Abstract

Boards of directors monitor and advice firm management. While research paid attention to the human and social capital of entrepreneurs to explain performance outcomes of their new ventures, the role of boards of directors of new ventures are often ignored. In the setting of new ventures, the resource provision function of boards are of significance, as they are strategic decision-makers who carry relevant human and social capital and are potentially able to affect the survival and growth of new ventures that often lack resources, legitimacy and established social ties. We explore to what extent and under what industry specificities the experiences of board directors in new ventures are related to the venture’s growth. We employ the Norwegian registry data, which is a longitudinal employer-employee matched dataset that involves individual work histories of all residents in Norway, as well as enables the identification of board directors. We include 70,297 startups over the period 2005 to 2013 in our sample. The findings indicate that particularly sales growth positively relates to industry and board experiences of these board members. Further analyses and findings point at the relevance and need of certain types of experiences of board directors depending on the type of uncertainty new ventures face.
Board Member Experience and the Performance of New Ventures

ABSTRACT

Boards of directors monitor and advice firm management. While research paid attention to the human and social capital of entrepreneurs to explain performance outcomes of their new ventures, the role of boards of directors of new ventures are often ignored. In the setting of new ventures, the resource provision function of boards are of significance, as they are strategic decision-makers who carry relevant human and social capital and are potentially able to affect the survival and growth of new ventures that often lack resources, legitimacy and established social ties. We explore to what extent and under what industry specificities the experiences of board directors in new ventures are related to the venture’s growth. We employ the Norwegian registry data, which is a longitudinal employer-employee matched dataset that involves individual work histories of all residents in Norway, as well as enables the identification of board directors. We include 70,297 startups over the period 2005 to 2013 in our sample. The findings indicate that particularly sales growth positively relates to industry and board experiences of these board members. Further analyses and findings point at the relevance and need of certain types of experiences of board directors depending on the type of uncertainty new ventures face.

Keywords:
Board of directors; strategic human capital; entrepreneurial firms; industry experience; new venture performance; environmental uncertainty
INTRODUCTION

The importance of human and social capital of entrepreneurs alleviates the liabilities of newness faced by new ventures (Gimeno, Folta, Cooper, & Woo, 1997; Bosma, Van Praag, Thurik, & De Wit, 2004). These ‘soft’ resources support development of competencies within new ventures, enable resource mobilization and establish legitimacy among stakeholders (Gimeno, Folta, Cooper, & Woo, 1997; Stam, Arzlanian, & Elfring, 2014; Amason, Shrader & Tompson, 2006). However, research rarely captures all the strategic human resources that contribute to decision-making in new ventures and thus, shape their performance path. Whereas early employees in startups have received attention (Coad, Nielsen, & Timmermans, 2017), we tend to pay less attention to the impact of other crucial supporting human resources within specific new ventures, namely board directors (Garg, 2013). There is agreement in the literature that the competences and skills of board directors together with the social ties and reputation they introduce to the venture are important for its performance (e.g. Lynall, Golden, & Hillman, 2003; Basly, 2007; Zahra, Filatotchev & Wright, 2009; Bocquet & Mothe, 2010; Kim & Cannella, 2008). Hillman and Dalziel (2003) referred to this as board capital1.

Board directors’ role in monitoring and counseling the management to shape the strategic direction of the venture and their respective ability to contribute connect to the performance of new ventures. Since these are subject to liabilities of newness and smallness, i.e. they lack resources, legitimacy and established social ties (Stinchcombe, 1965), their challenges differ from those of established firms, and hence the role of boards is different in young firms (Zhang & Wiersema, 2009).

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1 Yet, note that for many new ventures, involving board directors is not an option, as it is stipulated by law to establish a board when a particular governance form is selected by the entrepreneur.
A few prior studies aim to better understand the relationship between board and performance in new ventures yet, most of these studies appear inconclusive or dedicate attention to relatively small and particular sub-groups of new ventures (Li, Terjesen, & Umans, 2018). In this study, we unpack the impact of human and social capital of new ventures’ boards on the ventures’ performance over time. In particular, we focus on the industry experience of new ventures’ board members as an indication of relevant skills, competences (e.g. Kor & Misangyi, 2008; Kor & Sundaramurthy, 2009) and social capital (e.g. Certo, 2003; Furlan & Grandinetti, 2016). However, we caution that the skills, competencies, legitimacy of board members in new ventures may work differently across different levels of environmental uncertainty (e.g. industries) (Eisenhardt, 1989; Nielsen, 2015; Pfeffer, 1972).

To test the relationship of interest we employ the Norwegian registry data. This longitudinal employer-employee matched dataset holds individual work histories of all residents in Norway, as well as enables the identification of board members. Based on this register we identify over 70,000 new ventures in the period 2005 and 2013. These new ventures are all registered as limited liability companies and they therefore have a legal requirement for establishing a board. Despite the possible strategic importance of boards, only 30 percent of new venture seem to involve board members from outside the firm or its founder (i.e. employees, founder, family, etc.) and even a lower percentage involve outside board members with relevant industry and board experience. Those new ventures that do, tend to perform better. Our findings are useful for entrepreneurs as well as policy makers.

The paper is structured as follows; first, we discuss briefly, what boards do and how they support the performance of new ventures. We especially elaborate on the role industry-specific experience plays and how prior board member experience influences performance. This exercise enables us to
formulate hypotheses for our theory. Afterwards, we present the data and sampling procedure, also offering general descriptive statistics on the use of boards among new ventures. We continