similar to Tsoukas (1991, p. 575) metaphor "Organizations are like organisms" (Levie & Lichtenstein, 2010). The core propositions of stages approach about organizational growth are following (Kimberly & Miles, 1980, pp. 6–7 Levie & Lichtenstein, 2010): The first proposition states that like in growing organisms, similarly in growing organizations, characteristically different stages of development are identifiable. The second proposition asserts that a growing organization goes through these distinguishable stages in sequence and order, which is predetermined and therefore predictable. The third proposition claims that all organizations evolve according to prefigured rules correspondingly just as all organisms of the same species evolve according to the same genetic program starting from premature or latent state and developing progressively to more mature or differentiated state (Van de Ven & Poole, 1995).

These stage of development models explains how a firm adapts to accommodate growth, but it does not give an explanation what causes a business to grow (Dobbs & Hamilton, 2007). The underpinning assumptions of stage of development models that growth is invariant, linear, sequential and deterministic has been asserted not to appertain to organizations (Stubbart & Smalley, 1999, Phelps, Adams & Bessant, 2007). The stages of development model lack supportive empirical confirmation that growth process can be postulated a sequence of stages (Levie & Lichtenstein, 2010, Dobbs & Hamilton, 2007, Storey & Greene, 2010, p. 224). "Dynamic processes are force-fit into rigid 'procrustean bed' of series of prescribed stages." (Stubbart & Smalley, 1999, p. 274).

The learning approach in the following section concentrates on the firm's internal development.

2.2.5 Learning approach

Macpherson (2005) argues that the crises that firms face, are not sequential or linear but numerous, concurrent and idiosyncratic. Therefore, organizational growth is eventually dependent on sufficient resolution to the crisis of ‘knowing’, i.e. to knowing how to act and find solutions to specific crises facing organizations in a given context (ibid). The critical resource of adequate knowledge is created through learning in the decision-makers which in turn makes an easier following evolution of their business (Dobbs & Hamilton, 2007) i.e. growth. The organizational learning may be the balance between systems of knowledge exploration and systems of knowledge exploitation both within and between organizations (Macpherson, 2005). In other words, how to use the existing knowledge of organization and how to acquire new knowledge when its needed.

Intangible or “soft” resources, knowledge and relationships, were considered to be especially salient resources by Lichtenstein & Brush (2001). Tacit knowledge, which is by its nature difficult, if not impossible, to codify (Nonaka & Takeuchi, 1995, pp. 8–9) or articulate (Polanyi, 1966, p. 4) is a specific type of knowledge, which transfer is dependent on a deep understanding of its practice and context (Macpherson, 2005).

The last firm’s approach is deterministic approach which is covered on the next section.

2.2.6 Deterministic approach

The Oxford Dictionary (2019) specifies deterministic as following: ‘*Relating to the philosophical doctrine that all events, including human actions, are ultimately determined by causes regarded as external to the will*’. In other words, the deterministic approach leaves no room for a chance with the outcome as long as the initial factors remain the same. The deterministic approach contradicts with the stochastic approach and with Gibrat’s law (Becchetti & Trovato, 2002).

The emphasis of deterministic approach is to define the variables that causes growth (Dobbs & Hamilton, 2007). These explanatory variables, which would account for most the variation in growth rates, can be related to the firm, its resources, and external industry environmental factors (ibid). In the past growth literature, there has been a lot of effort to identify the determinants of growth (e.g. Coad et al., 2014, Audretsch, 2012, Davidsson & Delmar, 1997).

2.3 Scale-up phase and high-growth firms

Scale-up phase

World Economic Forum (2014) has defined the scale-up phase as “*assessing success factors in scaling a business sustainably to expand in terms market access, revenues, added value and number of employees, in particular identifying and realizing win-win opportunities for collaboration between market leaders and market disruptors*”. Pisoni & Onetti (2016) summarized that in the scale-up phase all the efforts are focused on evaluating conditions to expand the firm in terms of market access, added value, revenue and number of employees. In this study Pisoni & Onetti’s (2016) definition of scale-up is used.

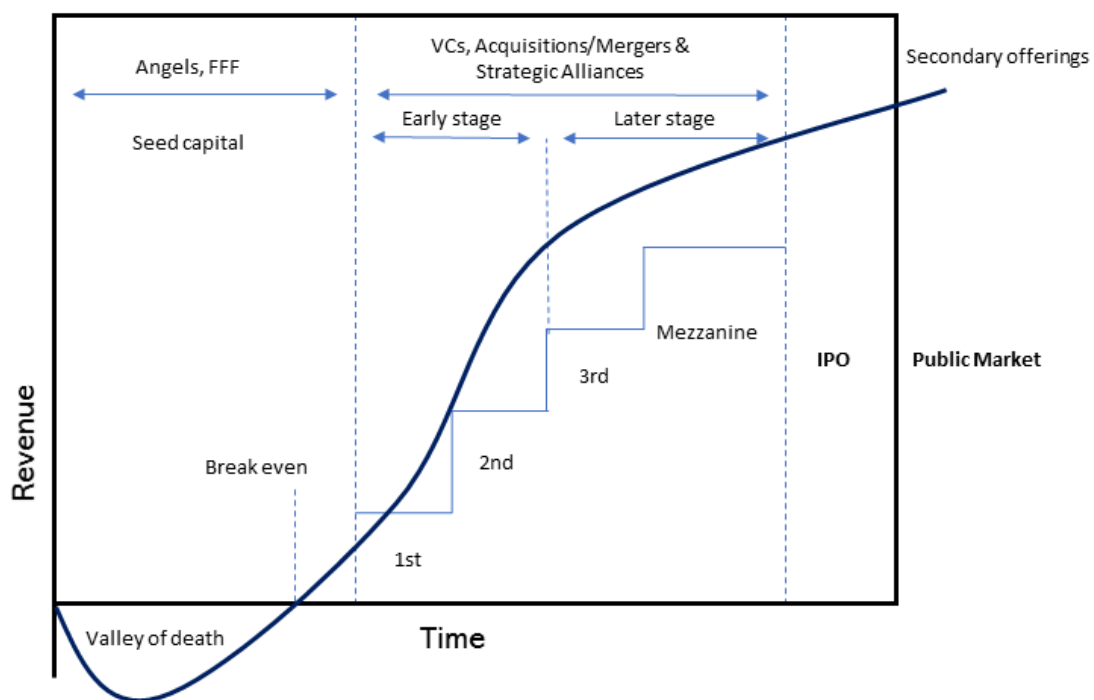


Figure 1. Development of startups’ revenue and related financial phases. Reprinted with permission of FiBAN (2019) (Tenhunen, 2017).

The curve in figure 1 illustrates how the revenue of startups’ develops over time. The scope of graph in figure 1 is to show how a startup is financed in different development stages, but the graph also helps to visualize the scale-up phase. Scale-up phase is a development phase when

the growth slope is the steepest and it can be well illustrated as ‘Early stage’ and ‘Later stage’ parts in the figure 1. ‘Early stage’ in figure 1 refers to startup financing rounds (1st and 2nd). Terminology in figure 1 is following: Seed capital sources are business angels and FFF, which is an abbreviation for family, friends, and fools. ‘Valley of death’ refers to time period when a startup is developing its’ product and/or services and the cash flow is negative. Break even happens when firm’s revenue covers its’ costs. ‘Later stage’ refers to financing rounds (3rd and Mezzanine). “*Mezzanine financing is a layer of funding between senior debt and equity.*” (Silbernagel & Vaitkunas, 2012). ‘Public Market’ refers to stock markets.

High-growth firms

If measuring the growth is somewhat ambiguous, defining a high-growth firm is even more so. Delmar & Davidsson’s (1998) defined high-growth firm as *the top ten percent growth firms* in terms of either relative changes or absolute in total employment growth, in organic employment growth, or in sales volume. They come up with the term ‘super growers’ representing close to twenty percent (19.4%) of studied high-growth firms i.e. about two percentage of all firms and which can be called a high-growth firm independent of the used definition.

Eurostat-OECD’s (2007, p. 61) recommendation as a definition for high-growth firms is following: “*All enterprises with average annualised growth greater than 20% per annum, over a three-year period should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover.*”

Henrekson and Johansson (2010) pinpointed on their literature research as a clear-cut result that a disproportionately large share of all new net jobs is generated by a few high-growth firms. High-growth firms are the ones that make the difference when it comes to economic growth and employment, hence the policymaker’s focus should be on high-growth firms (Shane, 2009).

Gazelles

The term Gazelles as a high-growth firms were coined by David Birch (Landström, 2005, p. 170). Eurostat-OECD (2007, p. 63) defined Gazelles as “*All enterprises up to 5 years old with*

average annualised growth greater than 20% per annum, over a three-year period, should be considered as gazelles.”

2.4 Summary of the firm’s growth

“Again, even apart from the practical accounting difficulties, there is no way of measuring an amount of expansion, or even the size of the firm, that is not open to serious conceptual objections” (Penrose, 1959, p. 199).

The problem starts with unit of analysis and how to measure it. Small firm growth is idiosyncratic, situated and complex by its nature regardless of how it is measured (Macpherson & Holt, 2007). In the 1990s and early 2000s, many studies were done to prove or disprove Gibrat’s law as summarized by Storey and Greene (2010, p. 217). Since the late 1990s, more and more effort had been put on studies to define deterministic factors impacting a firm’s growth (e.g. Coad et al., 2014, Audretsch, 2012, Acs, Parsons & Tracy, 2008, Wiklund & Shepherd, 2005, Becchetti & Trovato, 2002, Davidsson & Delmar, 1997) due to the positive economic impact of a small firm’s growth.

The small business growth literature gives prominence to a wide range of model specifications and growth measures due the lack or shortfall of any unifying theory (Dobbs & Hamilton, 2007). Scholars agree that there is no coherent or dominant theory for the small firm’s growth (Wiklund, Patzelt & Shepherd, 2009, Davidsson & Wiklund, 2000). Penrose (1959) seminal work has still a central place in the growth research within the entrepreneurship literature.

Various growth approaches on the literature highlight different aspects of small firm growth and, even when combined, they do not provide a holistic view of the growth. From a growth theory point of view, it is not enough to look only to firms’ past performance or its development process, but to understand also the firm’s resources, capabilities and dynamics which enables the firm’s growth.

The previous growth literature tends to gather all SMEs together and make conclusions based on characterisation of their different growth factors. The problem of this approach is two-folded. Firstly, the previous growth literature does not take into account the different goal settings within firms. Secondly, the previous growth literature does not study firms’ internal

activities that enables high-growth. A venture capital packed gazelle, which is targeting IPO, strives for growth with different activities than an older and mature SME. Additionally, the previous growth literature does not discuss IPO requirements and the impact that those requirements result in firm's activities. The implications of these listed shortcomings are that the previous growth literature does not offer much of a bonding layer for studies concentrating to high-growth firms resource allocation activities.

2.4.1 Theoretical framework elements

This chapter summarized different approaches for business growth. The resource-based approach is the most relevant approach for this research, hence the emphasis of this research is on the firm's internal resource allocation. The scope of investigation is on high-growth firms. Special attention is paid on the scale-up phase of high-growth firms. Pisoni & Onetti's (2016) definition of the scale-up is used in this research. The key theoretical framework elements from this chapter are summarized in the figure 2.



Figure 2. Key theoretical framework elements from chapter two.

Growth requires resources. The next chapter will continue building the theoretical framework on top the elements summarized above by concentrating to the resources.

3 RESOURCES

The emphasis on this chapter is on RBV, dynamic capabilities, functional and financial resources. Theoretical basis of the RBV and dynamic capabilities literature are used to explain how allocation of functional capabilities and resources impacts SMEs competitive advantage (Haapanen, 2017, p. 25). In the financial resources, the focal point is on venture capital funding.

3.1 *Resource-based view (RBV)*

The context of the RBV has had a significant influence from Penrose's (1959) book *The Theory of the Growth of the Firm* (Kor et al. 2016, Wernerfelt, 1984). Penrose (1959, p. 77) describes a firm as a collection of resources. Wernerfelt (1984), who refers Penrose's (1959) idea of looking firms as a broader set of resources, defines firm's resources as tangible and intangible assets that are bound semi-permanently to the firm. RBV defines resources as financial, tangible and intangible assets that firm owns and controls to execute its strategies (Haapanen, Juntunen & Juntunen, 2016).

The RBV builds the link between a firm's performance and its' internal characteristics as a competitive advantage. The source of firm's competitive advantage is built on two assumptions according to RBV: First, the strategic resources firm controls are heterogeneous rather than homogenous within an industry it operates. Second, these resources are firm-specific i.e. they are not perfectly mobile across firms. In order for a firm to have sustained competitive advantage requires that firm's resources are valuable, rare, imperfectly imitable, and non-substitutable. (Barney, 1991.) Referring to earlier researchers works (e.g. Wernerfelt, 1984, Barney, 1991) Eisenhardt & Martin (2000) summarized that resources need to be valuable, rare, inimitable, and non-substitutable, i.e. so-called VRIN attributes, to provide their owners competitive advantage. When resources are a firm's competitive advantage, then as an analogy to entry barriers Wernerfelt (1984) called them resource position barriers to competitors. Firm resource endowments are crucially important when creating sustained competitive advantage and those firm-specific resource endowments also determine the nature of firm's sustained competitive advantage (Barney, 1991).

Based on Newbert (2008) empirical findings, firm's performance related competitive advantage originates from resources and capabilities that are combination of valuable and rare.

Even though RBV encourages to exploit firm specific assets, it does not elaborate sufficiently how firms should create sustainable competitive advantage while dynamic capabilities framework building on top of RBV complements the overall theoretical framework (Cavusgil, Seggie & Talay, 2007).

3.2 Functional resources

Functional resources refer to a firm's key functions e.g. R&D, M&S, and management.

3.2.1 Dynamic capabilities and its' microfoundations

Capabilities

It is through human capital information exchange that capabilities are developed and carried (Cavusgil et al., 2007). Amit & Schoemaker (1993, p. 35) defines capabilities as “*information-based, tangible or intangible processes that are firm-specific and are developed over time through complex interaction among the firm's resources*”.

Dynamic capabilities

In their original form Teece, Pisano, and Shuen (1997, p. 516) defined dynamic capabilities as “*the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments*”. Dynamic capabilities literature disagrees with Teece et al. (1997) conclusion that inimitable dynamic capabilities would produce a sustainable competitive advantage (Haapanen, 2017, p. 27–28). As a compromise Helfat, Finkelstein, Mitchell, Peteraf, Singh, Teece & Winter (2009, p. 4) defined dynamic capability as “*the capacity of an organization to purposefully create, extend, or modify its resource base*”. According Helfat et al. (2009, p. 1) the key word with dynamic capability is *change* and that it is inherently entrepreneurial for firms, large and small, to create, adapt to, and exploit change.

Additionally, dynamic element such as learning is advanced by the dynamic capabilities' framework (Cavusgil et al., 2007).

Dynamic capabilities' microfoundations

The purpose of microfoundations is to build a link between micro (e.g. individual) and macro (e.g. firm's performance) levels (Abell, Felin & Foss, 2008). Firm-level dynamic capabilities that would give an internationalizing SME firm sustainable competitive advantage are not delivered by any of the functional microfoundations in isolation (Haapanen, 2017, p. 73). Microfoundations of dynamic capabilities are referring to functional skills, decision rules, processes, procedures, organizational structures and disciplines (Teece, 2007). Relevant managerial reconfiguration capabilities as well as sufficient microfoundations of sensing in both the marketing and R&D functions are needed. The nature of competitive advantage of internationalizing SMEs is based on concurrent dynamics within managerial, R&D, and marketing capabilities. The relative composition of needed capabilities varies during SMEs' international growth process. Market sensing microfoundations seems to be more salient than the ones that support emerging technologies. (Haapanen, 2017, p. 72–74.)

It is harder for the competitors to recognize the origin of competitive advantage, when the complementary assets, R&D and marketing, are tightly coupled and therefore competitors cannot copy a firm's value-creating strategy (Haapanen et al., 2018, Menguc & Auh, 2006).

3.2.2 Resource allocation and related constraints

Lack of financial resources limits SMEs possibilities to develop needed capabilities and obtain resources and the consequence is that international business is commonly more challenging for SMEs than large multinational enterprises (Knight & Kim, 2009, Haapanen, 2017, p. 26). Penrose (1959, p. 71) pointed out that a firm has an incentive to use as fully as possible the most valuable specialized services of its resources. Small and young firms have typically very limited resources and therefore it is essential how those resources have been allocated (Baker & Nelson, 2005).

SMEs internationalization can take a form of "resource-seeking" behaviour, hence they do not own, have access or control to adequate resources to bring their technology to market by

themselves during their internationalization and therefore the resource acquisition can be an important element of high-tech SMEs internationalization (Hewerdine, Rummyantseva & Welch, 2014).

Prior the initial internationalization the resource allocation of the firms seems to be towards the development of new services and products i.e. towards R&D, but at the point of initial internationalization firms redirect their available capabilities and resources to international operations, marketing & sales (Haapanen et al., 2016). While the international expansion develops and when the level of financial resources improves then marketing & sales and international operations begin to obtain resources (Haapanen, 2017, p. 75). Chen & Hsu (2010) argued that a critical factor determining a firm's international growth is their resource allocation decisions and their sample of Taiwanese firms would likely benefit if they would change their focus on resource allocation from R&D to marketing.

Since Penrose's (1959) seminal work, it has been acknowledged that firms to expand their operations the factors like the transfer of tacit competencies and learning becomes constraints (Kumar 2009).

The role of management

When managers make decisions to adjust their firm's resource base, the finding that performance related competitive advantage stems from resources and capabilities which is a combination of valuable and rare may influence their decisions (Newbert, 2008).

The dynamic capabilities approach emphasis the key role of the management (Teece & Pisano, 1994, p. 1) "*in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences toward changing environment*". Creation of sustainable competitive advantage depends how a firm's resource are configured, and how resource endowments are deployed by the management (Cavusgil et al., 2007).

Ambidexterity

Ambidexterity literally means ability to use both hands equally well while in the literature of the management it refers to the ability to exploit and explore simultaneously (Volery, Mueller & von Siemens, 2013). The seminal work on organisational ambidexterity was done by March (1991, p. 71), who defined the difference between exploitation and exploration in organizational learning as following: *“Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution.”*

March’s (1991) focal premise is the intrinsic trade-offs between exploration and exploitation. Managers face fundamental paradox if they endeavour to engage in both exploitation and exploration (Volery et al., 2013). The opposing nature of exploration and exploitation activities stem from expected organizational output, organizational inertia, and resource-allocation constrains (Lavie, Stettner & Tushman, 2010, Volery et al., 2013). Levinthal & March (1993, p. 105) summarized the issue from firm’s perspective: *“The basic problem confronting organizations is to engage in sufficient exploitation to ensure its current viability and, at the same time, devote sufficient attention to exploration in order to ensure the organization’s future viability.”*

3.2.3 Summary of RBV, capabilities, dynamic capabilities and it’s microfoundations

The RBV builds the link between a firm’s performance and its’ internal characteristics as a competitive advantage (Barney, 1991). The value of resource (or capability) can be realized only when it is combined with a corresponding capability (or resource) i.e. the key to obtaining a competitive advantage is the exploitation of a valuable resource-capability combination (Newbert, 2008, Makadok, 2001).

Something that cannot generally be bought but must be build is a fundamental quality of resources/competencies as well as dynamic capabilities. Dynamic capabilities are generally rooted in creative managerial and entrepreneurial acts. Abilities that enable firms to develop and co-evolve within a business environment are sensing, seizing and transforming. (Katkalo et al., 2010.) Sensing and seizing are similar activities as exploration and exploitation (March, 1991, Katkalo et al., 2010) which were described in the previous section. This paper uses exploration and exploitation terms instead of sensing and seizing.

Dynamic capabilities demonstrate firm's capacity to orchestrate its resources, competences, and other assets within the system of global specialization (Katkalo et al., 2010). Microfoundations acts as a link between micro (e.g. individual) and macro (e.g. firm's performance) levels (Abell et al., 2008). Individuals, processes, interaction, and structure is how microfoundations unfold as micro-level phenomena (Felin, Foss, Heimeriks & Madsen, 2012, Haapanen, 2017, p. 30).

Firms' capabilities and dynamic capabilities have been studied widely and there has been clear progress on theoretical framework development point of view (Teece et al., 1997, Teece, 2007).

3.3 *Financial resources: The role of venture capital*

"The lifeblood of the start-up economy is venture capital" (Lohr, 2019).

The challenge that entrepreneurs face is that they seldom have the capital to see their ideas to fruition and therefore they need to seek outside investors. These financing difficulties can be categorised as four problems: uncertainty about future, asymmetric information, soft assets, and market conditions which determine the financing climate and the terms of investment (Gompers & Lerner, 2001a, p. 7–9.)

Venture capital stand for investments provided to innovative, early-stage, and high-growth startup firms, which is a definition for venture capital typically used in North America (Cumming, 2012, p. 1). The venture capital is seen as a key driver of economic growth and therefore the venture capital companies play an important role when they are financing firms that otherwise have trouble attracting financing (Cherif & Gazdar, 2011, Gompers & Lerner, 2001b). The venture capitalist needs to succeed in dealing with vast information and incentive difficulties hence they usually focus on sectors with a large amount of uncertainty (Gompers & Lerner, 2004, p. 3). The entrepreneurs on these sectors typically have difficulties to raise money from banks due the considerable intangible assets that are difficult to value (ibid) and overall lack of collateral.

3.3.1 Venture capital investment activity

Venture capital investment can be described in five sequential steps: The first step is *deal origination* when the investors become aware of potential deals, the second step is *deal screening* to manageable set of potential deals, the third step is *deal evaluation* which requires return and risk assessment, the fourth step is *deal structuring* in terms of amount, form and price between investor and the potential investee, and the fifth step is *post-investment activities* including controls to protect investment and the assistance to investee in the areas of strategic planning, helping to recruit key executives and board members (Tyebjee, & Bruno, 1984).

3.3.2 Venture capital funds

Two key results due to asymmetric information are adverse selection and moral hazard (Storey & Greene, 2010, p. 330). Storey and Greene pointed out that *adverse selection* occurs when investors (or lender) based on deficient information does not distinguish a good investment from a bad one and makes poor investment decisions. VC strategies against adverse selection are due diligence and syndication (Storey & Greene, 2010, p. 355). Due diligence refers to investigation that VC conducts prior to making the investment decision and it includes numerous items from assessment of a firm to analysis of potential market and competitors (Fried & Hisrich, 1994, Storey & Greene, 2010, p. 356). Syndication means that multiple VC funds are financing an investee together and therefore they are spreading the risks through diversification (Storey & Greene, 2010, p. 368).

Once the VC has agreed an investment with the firm, a principal-agent relationship is formed between the VC (the principal) and the investee firm's directors (the agent). Their relationship puts the principal in a position where *the problem of moral hazard* (Holmström, 1982) arises, and it needs to be addressed. Having given up full ownership of the firm and acting in self-interest, the directors of the investee firm are prompted to limit effort and utilize benefits, hence they will absorb only a proportion of their cost. (Reid, 1998, p. 8.)

VCs have three different strategies to deal with moral hazards: (i) monitoring – addition to seeking monthly financial reporting data is to appoint a non-executive director, who is also a member of the board, (ii) allocate funding in stages instead of all at once, (iii) contracting, so that the entrepreneur only benefits from future success (Storey & Greene, 2010, p. 359–360).

3.3.3 Venture capital in high-growth firms

Venture capital is a global phenomenon. Firms can utilize early internationalization as a strategy to gain access to capital as highlighted by Løvdal & Neumann (2010) on their assessment of the marine energy industry.

Venture capital investors and business angels can provide strengthening of management resources of a high-growth firm by their industry-specific experience and therefore improve the quality of decision making (Gabrielsson, Sasi & Darling, 2004).

Stuart, Hoang & Hybels (1999) proposed that to make a judgement about quality of young firm third parties rely on the prominence of young firm partners. In other words, if a startup is able to raise venture capital, it increases the likelihood that the startup can also attract other finance providers. Davila, Foster & Gupta (2003) concluded also that raising venture capital helps startups with credibility build up and present a relevant signal to separate startups with different quality.

3.3.4 Venture capital investments in Finland

The exit possibilities that the financial system produce defines the long-term development of the venture capital industry (Ali-Yrkkö, Hyytinen & Liukkonen, 2001). In the past, the problem of the Finnish financial system was that it provided less than optimal exit venues for the Finnish VCs (ibid).

Funding of Finnish startups and early stage growth companies is illustrated in figure 3.

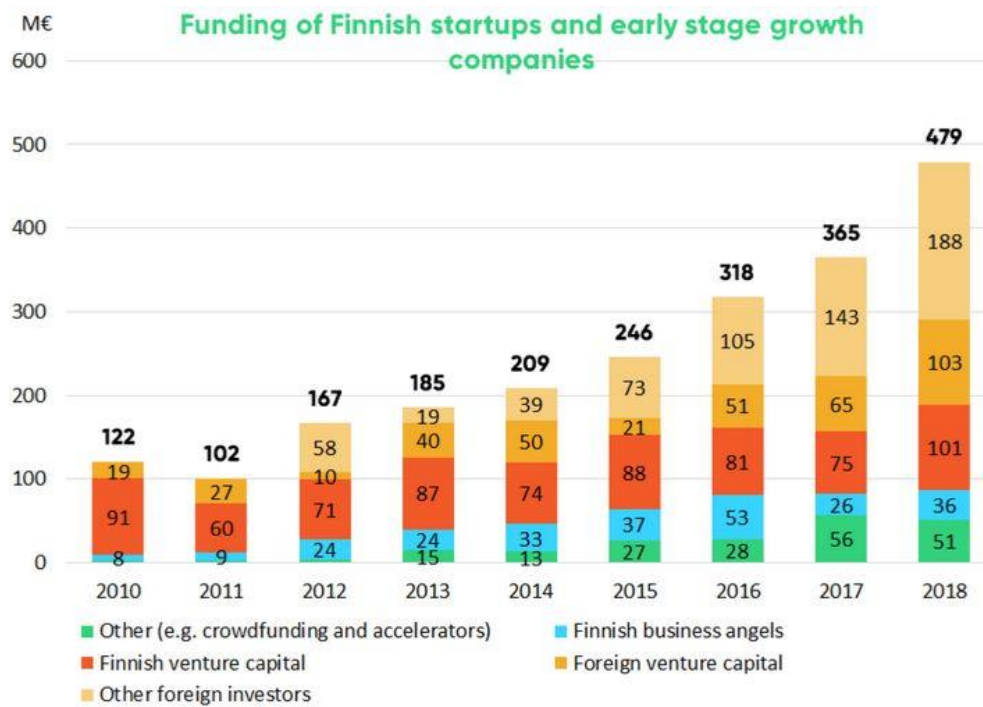


Figure 3. Startup and growth firms financing in Finland (FVCA, 2019 and FiBAN, 2019). Reprinted with permission of FVCA (2019).

There has been gradual increase of venture capital and business angels funding for the Finnish early-stage growth companies and startups, but the increase the foreign venture capital and other foreign investors are clearly higher as shown figure 3.

3.4 The summary of theoretical framework

The focus of this research is on high-growth firms and their scale-up phase. Chapter two summarized different approaches for business growth. The most relevant growth approach for this research is the resource-based approach. The focal point of this chapter is resources.

The source of the competitive advantage are the firm's resources (Barney, 1991). From the firm resources, the emphasis on this research has been placed on the human and financial resources. The allocation of R&D and M&S functional resources is where the primary focus of this research lies. The basis of the theoretic framework is formed by RBV and dynamic capabilities. The scale between R&D and M&S resourcing demonstrates the organizational ambidexterity i. e. the balance between exploration and exploitation activities. Venture capital

is an area of interest in financial resources side. The model of the theoretical framework of this thesis is shown on the figure 4.

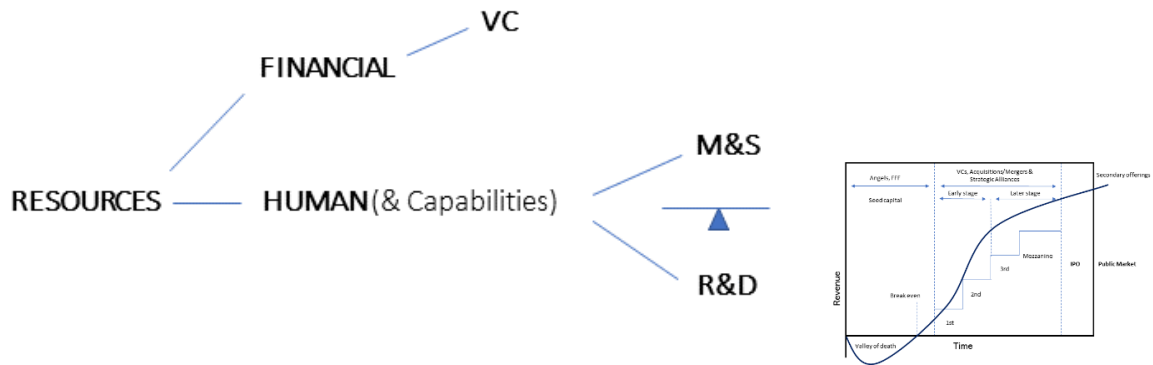


Figure 4. The summary of the theoretical framework model. The graph reprinted with permission of FiBAN (2019) (Tenhunen, 2017).

The purpose of the framework model is that the empirical results are reflected against the theoretical model and relevant findings of previous research.

This summary of the theoretical framework ends this chapter and the following chapter concentrates on the research methodology.

4 RESEARCH METHODOLOGY

“Research design is the science and art of planning procedures for conducting studies so as to get the most valid findings” (Vogt, 2005, p. 276).

The focus of this chapter is to describe the methodological choices made relating to research design including sampling and data collection, measurement, and analysis of the data.

4.1 *Research design*

The forms of survey research designs are cross-sectional, repeated cross-sectional and panel. Cross-sectional designs produce a snapshot of the phenomena, hence all the data is collected at the same time. Due to the snapshot nature, the limitation of cross-sectional designs is that they have some trouble demonstrating the order in which events occur. When cross-sectional surveys are carried out in varying intervals with a different sample on each instance, they are called repeated cross-sectional surveys. To pinpoint trends and changes at the individual level panel surveys are used to trace same sample over time. (Moutinho & Hutcheson, 2011, pp. 319–320.)

The scope of the research was to shed light on resource allocation of the high-growth firms in the scale-up phase. The amount of the publicly available information from the non-listed companies is limited. Open and obtainable data regarding firm’s resource allocation is restricted to financial information. Due the idiosyncratic and complex nature of the firm’s growth (Macpherson & Wiklund, 2007) and the lack of in-depth research of high-growth firms’ resource allocation, the wider sampling of firms is warranted and therefore the research design was decided in the form a cross-sectional survey.

Furthermore, the marketing & sales expenses are not itemized at the most widely used profit and loss statement, i.e. layout of the profit and loss account by nature of expenses, (Ihantola et al., 2016, p. 144–147) by the firms in Finland. Therefore, the Finnish small and medium-sized enterprises (SMEs) do not report their marketing & sales expenses publicly. Hence the firms’ marketing & sales expense data is unobtainable from public sources, the remaining alternative is to ask directly from firm’s representatives about the share of marketing & sales and R&D expenses in their firms.

4.1.1 Survey design

“Survey designs are widely used both to describe and explain phenomena.” (Moutinho & Hutcheson, 2011, p. 318). Fowler (2009, p. 4) points out that *“A sample survey brings together three different methodologies: sampling, designing questions, and data collection.”*

4.1.2 Sampling

There are only few publicly available growth rankings from Finnish companies. Talouselämä magazine (Talouselämä, 2019) ranks the 500 largest Finnish companies based on their previous year’s revenue while Deloitte’s Technology Fast 50 Finland list focuses to the fastest growing technology companies. Talouselämä 500 list has only the percentage of revenue change compared to previous year’s revenue as a growth measure. In the annually created list, Deloitte ranks 50 fastest growing technology companies in Finland based on company’s revenue growth over the last four years.

Deloitte’s Technology Fast 50 Finland 2017 and 2016 (Deloitte, 2018) listings were used as a basis for Finnish growth company listing for this research, hence Deloitte’s criteria to follow growth over a longer period of time is more suitable for the growth focused research like this. When the Deloitte’s 2017 list firms are compared with 2016 list firms there is certain consistency in place hence 72% of the firms are the same in both lists. From the Deloitte’s 2016 list, six firms, i.e. 12% of list’s firms, were either acquired or merged with another company and in four out of six cases, the buyer was an international firm. The six acquired or merged firms from Deloitte’s 2016 list were excluded from the research.

Deloitte’s listing of companies was used as a starting point to obtain a contact list of board members, founders and the operational management of each company. The intention was to reach as many founders, board members and top managers from each firm as possible. To be included into the sample, individuals from the operational management were at the positions which are listed at appendix 1.

None of the companies had even close to all of these roles, but rather some kind of idiosyncratic variation of them. Due the fact that each contact information was individually obtained from public sources it turned out to be time-consuming exercise. The outcome of the

contact search was close to 280 email contacts, which each received through email a web page link to Finnish and English versions of the web-based survey.

4.1.3 Survey questions

Demographic features related questions from individuals and firms were placed at the beginning of the survey followed by more detailed questions of firm's business and market focus. Firms' financing, revenue, development stage, IPO plans and accounting practices were also asked from respondents. The focus of the remaining questions was resource allocation related i.e. marketing & sales and R&D resourcing specific questions.

Numeric scale was used with those questions where it was suitable. Rather than using a set of bipolar scales e.g. little/a lot (Verhagen, van den Hooff & Meents, 2015) within numeric scale a percentage scale was used instead, and the question was framed accordingly. Response options with Likert scale (Vogt, 2007, p. 88) was not used in the survey.

The goal of the survey design was that the questions are unambiguous and clear. A Finnish version of the survey was initiated first and then an English version was translated from it as the work progressed. Once the survey was finalized, it was piloted with a small group of people.

4.1.4 Data collection

The web-based system, called Survey Monkey, was used to conduct the survey. The survey was sent out at the beginning of December 2018. The first dedicated email reminder was sent just before Christmas 2018 and the final email reminder one week before closing the survey at the end of January 2019. It is noteworthy that bulk of the responses came after each of the reminders.

The latest financial statements of each Deloitte's list companies were retrieved from Voitto+ database and from Asiakastieto web page (Asiakastieto, 2019). The financial data was compared between these two sources. Financial statements, company web sites, annual reports from the public companies, and Crunchbase data (Crunchbase, 2019) were used as other data source.

As the United States (US) reference for growth companies Ritter's (2018) technology IPO listing 2017 was used as an initial source. The list of US 2017 Technology IPO companies is not an exhaustive list of all US 2017 Technology IPOs, but it is a representative sample of them. When a US company is doing IPO, it needs to register itself to the United States Securities and Exchange Commission (SEC). The registration takes place with an S-1 form which is the general form for registration of securities under the Securities Act of 1933 (SEC, 2019). Afterwards IPO companies send their annual report with a 10-K form. Both forms, S-1 and 10-K, were used to collect US 2017 Tech IPO companies' revenues and expenses prior to their IPO and after it (ibid).

4.1.5 Sample statistics

Altogether 58 surveys were received from respondents through the web-based system. The response rate was 20.7%. Three survey responses were not included to this research. One survey was only partially filled and therefore it was omitted from the results. In the preliminary analysis two surveys were clear outliers relating their annual revenues, number of employees, and firms' founding years i.e. there were no such firms in Deloitte's 2017 and 2016 lists that would match given characteristics, hence those two surveys were also omitted from the results. Contact details were left by 39 persons and based on those contact details the firm level response rate was higher than 50%.

4.2 *Measurement*

An observation represented as a number is a measurement (Vogt, 2007, p. 9). There are four levels or types of measurement and when ranked from low to high they are nominal, ordinal, interval, and ratio (Bernard, 2000, pp. 41–43). The information content of the measurement scale increases as the rank increases. Nominal measures are identifiers or categories and number values itself are just labels which do not express quantitative information e.g. 1. Female, 2. Male. Nominal categories must be exhaustive, i.e. not leaving anything out, and mutually exclusive i.e. persons or things can be categorized in only one way. Ranks are ordinal measures like grading at the school. In an ordinal scale distances between ranks are not necessarily equal while in interval scale distances between any two adjoining number are equal. Interval scale has no meaningful zero point. Ratio scales have a true zero point as well

as equal intervals. Zero point means that the subject has none of the property. In practical use, the levels of measurement can be reduced to three: qualitative (nominal/categorical), rank (ordinal), and quantitative (interval and ratio). (Vogt, 2007, pp. 9–10.) Table 1 has levels of measurement listed with examples.

Table 1. Examples of levels of measurements (adapted from Vogt, 2007, p. 9)

Level	Distance between ranks	Examples	
Nominal	N/A	Gender	Religion
Ordinal	Not equal	Class rank	Measurement level
Interval	Equal	Temperature in Celsius	Years in calendar
Ratio	Equal	Age	Years of experience

The guidance in the literature is to use the highest possible level of measurement (Bernard, 2000, p. 44).

The collected survey data had all three (qualitative, rank and quantitative) levels of measurements.

4.3 Data analysis

The key features of survey design are the form of data and the method of analysis (Mars, 1982, p. 6). The form of data is a variable-by-case grid, which is generated by the survey and the grid cells hold information about a case's attribute on the relevant variable. At the simplest, the method of analysis is a descriptive analysis, which is attained when the distribution of attributes of variables from the variable by case grid are counted and cross-tabulated. (Moutinho & Hutcheson, 2011, p. 319.)

The quantitative methods will be used to analyse the data. The data analysis in this study has been done by comparing absolute and relative values of continuous variables. Mean values, i.e. average, and standard deviation of continuous variables has been also calculated. The summary table of descriptive statistics is presented in figure 24 at appendix 6. The research visualization has been done with Microsoft Excel and IBM's SPSS statistic software tool.

The methodological discussion of data analysis ends this chapter and the following chapter focuses actual analysis of survey data.

5 ANALYSIS OF DATA

The empirical results of the research are discussed thoroughly in this chapter. The scope of the firm growth survey, which data is used in this thesis, is wide and therefore the intent within this thesis is mainly to investigate respondents' feedback to those questions from the survey that are relevant to the research questions and not to cover all the survey questions.

A firm is a legal entity. Over time firms change their legal form (McKelvie & Wiklund, 2010). Delmar & Davidsson (1998) pointed out that the register data is a common problem with firm-level data analysis due the closures and corresponding startups. Similar phenomena were visible with some of the Deloitte's list of firms. The business entity was changed to a different one, from a group of firms to a single firm or vice versa during the time period of interest. Additionally, part of the firms had gone through a merger or an acquisition. The consequence of these changes was that part of the data from other sources (e.g. Asiakastiето, 2019) become discontinuous.

5.1 *Characteristics of the respondents*

The gender split of respondents was such that 13% of respondents were female and 87% were males. The respondents' age was not continuous variable. The survey had predefined age groups. The distribution of respondents' age was following: The highest age group was 41-50 years old with 38% share followed by 31-40 years old with 29% share. The third largest group was with 22% share was 51-60 years old. Other age groups were relatively small compared to these three groups. Considering that the survey was targeted to the operative management and the board members of the Deloitte's lists firms, age distributions is not unusual for those positions.

5.1.1 Respondents' position at the firm

Survey respondents' position at the firm is shown on the table 2. The total sum of the percentages is 118% due to the fact part of the respondents selected multiple position categories. The most typical dual positions of respondents were a founder and a CEO or a founder and a board member.

Table 2. Respondents current position at the firm:

	Count (N)	Percent of cases
Board member	19	35%
Founder/Co-founder	15	27%
CEO (Chief Executive Officer)	16	29%
CFO (Chief Financial Officer)	5	9%
CTO (Chief Technical Officer)	1	2%
Other position	9	16%
Total	65	118%

Source: Survey data.

The respondents which selected the category of ‘Other position’ had following job titles: Chief Marketing Officer, Sales Manager, VP of Sales, Development Manager, Manager of Software Solutions, Communication and Marketing Manager, and Other position.

The highest single group of respondents are board members with 35% share followed by CEOs with 29% and founders with 27%.

5.1.2 Respondents’ experience

Respondents were asked to estimate how many years of startup experience they have. The respondent’s experience is continuous variable and it is categorized for the analysing purpose. Clearly the highest share of the respondents (41.5%) had 6-10 years of startup experience. The second largest group was respondents with 11-15 years of startup experience (18.9%) and the third largest group was respondents with 16-20 years of startup experience (11.3%). The sizes of remaining groups were below 10% level. The mean value of the respondents’ startup experience was 11.3 years and the standard deviation 7.2 years.

5.2 *Characteristics of the firms*

Three of the Deloitte’s lists 2016 and 2017 firms are publicly traded by March 2019. One firm is listed on in Nasdaq Helsinki (Nasdaq, 2019a) and two of the firms are listed in the Nasdaq First North (Nasdaq, 2019b). The rest of the studied firms were private, unlisted firms.

5.2.1 Branch of Business

Surveyed firms' branches of businesses are summarized at the table 3. The branch of business was multiple-choice question i.e. the respondents could have selected more than one response and most of the respondents did select multiple responses. The total percent of cases 187% is reflecting those multiple responses.

Table 3. Branch of businesses.

	Count (N)	Percent of cases
Business to Business (B2B)	46	85.2%
Business to Consumer (B2C)	0	0%
Product business, physical product	4	7.4%
Product business, immaterial product (e.g. software)	28	51.9%
Service business and/or consulting	22	40.7%
Other (industry)	1	1.9%
Total	101	187.0%

Source: Survey data.

Most of the firms have focused to sell their immaterial products services or consulting to other businesses while none of the firms are concentrated to consumer business based on the respondents' answers. At 7.4% of respondents' firms have physical product as their branch of business. The respondents who marked their firm's branch of business as a physical product also left their contact information which indicated that they worked for three different firms.

5.2.2 Age of firms

Figure 5 demonstrates how the founding years varies between Deloitte's lists firms. The count of the same founding year is visible in the vertical axis and the horizontal axis represents the founding years of the firms.

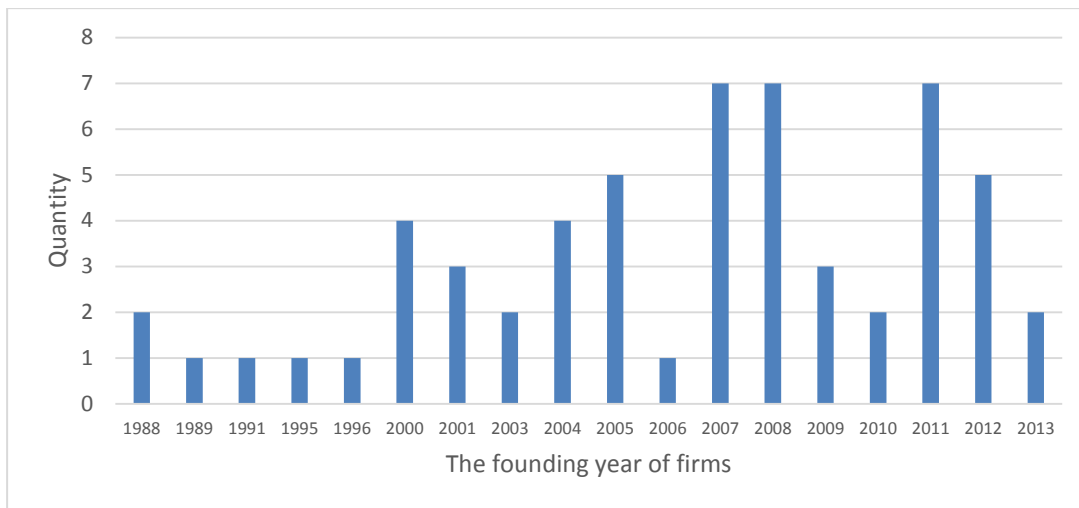


Figure 5. Founding year of the Deloitte’s 2017 & 2016 listed firms as a yearly cumulative sum. Source: Asiakastiето, 2019.

As it can be seen from figure 5 the oldest firms at the Deloitte’s 2017 & 2016 lists are more than 30 years old and the youngest firms are six-years-old. The oldest firms are already quite mature. The individual founding years vary from 1988 to 2013, in other words 25 years. The average age of Deloitte’s 2017 & 2016 lists firms is 13.5 years.

5.2.3 Revenues of firms

Figure 20 in appendix 2 shows the revenues of the Deloitte 2017 & 2016 lists firms. The latest published lost and profit statement for most of the firms is from year 2017. Few firms have their fiscal year another than calendar year and for those firms also 2018 revenue is shown if it was available. The firms are put in order, based on the 2017 revenue in figure 20 at appendix 2.

The variation of the firm’s revenue is relatively large. The revenue of 2017 varied from over 40 million euros (iLoq Oy) to 39 000 euros (City Digital Oy) (Asiakastiето, 2019).

5.2.4 Operating profits

Figure 21 in appendix 3 demonstrates operating profit or loss of Deloitte’s 2017 & 2016 firms which are ranked based on their 2017 operating profits. Large variation applies also the Deloitte’s lists firms’ operating profits. The highest operating profit in 2017 was over 14

million euros by Visma Solutions Oy and the highest operating loss was almost 4.6 million euros by Blueprint Genetics Oy.

5.2.5 Number of employees

Number of employees of Deloitte's 2017 & 2016 listed firms are shown in figure 22 in appendix 4. Firms are arranged according the number of employees in 2017 in figure 22. The employee data is somewhat scattered due the fact that it is not available part of the firms for all the covered years. Additionally, ten firms are missing from figure 22, since they did not have any employment data available at Asiakastieto (2019).

Nine firms have over 100 employees while the bulk of the firms employ from 55 to 20 people. Futurice Oy employed 293 employees in 2017, which was the highest number of employees on those firms that had the employment data available at Asiakastieto (2019). The ranking of the Deloitte Technology Fast 50 2017 list would have been different if the employment would have been used as a measure instead of revenue.

5.2.6 Development stage of the firms

The development stage of the studied firms is visualized in table 4. Hence the respondents were able to select multiple stages, there are some overlapping between different stages and the percentages on the graph are indicating percentage of each stage selected by respondents.

Table 4. Development stage of the firms.

Development stage	Count (N)	Percentage
R&D phase	0	0%
Business model development stage	2	4%
Early growth phase (investing in sales and/or user base growth)	3	5%
Scale-up phase (revenue and/or user base has continued to grow 2-5 years)	37	67%
Later phase growth (company is established at market)	22	40%
Company has been acquired (M&A)	4	7%
Company is publicly listed (IPO)	1	2%
Other	0	0%
Total	69	125%

Source: Survey data.

Scale-up phase either alone or together with other stage was selected 67% of the respondents. Solely a scale-up phase was chosen by 47% of respondents. The later phase of growth of the firm was indicated by 40% of the respondents.

5.2.7 Market areas of the firms

Market areas of the firms are shown in the figure 23 in appendix 5. Respondents were able to select multiple markets areas and therefore the percentage represent the share of each market areas selected by respondents in figure 23.

All the respondents selected either Finland (73%), Nordic countries (44%), global only (20%) or Europe (44%) as their market areas i.e. market area which included Finland. However, it is not possible to explicitly state that all firms had Finland as their market area due the overlapping geographical areas even though that is most likely the case. The number of respondents which selected Finland as their firm's only market area was 15%. In other words, 85% of the respondents worked on the firms that operated on the international market areas. Nordic countries and Europe both were chosen by 44% of the respondents as their firms' market area while North America was picked up by 20% of respondents. Only 4% of the respondents single out Asia as their firm's market area which is surprisingly low figure albeit Asia can be also covered if the global option was chosen. None of the respondents selected Africa as their firm's market area.

Most of contemporary firms' internationalization is no longer optional (Knight & Kim, 2009) as can be seen from figure 23 in appendix 5.

5.2.8 Firms' IPO plans

The questions regarding firms' IPO plans was following:

Does the firm have a clear goal in becoming eligible as a publicly listed company (IPO)?

The numeric scale was used as an input method. There were four responses with zero value and ten responses with empty value. When these zero and empty values are omitted from the results, the average value that respondents gave for their firm's IPO plans was 71.8%. If the

zero values are included to the result, then the average value is 65.4%. The fact that ‘I don’t know’ option was not available with the numeric scale could have contributed to the amount of empty and zero responses.

5.3 Resource allocation: Marketing & sales and R&D

5.3.1 Marketing & sales employees

Figure 6 illustrates the share of marketing & sales employees from firm’s all employees. The vertical axis shows the number of employees and the horizontal axis illustrates individual respondents.

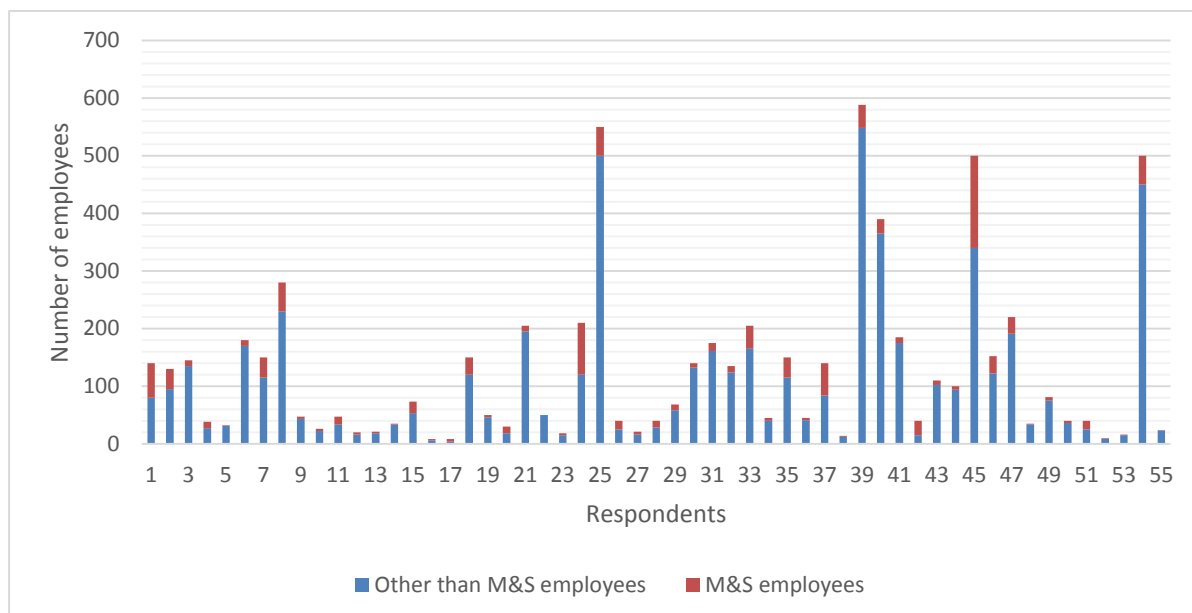


Figure 6. The share of marketing & sales employees from all firm’s employees. Source: The survey data.

Based on the survey data, the average amount of marketing & sales employees from all employees was 18%. The standard deviation was 14% and as it can be seen from the figure 6 there is wide variation between individual firms’ share of marketing & sales employees varying from 63% to 0% of all employees.

The end of 2018 employment data from the firms were not available at the time of the data analysis and therefore the crosschecking with the actual employment data was not possible. As stated earlier in the section 5.2.5 *Number of employees* in 2017 the highest number of employees were 293 people, but on the other hand ten firm’s employment data were missing

from that summary. Nevertheless, it could be that part, or all five outliers are exaggerated amount of the employees, but that was difficult to verify from other sources.

5.3.2 R&D versus marketing & sales expenses as budgeted

First the individual question data is visualized in figures 7 and 8, then the comparison is done between R&D versus marketing & sales expenses.

Survey question: What is the share of research and development (R&D) expenses in the company's latest budget? (The scale was from 0-100%)

The share of R&D expenses in the latest firm's budget as a histogram is shown on figure 7.

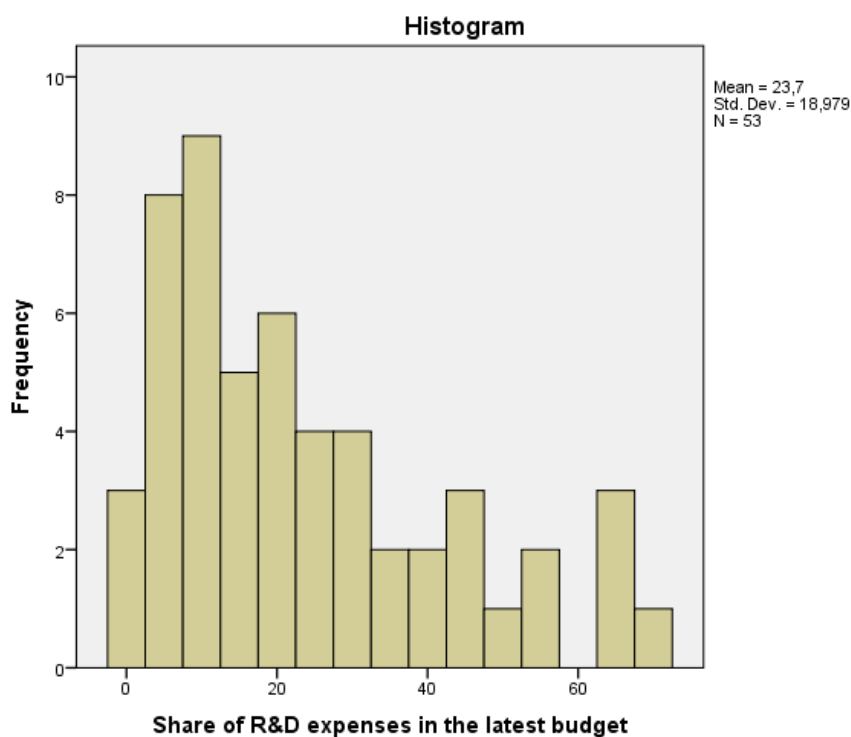


Figure 7. The histogram of the responses to the question what is the share of research and development (R&D) expenses in the company's latest budget. Source: Survey data.

The vertical axis in figure 7 shows the frequency, which is same as the count of responses and the horizontal axis represents the percentage share of R&D expenses in the latest budget as

provided by respondents. The mean value of all responses is 23.7% and the standard deviation (Stand. dev.) is 19.0%.

Survey question: What is the share of sales and marketing expenses in the company's latest budget? (The scale was from 0-100%)

Even though in the survey questions have been formulated as *sales and marketing* in this paper, the form *marketing & sales* (or abbreviation M&S) will be used instead, hence that seems to be more common in the literature.

The illustration of marketing & sales expenses in the latest firm's budget is shown on figure 8.

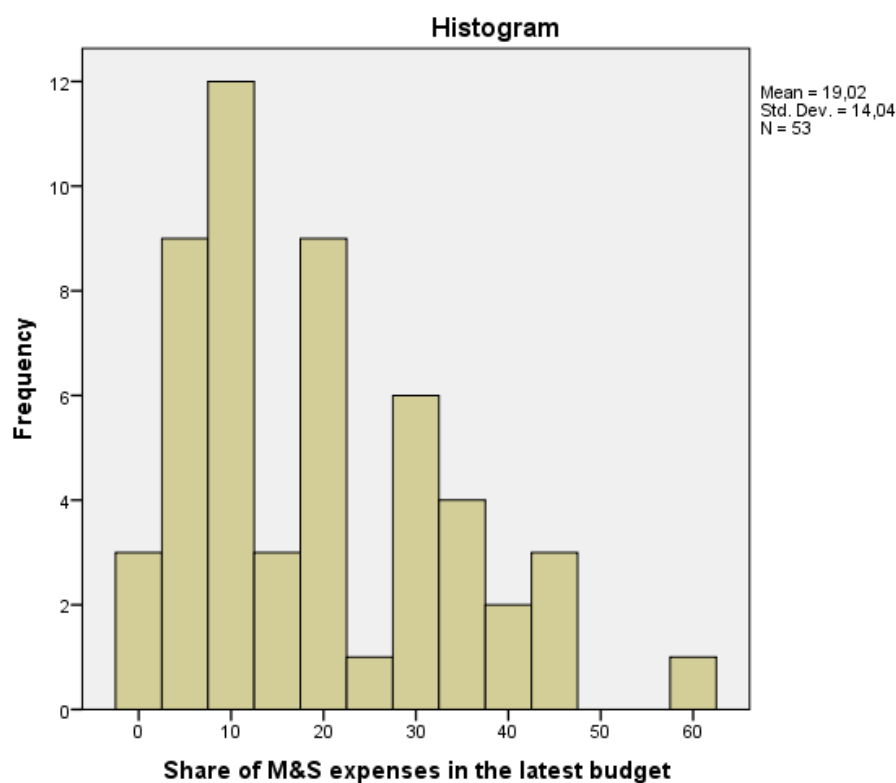


Figure 8. The histogram of the marketing & sales expenses share in the firms' latest budget. Source: Survey data.

The vertical axis in figure 8 shows the frequency, which is same as the count of responses and the horizontal axis represents the percentage share of marketing & sales expenses in the latest

budget as provided by respondents. The mean value of all responses is 19.0% and the standard deviation is 14.0%.

Comparison of R&D and marketing & sales expenses

Contrasting way to compare budgeted R&D expenses to budgeted marketing & sales expenses is to calculate their differential i.e. subtract marketing & sales expenses from R&D expenses. The word differential is used instead of difference to distinguish the variable. The resulting differential is shown on figure 9. The blue colour indicates that R&D expenses are higher by the negative percentage amount while the red colour illustrates that marketing and sales expenses are higher by the positive percentage amount. Four respondents were omitted from this analysis: one respondent had both values as zeros, one respondent had not answered either one of the questions, and two respondents did not answer both questions.

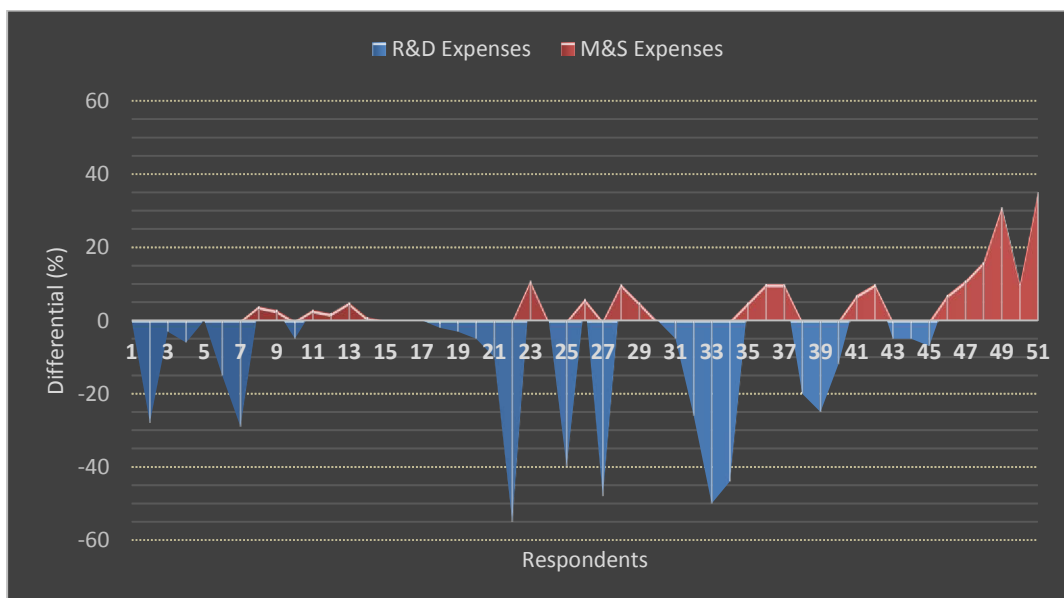


Figure 9. The differential of the M&S and the R&D expenses as budgeted. Source: Survey data.

The vertical axis in figure 9 shows the resulting differential and the horizontal axis illustrates individual respondents. R&D expenses are equal or higher than marketing & sales expenses in 58% of responses. As it can be seen from the graph in the figure 9 the difference between R&D and marketing & sales expenses is on some of the cases relatively large.

5.3.3 Respondents view of resource allocation at the scale-up phase

R&D resourcing at the scale-up phase

Survey question: What share of the company's resources should be directed to research and development (R&D) during the scale-up phase? (The scale was from 0-100%)

Based on the respondents' answers, the share of the firm's resources that should be allocated to the research and development during the scale-up phase is presented at the histogram in figure 10.

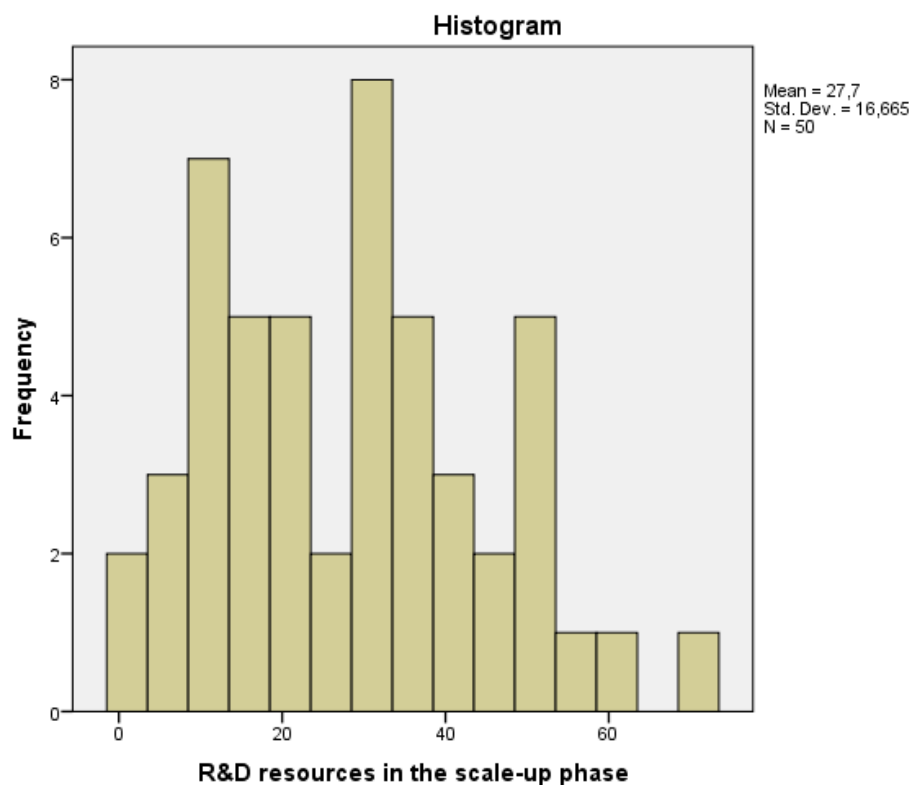


Figure 10. The share firm's resources that *should be* allocated to research and development (R&D) resourcing in scale-up phase based on respondents' view. Source: Survey data.

The vertical axis in figure 10 shows the frequency, which is same as the count of responses and the horizontal axis represents the percentage share of R&D resources in scale-up phase as indicated by respondents. The mean value of all responses to the R&D share in scale-up phase is 27.7% and the standard deviation is 16.7%.

Marketing & sales resourcing at the scale-up phase

Survey question: What share of the company's resources should be directed to sales and marketing during the scale-up phase? (The scale was from 0-100%)

The histogram in figure 11 shows respondents answer to the above question.

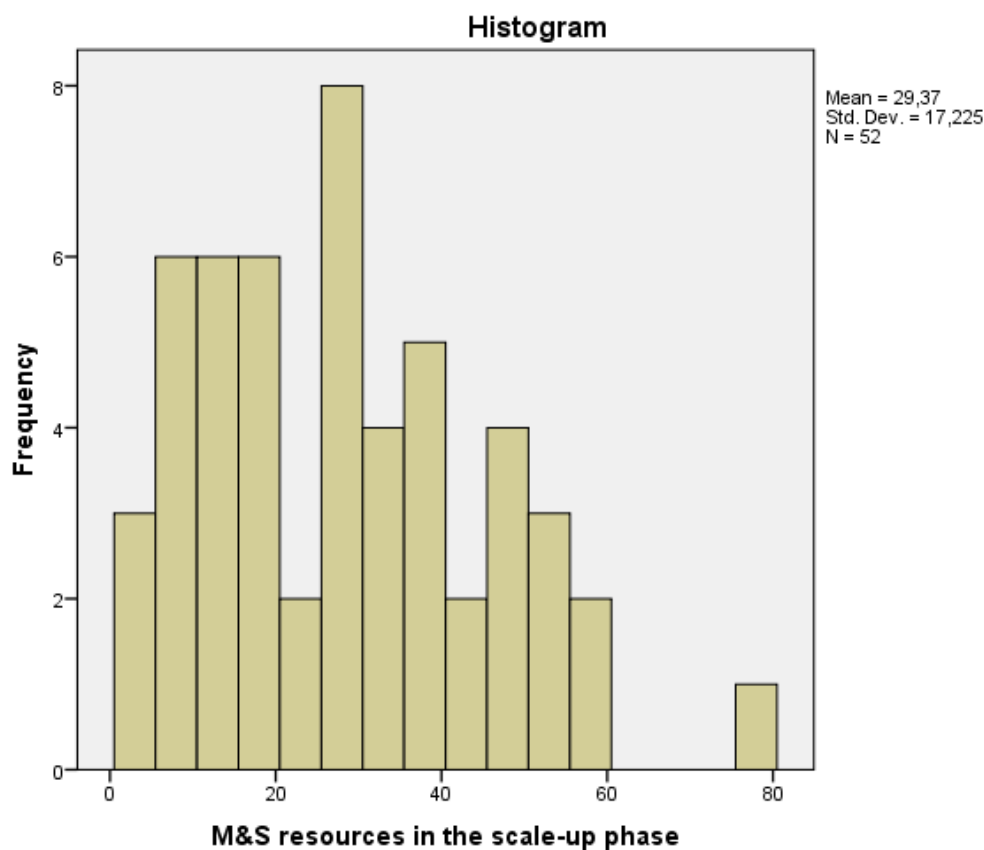


Figure 11. The share of firm's resources that *should be* allocated to marketing & sales (M&S) resourcing in scale-up phase based on respondents' view. Source: Survey data.

The vertical axis in figure 11 shows the frequency, which is same as the count of responses and the horizontal axis represents the percentage share of marketing & sales resources in scale-up phase as answered by respondents. The mean value of all responses to the marketing & sales share in scale-up phase is 29.4% and the standard deviation is 17.2%.

Marketing & sales resourcing in the scale-up phase in absolute terms

Survey question: How much would the previous question's marketing & sales resourcing percentage be when converted to millions of euros? The referred previous question was: What share of the company's resources should be directed to sales and marketing during the scale-up phase?

The marketing & sales resourcing percentage (figure 11) is converted to the absolute terms i.e. millions of euros by the respondents at the histogram in the figure 12.

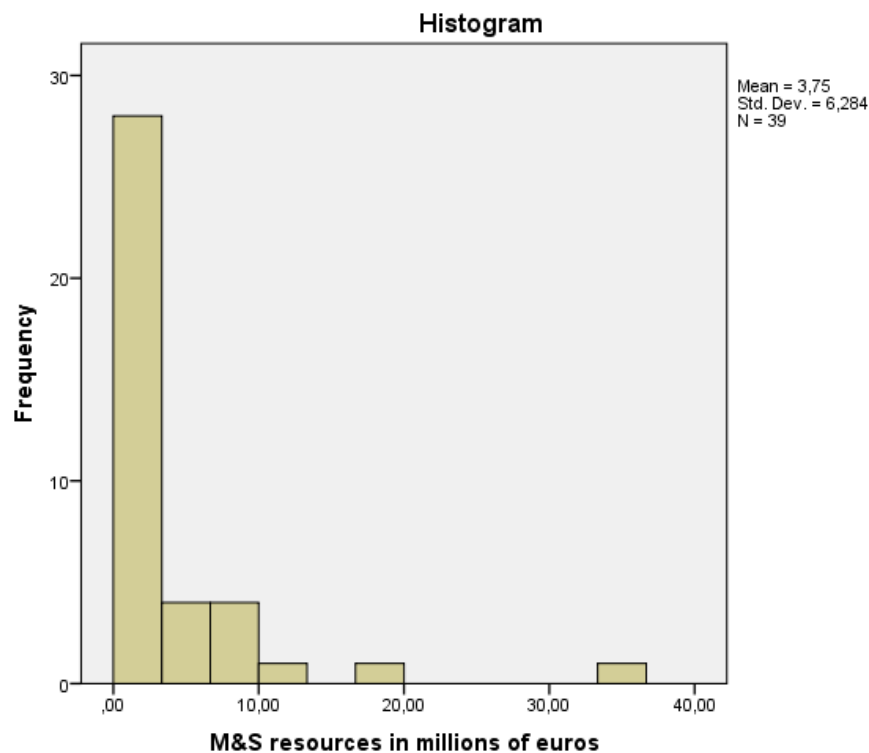


Figure 12. Respondents' view of required marketing & sales resourcing as millions of euros in scale-up phase. Source: Survey data.

The vertical axis in figure 12 shows the frequency, which is same as the count of responses and the horizontal axis represents marketing & sales resources in millions of euros during the scale-up phase as indicated by the respondents. Mean of the marketing & sales resourcing in scale-up phase is 3.75 million of euros and the standard deviation is 6.28 million of euros. There are two clear outliers on the figure 12 which are 35 and 19 million euros.

Survey question: How much would the sales and marketing resourcing percentage be when converted to the number of employees? The referred percentage was the answer to following

question: What share of the company's resources should be directed to sales and marketing during the scale-up phase?

Similarly, the marketing & sales resourcing percentage (figure 11) is converted to the absolute terms as a number of employees by the respondents at the histogram in the figure 13.

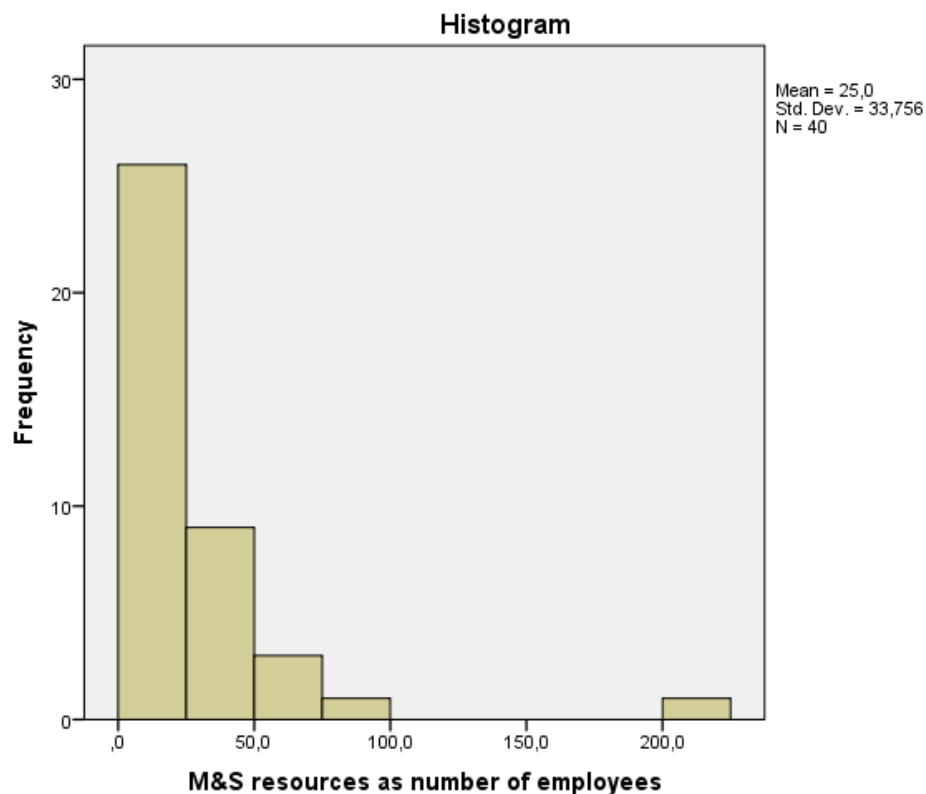


Figure 13. Respondents' view of required marketing & sales resourcing as number of employees in scale-up phase.
Source: Survey data.

The vertical axis in figure 13 shows the frequency, which is same as the count of responses and the horizontal axis represents marketing & sales percentage during the scale-up phase as number of employees. When the marketing & sales resourcing is converted to number of employees the mean value is 25 employees and the standard deviation is 33.8 employees. There is one clear outlier on the figure 13 which is 200 marketing & sales employees. The respondent who gave the outlier number to this question left also his contact information. Therefore, it was possible to compare the given number to the actual number of firm's employees in 2017 and there was no reason to remove the outlier as a completely unrealistic number.

5.3.4 Reference from US IPOs

Percentage comparison

Hence the firms' IPOs took place 2017, the focus is on the marketing & sales expenses on years 2016 and 2015. A year prior to the IPO, i.e. 2016, the average marketing & sales expenses per revenue of the US Tech IPO firms was 48% and for the year 2015 it was 58%. The combined average for years 2015 and 2016 was 53%.

Annual marketing & sales expenses per revenue of 2017 US Tech IPO firms is shown on the figure 14. The vertical axis in figure 14 shows the marketing & sales expenses/revenue and the horizontal axis represents 2017 US Tech IPO firms.

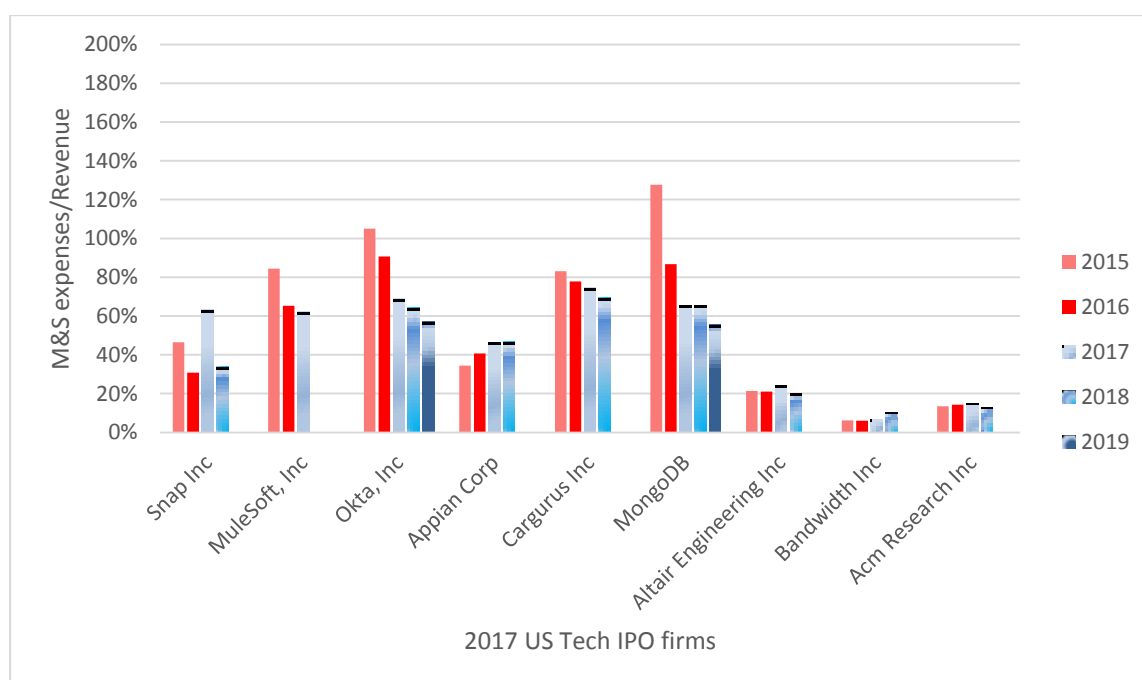


Figure 14. Annual marketing & sales expenses/revenue from 2017 US Tech IPO firms. Source: SEC (2019).

As the graph on figure 14 illustrates there is relatively large variation between different firms on their marketing & sales expenses per revenue percentages.

Finnish firms use typically layout of the profit and loss account by nature of expenses ('kululajipohjainen tuloslaskelma' in Finnish), which does not itemize marketing & sales

expenses separately. Based on the analysis of their profit and loss statements, Deloitte's lists firms follow the suit in this regard. Therefore, direct comparison of marketing & sales expenses between Deloitte's lists firms and US Tech IPO 2017 firms is somewhat problematic. The best available proxy in this case is to use budgeted marketing & sales expenses as reported by survey respondents, hence the actual expenses are not available. Similarly, the budgeted R&D expenses as reported by survey respondents were used as a proxy for R&D expenses.

Differential comparison

When 2017 US Tech IPO firms' marketing & sales expenses per revenue is subtracted from R&D expenses per revenue, it is resulting to a differential. Equation (1) visualizes the relationship between variables and the resulting differential is shown in figure 15.

$$\left(\frac{M\&S\ expenses}{Revenue}\right) - \left(\frac{R\&D\ expenses}{Revenue}\right) = Differential \quad (1)$$

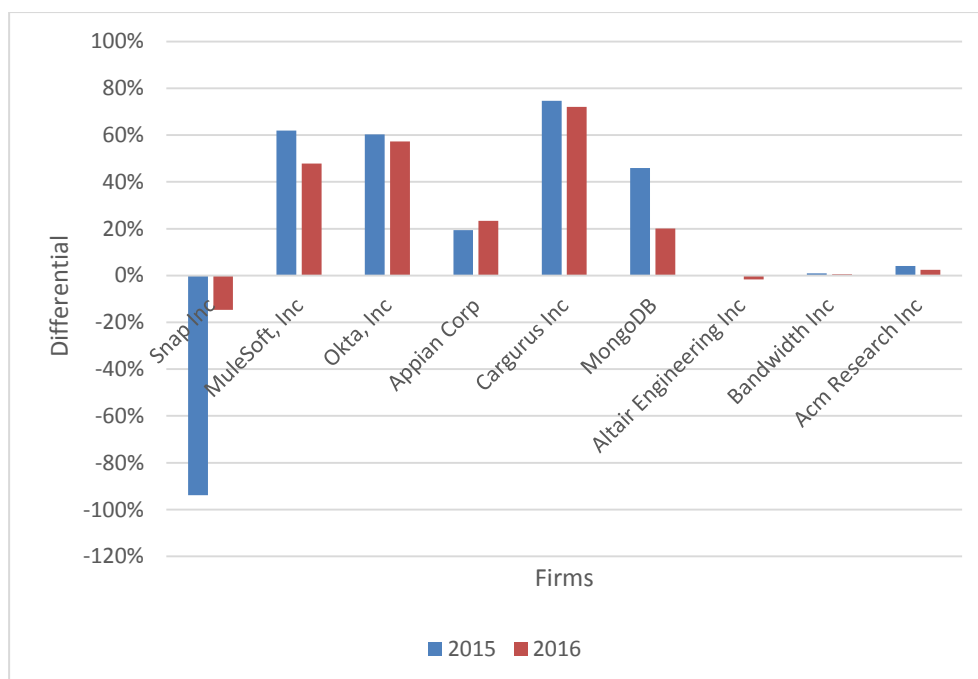


Figure 15. 2017 US Tech IPO firms' M&S expenses/revenue subtracted from R&D expenses/revenue. Source: SEC (2019).

The positive percentage in figure 15 indicates that marketing and sales expenses are higher by the shown amount while by the negative percentage points out that R&D expenses are higher by the shown amount. 2017 US Tech IPO firms' marketing & sales expenses/revenue was in average 19% higher in year 2015 than R&D expenses/revenue (33% if Snap Inc is excluded). In year 2016, their marketing & sales expenses/revenue was in average 23% higher than R&D expenses/revenue (28% if Snap Inc is excluded). The combined average for years 2015 and 2016 was 21%.

Relative comparison

A third alternative method to compare US Tech IPO firms and Finnish high-growth firms resource allocations is to calculate M&S/R&D expense ratio as shown in the equation (2).

$$\frac{\frac{M\&S\ expenses}{Revenue}}{\frac{R\&D\ expenses}{Revenue}} = \frac{M\&S\ expenses}{R\&D\ expenses} \quad (2)$$

2017 US Tech IPO firms' average ratio for the years 2015 and 2016 is 2.85. The interpretation of that ration is that 2017 US Tech IPO firms marketing & sales expenses are in average over two years period 2.85 times higher than R&D expenses.

Absolute revenue values

To demonstrate the scale difference of high-growth between 2017 US Tech IPO firms and Deloitte's Technology Fast 50 Finland 2017 list firms, four firms' revenues are shown in table 5.

Table 5. Examples of US and Finnish high-growth firms' revenues in absolute values.

Firm	Revenue 2015	Revenue 2016	Revenue 2017
Snap Inc	58 663 000 \$	404 482 000 \$	824 949 000 \$
Mulesoft Inc	110 252 000 \$	187 747 000 \$	296 456 000 \$
iLoq Oy	23 063 600 €	33 741 000 €	40 345 400 €
LeadDesk Oyj	4 206 000 €	4 593 000 €	5 527 000 €

Source: SEC (2019) and Asiakastieto (2019).

Snap Inc is an example of a category winner while Mulesoft Inc represents a typical 2017 US Tech IPO firm. iLoq Oy had the highest revenue in 2017 from all Technology Fast 50 Finland 2017 and 2016 lists firms. LeadDesk Oyj did initial public offering (IPO) at the First North in early 2019.

The revenue difference is large between US and Finnish high-growth firms. Albeit it is the growth rate comparison, which reveals how aggressively US Tech IPO firms strive for growth. LeadDesk Oyj average growth rate was 15% over three years period while iLoq Oy's average growth rate was 33% respectively. Mulesoft Inc's average growth was 64% over three years period and Snap Inc's average growth was 347% respectively.

5.4 Resources: Financial

5.4.1 Financing sources

Different sources of financing are shown on table 9 in chapter 6 where the research questions are answered. Most of the studied firms had multiple sources of financing which is also visible at table 9. The large majority of the firms (84%) financed their operations with sales income and a portion of firms solely with it. Founders (49%) was the second biggest source of financing. Venture capital (47%) and banks (45%) are almost as salient source for financing as founders covering almost half of the firms as indicated by the respondents.

5.4.2 Venture capital and business angels

The total size of investment from business angels and/or venture capital funds to the firms that received funding from those sources is shown on figure 16 in increasing order. The mean value of venture capital and business angels' investments is 4.3 million euros and the standard deviation is 7.5 million euros. In other words, the variation of size of the venture capital and business angels financing is relatively large.

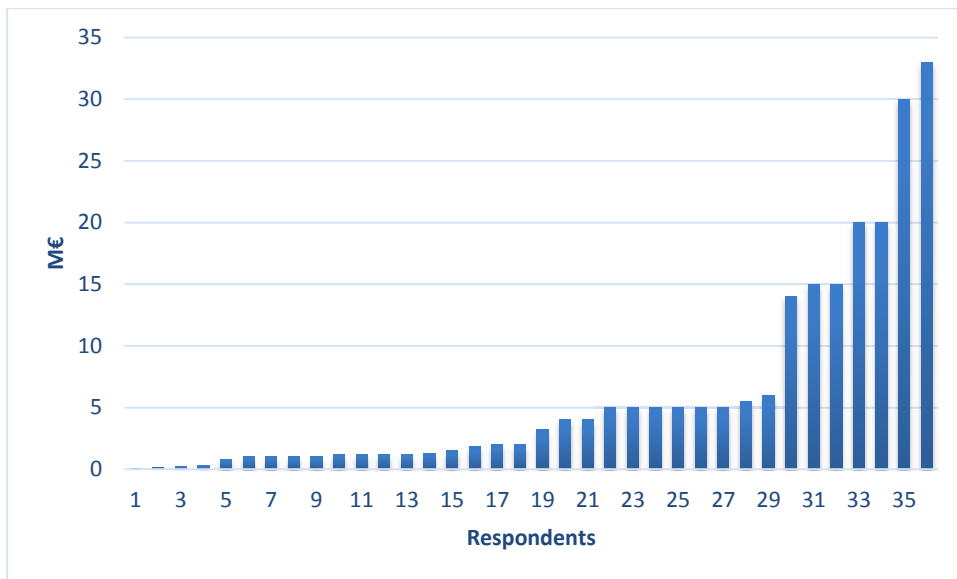


Figure 16. Total size of investments from business angels and/or venture capital funds to the firms. Source: Survey data.

When the contact search was done to the Deloitte's lists firms, it revealed that Gompers & Lerner (2001a, p. 58) and Tyebjee & Bruno (1984) argued that venture capitalists have active roles either as board members or as a chairman of the board on the investees' firms.

These financial results close the data analysis and the next chapter covers the research results by answering the research questions.

6 RESULTS

The focus of this chapter is to explain the empirical results thoroughly by answering the research questions.

Small and young firms have only limited resources available therefore it is crucial that how those limited resources are allocated (Baker & Nelson, 2015).

Next the research questions are investigated in the light of this research findings.

6.1 How are resources allocated between R&D and M&S?

How resources are allocated between R&D and M&S in high-growth firms currently?

The differential, which is calculated by subtracting R&D expenses from marketing & sales expenses, is shown on figure 17. Positive numbers (red colour) are indicating that marketing & sales expenses are corresponding amounts higher than R&D expenses, while the negative number (blue colour) is indicating that R&D expenses are corresponding amounts higher than marketing & sales expenses. These expenses are based on the firms' latest budget as reported by respondents, so they are reflecting the current situation on the firms' resource allocation. The yellow line indicates the split between respondents, that indicated that their firm is currently at the scale-up phase and those respondents which specified that their firm is not at the scale-up phase. The vertical axis in figure 17 shows the resulting differential and the horizontal axis illustrates individual respondents.

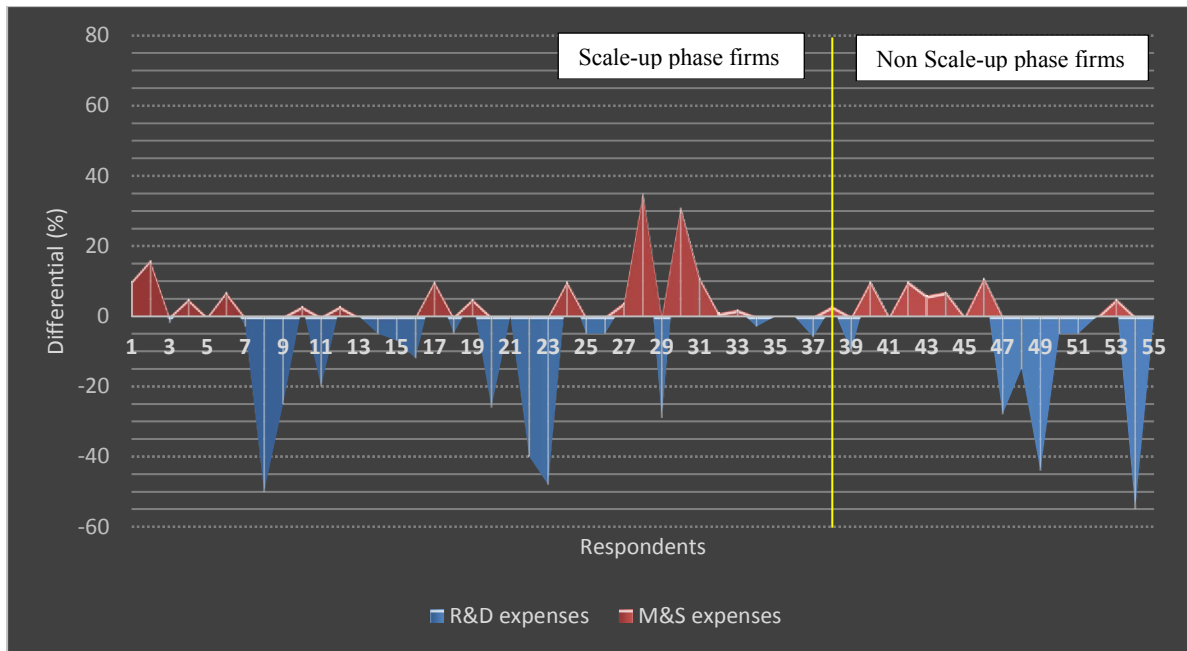


Figure 17. The differential of the M&S and the R&D expenses in the firms' latest budget. Source: Survey data.

As it can be seen visually from the figure 17, R&D expenses are relatively higher than marketing & sales expenses in the firms' latest budget. Albeit there is a lot variation between firms. Part of the firms are strongly focusing their resources to the R&D while others have shifted the resource focus on the marketing & sales side. The average values and standard deviations of the latest budgeted numbers and *should be* values as indicated by respondents in scale-up phase are compared at table 6.

6.2 *The management view how resources should be allocated between R&D and M&S in scale-up phase*

What is the high-growth firms' management view how resources should be allocated between R&D and M&S in high-growth firms during the scale-up phase?

As a reference, similar type of differential than in figure 17 is shown on figure 18 to illustrate how the respondents answered to the questions what share of the company's resources *should be* directed to research and development and respectively to the marketing & sales during the scale-up phase. The vertical axis in figure 18 shows the resulting differential and the horizontal axis illustrates individual respondents.

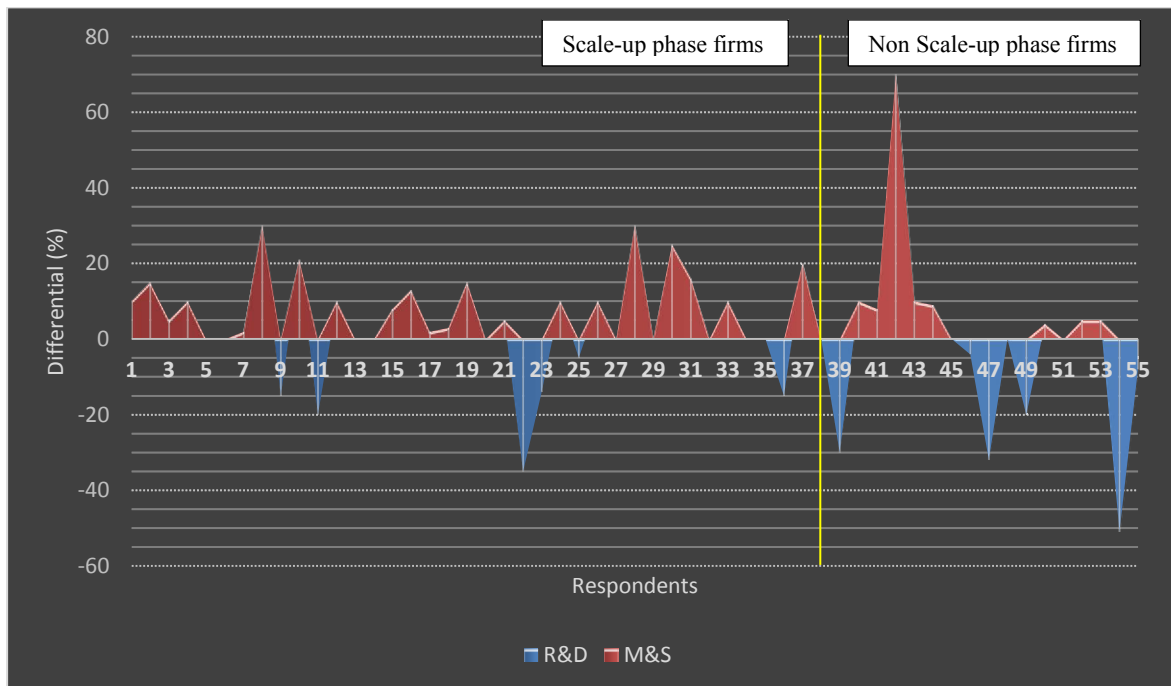


Figure 18. The differential of how much resources should be allocated to the M&S and the R&D during the scale-up phase. Source: Survey data.

First notification is that most of respondents increased the share of marketing & sales compared to R&D's share especially on those firms which are currently in scale-up phase. The numerical values are compared in table 6.

Table 6. Resource allocation – All respondents.

	R&D Mean (Stand. dev.)	Marketing & Sales Mean (Stand. dev.)
Expenses as in the latest budget	23.7% (19.0%)	19.0% (14.0%)
<i>Should be</i> share in scale-up phase	27.7% (16.7%)	29.4% (17.2%)
Relative increase of the share	16.9%	54.7%

Source: Survey data.

The mean, i.e. average, value of the marketing & sales share increased by 54.7% from the latest budgeted share to *should be* value as shown at the table 6, which is a significant increase. The R&D share mean value increased as well by 16.9% between the latest budgeted and *should be* value. It is noteworthy that standard deviation of these results varied from 19.0% to 14.0% i.e. there was quite a bit variation with the responses.

Table 7. Resource allocation – Scale-up phase firms only.

	R&D Mean (Stand. dev.)	Marketing & Sales Mean (Stand. dev.)
Expenses as in the latest budget	26.3% (18.9%)	21.8% (15.0%)
<i>Should be</i> share in scale-up phase	28.4% (14.7%)	31.5% (15.5%)
Relative increase of the share	8.0%	44.5%

Source: Survey data.

Only when the respondents indicated that their firm were considered at scale-up phase, then the mean value of marketing & sales share increased by 44.5% from the latest budgeted share to *should be* value as shown at the table 7. R&D's share increased by 8.0% between the latest budgeted and *should be* cases. The marketing & sales resourcing share increase by 44.5% is a significant increase.

6.3 US reference level for resource allocation between R&D and M&S

What is US reference level for resource allocation between R&D and M&S in scale-up phase firms?

Percentage comparison

Keeping in mind that the survey respondents answer to the question if the company have a clear goal in becoming eligible as a publicly listed company was in average 71.8% (zero responses excluded) and 65.4% (zero responses included). The investment level to the marketing & sales resources in the US references were in average 54% of their revenue for the last two years prior to IPO year. The Finnish high-growth firms' budgeted resourcing in the marketing & sales is in average 19.0% for all respondents and in average 21.8% for those respondents which reported their firm to be at the scale-up phase.

Differential comparison

When the average differentials (see equation (1) in section 5.3.4 for 2017 US Tech IPO firms differential calculation) are compared between 2017 US Tech IPO firms and studied Deloitte's lists firms, the results are following: 2017 US Tech IPO firms' marketing & sales expenses were in average 21% higher than R&D expenses (years 2015 and 2016). Deloitte's lists firms' R&D expenses were in average 4.5% higher than marketing & sales expenses (budgeted – all firms) and respectively 3.7% higher for those respondents who indicated their firms to be at the scale-up phase. When Deloitte's lists firms' respondents reported how resourcing should be during scale-up phase, the result was that marketing & sales resourcing were in average 2.6% higher than R&D resourcing for all firms and respectively 4.5% higher for those firms that indicated to be at the scale-up phase. The difference between US reference (21%) and Finnish high-growth firms' (– 3.7% as budgeted and 4.5% 'should be' in scale-up phase value) resourcing to the marketing & sales during the scale-up phase is significant.

Relative comparison

2017 US Tech IPO firms' ratio was 2.85 i.e. marketing & sales expenses were in average over two years period *2.85 times higher* than R&D expenses. Deloitte's list firms average M&S/R&D ratio for budgeted expenses for all respondents was 1.12 (1.07 for scale-up phase firms), i.e. marketing & sales expenses were *1.12 times higher* than R&D expenses. Deloitte's lists firms average M&S/R&D ratio when respondents reported how resourcing should be during scale-up phase was 1.5 for all respondents and 1.36 for those respondents who indicated their firms to be at the scale-up phase.

In summary, the impression that most of management and board members in the Finnish high-growth firms seem to have regarding required resourcing in the marketing & sales in the scale-up phase is inadequate, if it is compared to the US references.

6.4 Board members and operative management views

Do the high-growth firms board members and operative management share similar views regarding needed investment level to the marketing & sales activities in general and especially during the scale-up phase?

The share of respondents that were board members was 35% and rest of the respondents were on the operative management role. The differential i.e. share of the firms' resources that should be directed to marketing & sales subtracted from resources that should be directed to R&D during the scale-up phase as indicated by respondents is shown in figure 19. The vertical axis in figure 19 shows the resulting differential and the horizontal axis illustrates respondents. It is noteworthy that these results (blue and red line) are between different respondents, who are typically representing different firms e.g. number one respondents have blue and red dot, which are representing two different respondents and most likely from two different firms.

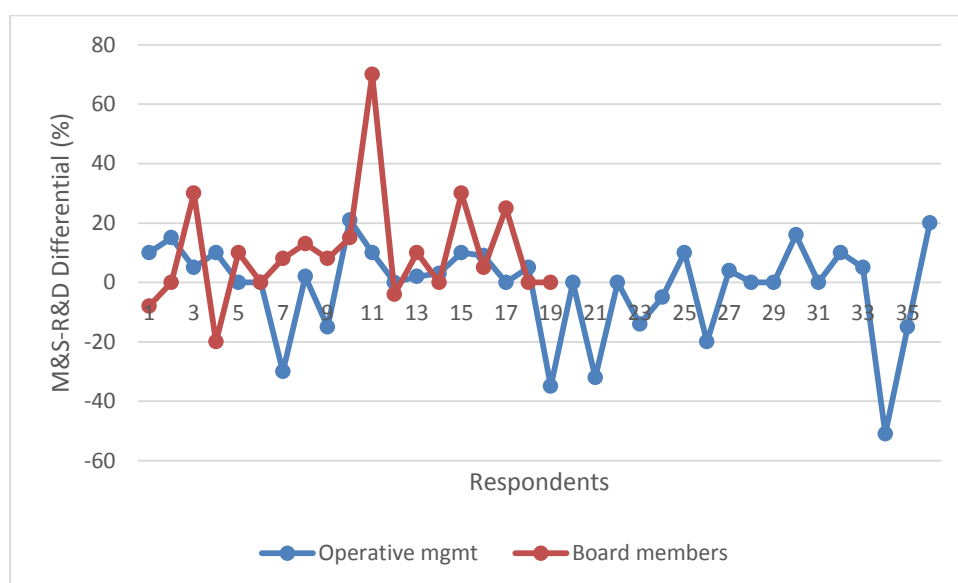


Figure 19. Comparison of operative management and board members view of firm's resource allocation in the scale-up phase. Source: Survey data.

As both figure 19 and table 8 confirm in average the board members would invest more to the marketing & sales during the scale-up phase than the operative management.

Table 8. Comparison of operative management and board members view of resource allocation.

	R&D Mean (Stand. dev.)	Marketing & Sales Mean (Stand. dev.)
Board members	24.8% (12.3%)	32.7% (20.0%)
Operative management	29.1% (18.4%)	27.6% (15.6%)
Differential	-4.3%	+5.1%

Source: Survey data.

Board members would invest marketing & sales in average 5.1% more than operative management and respectively 4.3% less to the R&D than operative management as shown in table 8. The operative management seem to value investment to R&D resourcing on average more than investment to the marketing & sales.

In the process of firm's expansion, the experience of firm's management team plays a crucial role according to Penrose (1959, p. 48). As Gabrielsson et al. (2004) pointed out business angels and VC investors with their industry-specific experience can contribute strengthening of management resources of a high-growth firm and that way improve the quality of the high-growth firm's decision making.

6.5 The role of venture capital within high-growth firms

What is the role of venture capital in Finnish high-growth firms' financing?

The research question is answered by answering the sub-question.

How Finnish high-growth firms are financed?

Table 9 shows how the Finnish high-growth firms are financed based on the survey data. Most of the firms had multiple sources of finance.

Table 9. Financial resources:

Source of finance	All studied firms	Scale-up phase firms only
Sales income	84%	81%
Founders	49%	54%
Venture capital	47%	54%
Banks	45%	46%
Public funding	35%	43%
Business angels	13%	19%
Crowdfunding	9%	11%
Other income	4%	0%

Source: Survey data.

Sales income is the most common source of financing followed by founders, venture capital and banks. In other words, venture capital is the most common firm's "outside" source of funding for the high-growth firms. Firms, which are able to raise venture capital finance, are also more likely to attract alternative finance providers (Stuart et al., 1999) i.e. if a third party has done the due diligence and a firm has passed the test, then a threshold for the others to join seem to be lower. 58 % of the studied firms which had venture capital financing indicated that also banks financed them.

For the scale-up phase firms, venture capital, public funding and business angels are somewhat more common source of finance than for the all of the studied firms.

As Gompers & Lerner (2001a, p. 58) and Tyebjee, & Bruno (1984) argued venture capitalists are having active role as board member(s) on these firms which they have invested.

6.6 Industries

High-growth firms can be found in many kinds of businesses as Deloitte's lists firms demonstrate. In this research studied high-growth firms operates mainly with immaterial products, e.g. software, and services or consulting. The industrial shift compared to the earlier research of high-growth firms (Davidsson & Delmar, 1997) which was done on 1995-96 is quite significant. Davidsson & Delmar (1997) studied firms' industries were manufacturing (25%) and services (75%), while in this research, the largest branch of businesses were immaterial products (51.9%) and services or consulting (40.7%). From the all respondents, 7.4% were working for three firms which were producing physical products as their business. Whether those firms are also manufacturing their products by themselves remained unclear, hence it was not asked on the survey. As a summary, the amount of manufacturing firms has clearly decreased and firms' focusing to the immaterial products like software has significantly increased compared to earlier study. Services as a branch of business has decreased when this research is compared to Davidsson & Delmar (1997) research, but how much has it decreased stayed unclear hence services and consulting was combined as a one branch of business in this research. One observation of Deloitte's lists firms is that none of these high-growth Finnish firms have products or services which would be targeted to the consumer markets. One plausible explanation is that the market dynamics are quite different

with consumer markets compared to business to business markets and achieving high-growth over a longer period of time is challenging.

This ends the results section and the last chapter is devoted to discussion and conclusion part.

7 DISCUSSION AND CONCLUSIONS

This final chapter summarizes different part of the thesis. Main findings are considered and reflected against the theoretical framework. Contribution of the research is concluded as well as research's limitations and validity. Final section is devoted for suggestions of future research.

7.1 *Resource allocation in high-growth firms*

The amount of studies concentrating to the firm's resource allocation seems to be scarce and resource allocation studies of high-growth firms are even more scarce based on the literature search. The latest researches about firms' competitive advantage Haapanen et al. (2018) and capability portfolios Haapanen et al. (2016) are contributing to the firm's resource allocation research. From a theoretical aspect, prior scattered results of resource allocation between firm's functions are collected together and analysed by Haapanen (2017, p. 71).

A factor that could contribute in short supply of studies concentrating on high-growth firms' resource allocation in Finland is the fact that firms' marketing & sales investment data is unobtainable from public sources. The factor how easily data is available impacted the growth measure selection to be related to revenue or number of employees (Delmar, 1997).

7.2 *Summary of key results*

The purpose of this research is (i) to shed light on how resources are allocated within Finnish high-growth firms, (ii) to point out if any adjustment of resource allocation is required at the scale-up phase based on the survey results, (ii) to compare Finnish high-growth firms' resource allocation to the US high-growth firms' reference level, (iv) to analyse if firms' board members and operative management views diverge on resource adjustment needs at the scale-up phase and finally (v) to clarify the role of venture capital in high-growth firms' financing.

Budgeted resources versus respondents view of should be allocation

The current resource allocation is such that in average R&D resourcing (23.7%) is somewhat higher than in average the marketing & sales (19.0%) resourcing in the Finnish high-growth firms based on the latest budget as pointed out by respondents. The respondents indicated also that for the scale-up phase firms, the marketing & sales resource allocation should be clearly higher (29.4%) and that R&D resourcing share should be increased (27.7%) as well.

Most of the studied firms (67%) were currently at the scale-up phase according the respondents. When scale-up phase firm's budgeted resource allocation was compared to respondents view of what the allocation should be when firms are on the scale-up phase, in average marketing & sales share increases clearly (44.5%) while in average R&D share increases only slightly (8.0%). There was quite a bit variation within the above results i.e. relatively large standard deviation. In other words, from most of the respondents suggested their firm's current resource allocation balance between R&D and marketing & sales to be incorrect. Additionally, when the share of both marketing & sales and R&D on firm's resources increases, the share of something else would need to decrease unless a firm is getting additional resources outside.

The probable explanation for these findings is that small firms are not able to invest concurrently to R&D and marketing & sales with their limited financial resources and they need make trade-offs between those functions as pointed out by Haapanen et al. (2016) and Chen & Hsu (2010) on their studies. Alternatively, as Helfat et al. (2009, p. 4) defined dynamic capabilities as the capacity of organization to intentionally modify or extend its' resource base, it might be that the high-growth firms lack required dynamic capabilities to react on changing circumstances during scale-up phase. Hence the dynamic capabilities approach emphasized the key role of the management to reconfigure and adapt organizational resources and functional competences within changing circumstances (Teece & Pisano, 1994, p. 1, Cavusgil et al., 2007), the responsibility to react lies with the management.

On the other hand, these results could be interpreted from the organizational ambidexterity point of view (March, 1991, Volery et al, 2013, Lavie et al., 2010). The emphasis on these high-growth firms is still on the exploration type activities (R&D) when it should change towards exploitation activities (M&S).

Furthermore, hence large majority of the firms participating to this research (85%) are already internationalized they would likely benefit by changing their focus on resource allocation from R&D to marketing (Chen & Hsu, 2010). Small and young firms have typically limited resources and therefore it is saliently important that those resources have been allocated optimally (Baker & Nelson, 2005).

US reference level of marketing & sales resourcing in high-growth firms?

The investment level to the marketing & sales resources in the US reference firms were in average 54% of their revenue for the last two years prior to IPO year. The Finnish high-growth firms' operative management and board members' opinion were that the desired share of firms' resourcing in marketing & sales in the scale-up phase is in average 31.5% of firm's resources, for those respondents that reported their firm to be at the scale-up phase (29.4% for all respondents).

The differential (R&D expenses subtracted from marketing & sales expenses) difference between US reference (21%) and Finnish high-growth firms' (-3.7%) resourcing to the marketing & sales during the scale-up phase is significant.

The relative comparison indicated that 2017 US Tech IPO firms' ratio was 2.85 i.e. marketing & sales expenses were in average over two years period *2.85 times higher* than R&D expenses. Deloitte's list firms average M&S/R&D ratio for budgeted expenses for all respondents was 1.12 i.e. marketing & sales expenses were *1.12 times higher* than R&D expenses.

In sum, all these three comparison measures demonstrate that US reference firms have invested significantly more to the marketing & sales relative to R&D investment than Finnish high-growth firms. The impression that most of management and board members in the Finnish high-growth firms seem to have regarding required resourcing in the marketing & sales in the scale-up phase is inadequate if it is compared to the US reference firms.

Based on the survey results it seems, that hence SMEs' marketing & sales expenses are not transparent in Finland and the high-growth firms' resource allocation in scale-up phase is a

scarcely studied topic, the high-growth firms' management are not necessarily aware of the benchmarking results with the US high-growth firms.

Views of board members and operative management regarding resource allocation

In average, the board members would invest more to the marketing & sales during the scale-up phase than the operative management. The operative management seem to value investment to R&D resourcing on average more than investment to the marketing & sales.

Apparently, there is tension between exploration (R&D) and exploitation (M&S) type of organizational activities (Volery et al. 2013, Lavie et al., 2010). The senior management, i.e. the board members, puts more emphasis on activities relating to existing products/services, while operative management sees future related activities more important.

What is the role of venture capital in Finnish high-growth firms' financing?

Venture capital funds are the largest external financier of the studied Finnish high-growth firms. The average size of venture capital and/or business angel investment was 4.3 million euros to the studied firms. Firm's internal financing sources, i.e. sales income and founders, are the largest sources of finance. Banks are the second largest external financier after venture capital funds.

7.3 Contribution of the research

From the theoretical framework point of view small firm's growth literature is widely analysed, and conclusion summarized from it. A firm's resource allocation is not widely researched topic among the scholars based on the literature review. High-growth firms' resource allocation research is even more rare. Therefore, this research contributes on the scarcely populated field of high-growth firms' resource allocation studies.

The key findings from the empirical analysis contribute to existing knowledge in many ways. Firstly, for the firms, which are currently in the scale-up phase, there is clear contradictions between budgeted resource allocation and what the allocation *should be* based on the survey respondents' opinion. The emphasis of resource allocation is still within R&D while it would

need to be focused more to the marketing & sales based on the results. In other words, most of the survey respondents identified the need to increase the share of marketing & sales resources from the current level. Albeit the reason for the contradiction remained unclear.

Secondly, the assumption or expectation that most of management and board members in the Finnish high-growth firms seem to have regarding required resourcing in the marketing and sales in the scale-up phase is inadequate, when it is compared to the US references when the firms are planning IPO.

Thirdly, the board members would invest more to the marketing and sales during the scale-up phase than the operative management. The operative management would in average keep the R&D resourcing higher than marketing & sales in scale-up phase.

Fourthly, venture capital and banks are in average almost as important source for high-growth firms' financing as founders are. Almost half of all respondents indicated that their firms' source of financing is via venture capital funds.

The contributions of the study can be used to guide high-growth firms' managerial attention toward importance of resource allocation decisions especially when the firm is on the scale-up phase. Moreover, policymakers and public actors can use the contributions when they are assessing firms receiving public funding to evaluate if there is adequate balance between R&D and marketing & sales investments.

7.4 Limitations of the research and assessment of validity

Like all other researches, this research also has its' limitations. The first limitation is the generalizability of the research results due the fact the research data were gathered from Finnish high-growth firms. To have a reference for the Finnish high-growth company results, it would be beneficial to conduct the survey in other countries within Europe e.g. Sweden, Germany and with benchmark countries like Israel and US.

Firms on the Deloitte's lists are ranked based on their revenue development. As described on section 2.1 Measuring growth, using a single growth measure is also problematic from the generalizability point of view. Delmar and Davidsson (1998) argued that it does not seem to be enough to use a single measure of growth, hence researches using a single measure would

explore one specific kind of growth and the result would not be necessarily generalizable to other forms of growth.

7.4.1 Validity of research

To be valid the design or measure needs to be relevant for the question being enquired into and suitable for reaching accurate conclusion (Vogt, 2007, p. 118)

Direct comparison of marketing & sales expenses between Deloitte's lists firms and US Tech IPO 2017 firms was not possible hence Finnish firms not provide itemized marketing & sales expenses on their financial statements. The best available proxy in this case was to use budgeted marketing & sales expenses as reported by survey respondents hence the actual expenses were not available. Similarly, the budgeted R&D expenses as reported by survey respondents were used as a proxy for R&D expenses. A method to overcome the lack of one-to-one measure and to improve validity of the result was to use three different type of measures: percentage, differential and relative measure. The final comparison between Deloitte's lists firms and US Tech IPO 2017 firms was done by using all of three measures.

When the time used to fill in the survey is relatively short, the detailed facts are not necessarily checked elsewhere. If survey questions require detailed and specific numeric responses, the rush to fill in the survey could become a problem.

To verify validity of the survey data, comparison was run between those respondents' answers that left their contact information and related company information collected from other sources. The result was a surprise. It seemed particularly difficult for respondents to get exact numeric facts reported correctly to the survey. The founding year of the company was remembered correctly by 55% of respondents that left their contact information, albeit mostly the founding year was incorrect by ± 1 year. The correct revenue bracket for the company was selected by 60% of respondents that left their contact information. It appears that factual numeric data, like previous year revenue from survey, can be used to screen that the respondent is answering behalf of a correct company, but results need to be compared to other sources in order to verify their validity.

The purpose of this kind of triangulation of data from multiple sources is to increase the validity of the research. From the reliability point of view, the methodological choices and research process has been described in detail in the chapter of research methodology.

7.5 *Future research*

The primary data of this research is from the web-based survey and even though secondary data sources were used for comparison and to validate the research, it would help to validate results further by conducting in-depth interviews with the selected sample participants whom have left their contact information.

To have a reference for the Finnish high-growth company results, it would be beneficial to conduct the survey in other countries within Europe e.g. Sweden, Denmark, Germany and with benchmark countries like Israel and US.

As the results of this research indicated, there are contradicting views between board members and operative management on how resource allocation should be done in scale-up phase firms. It would be interesting to further investigate if these contradicting views exist in wider context, and with foreign high-growth firms as well. Also, the contradicting views impact to the decision making within a firm would be an interesting topic for further study.

This research shed light on how Finnish high-growth firms are financed, but it only scratched the surface and therefore it would be interesting to conduct an in-dept study on the role and origin of the venture capital finance within Finnish high-growth firms.

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APPENDIX 1: OPERATIONAL MANAGEMENT POSITIONS OF SURVEY SAMPLE

To be included into the sample, individuals from the operational management were at the following positions: Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Technical Officer (CTO), Head of Development, Chief Marketing Officer (CMO), Vice President of Marketing or Global Marketing, Marketing Director, Vice President of Sales, Head of Sales, Chief Sales Officer or Manager, Sales Director, Chief Operation Officer (COO), Head of Operation, Marketing & Communication Manager, Head of Engineering, R&D Team Manager, Business Development Director, Vice President of Strategy and Corporate Development, Head of Outsourcing, Chief Business Controller.

APPENDIX 2: REVENUES OF THE STUDIED FIRMS

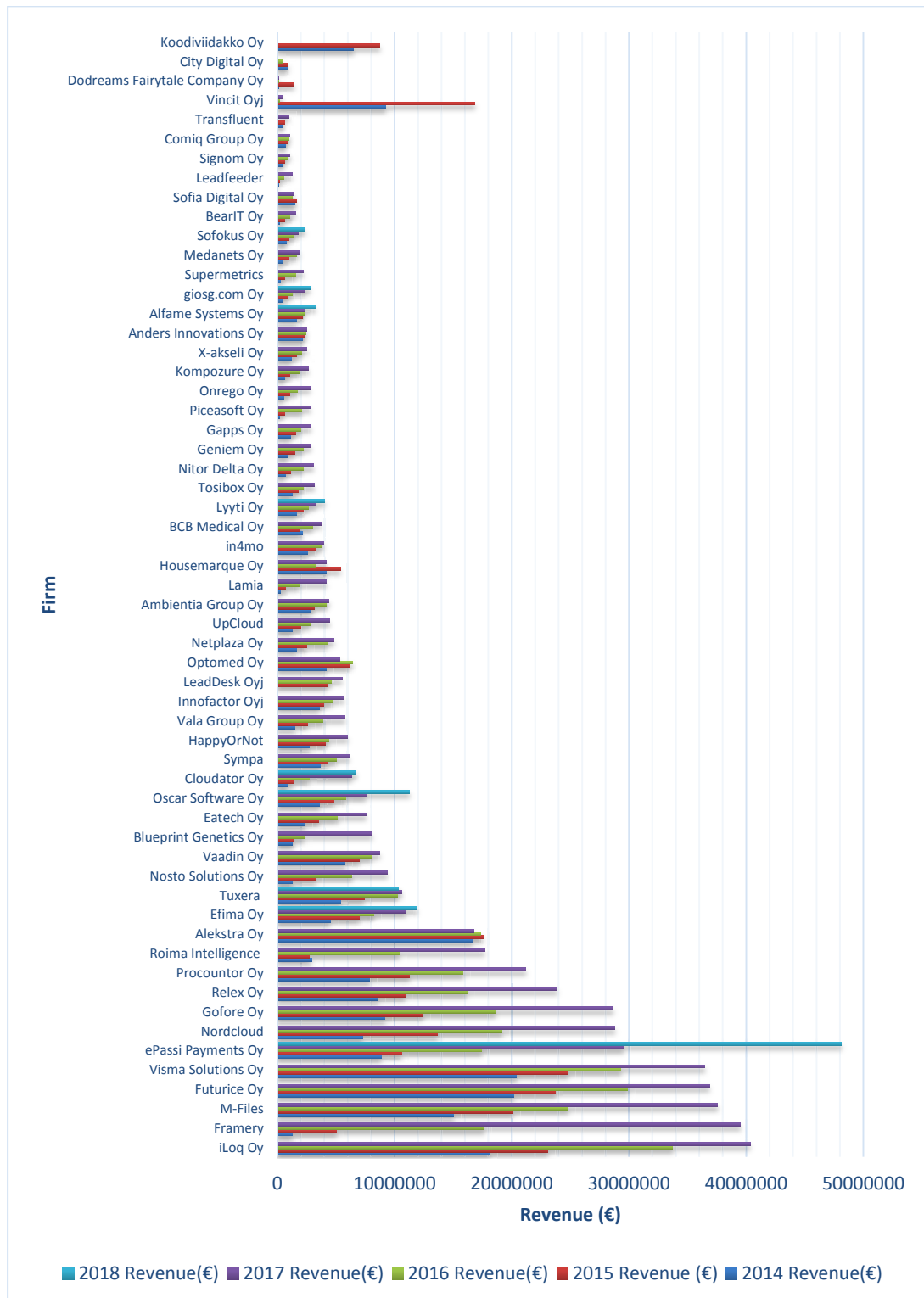


Figure 20. Revenues of the individual firms from Deloitte's Technology Fast 50 2017 & 2016 Finland lists. Source: Asiakastieto, 2019.

APPENDIX 3: THE STUDIED FIRMS' OPERATING PROFIT OR LOSS

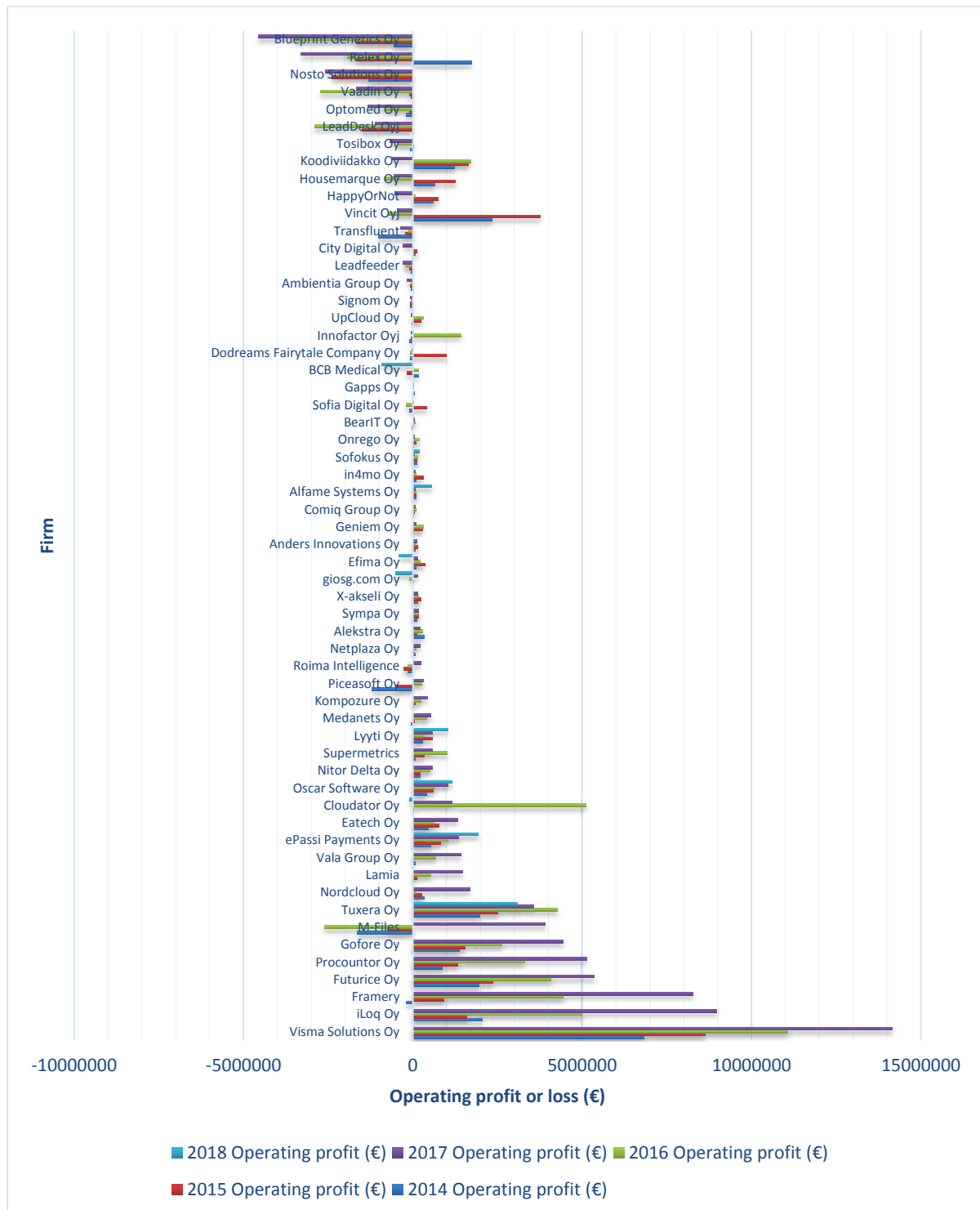


Figure 21. Operating profit or loss of Deloitte's Technology Fast 50 2017 & 2016 Finland firms. Source: Asiakastiето, 2019.

APPENDIX 4: NUMBER OF EMPLOYEES

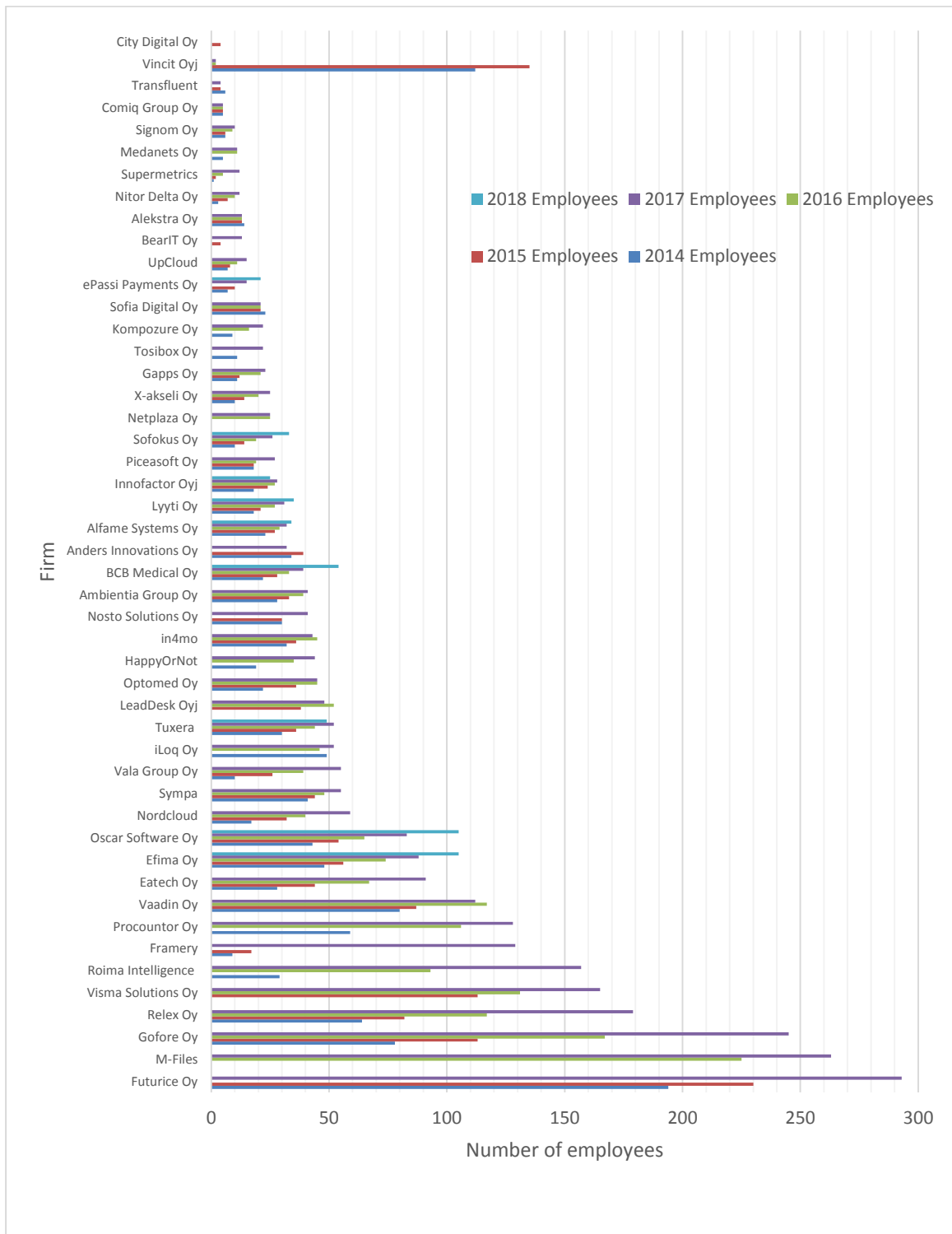


Figure 22. Number of employees at Deloitte’s Technology Fast 50 2017 & 2016 Finland listed firms. Source: Asiakastiето, 2019.

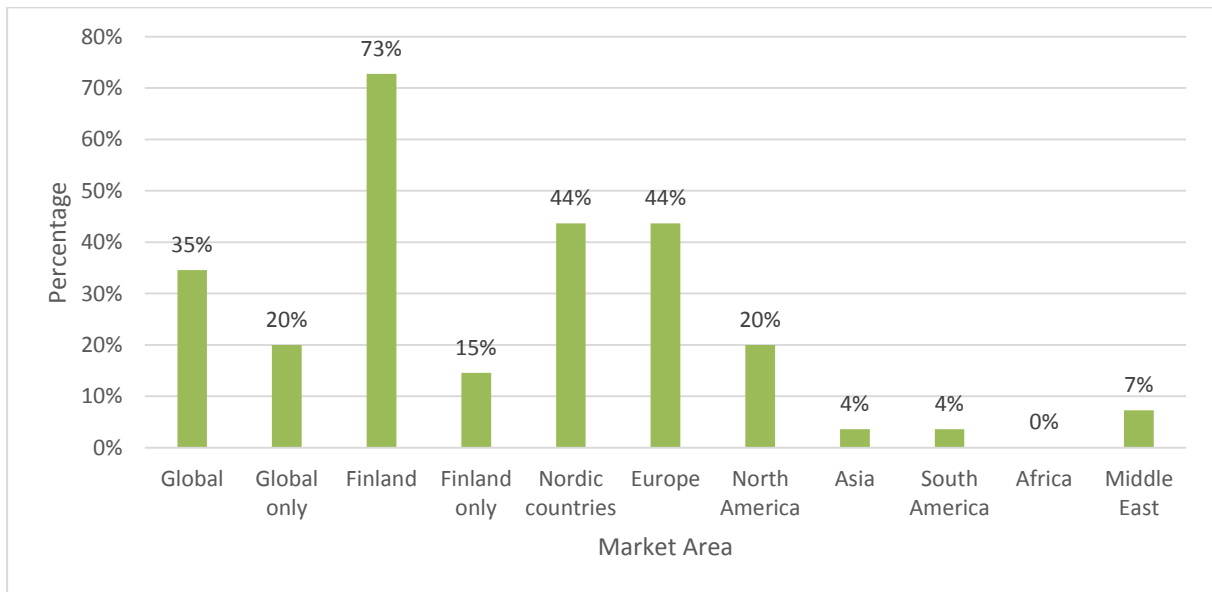
APPENDIX 5: MARKET AREAS OF STUDIED FIRMS

Figure 23. Market areas of the firms. Source: Survey data.

APPENDIX 6: DESCRIPTIVE STATISTICS

Descriptive statistics of continuous variables of the survey are presented on the figure 24.

	Descriptive Statistics											
	N Statistic	Range Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic	Variance Statistic	Skewness		Kurtosis	
									Statistic	Std. Error	Statistic	Std. Error
Startup Experience	53	35	0	35	11,34	,990	7,206	51,921	1,134	,327	1,888	,644
Founding Year	55	26	1988	2014	2006,42	,775	5,747	33,026	-1,171	,322	1,398	,634
Employees	55	580	8	588	125,31	18,927	140,364	19701,958	1,958	,322	3,539	,634
S&M Employees	55	160	0	160	20,04	3,666	27,188	739,184	3,068	,322	12,676	,634
VC and/or BA Financing	51	33,00	,00	33,00	4,2859	1,04458	7,45977	55,648	2,506	,333	6,145	,656
IPO as a goal	45	100	0	100	65,40	5,308	35,605	1267,745	-,629	,354	-1,003	,695
Importance of S&M expenses - Board	55	85	15	100	63,75	3,124	23,171	536,897	-,105	,322	-,502	,634
Share of R&D expenses in the latest budget	53	70	0	70	23,70	2,607	18,979	360,215	,953	,327	,005	,644
Share of S&M expenses in the latest budget	53	60	0	60	19,02	1,929	14,040	197,134	,796	,327	-,061	,644
R&D resources in the scale-up phase	50	69	1	70	27,70	2,357	16,665	277,724	,403	,337	-,518	,662
S&M resources in the scale-up phase	52	77	3	80	29,37	2,389	17,225	296,707	,591	,330	-,003	,650
S&M resources in millions of euros	39	34,74	,26	35,00	3,7500	1,00630	6,28436	39,493	3,792	,378	16,738	,741
S&M resources as number of employees	40	200,0	,0	200,0	25,000	5,3373	33,7561	1139,474	3,864	,374	18,715	,733
Valid N (listwise)	25											

Figure 24. The summary table of descriptive statistics of continuous variables. Source: Survey data.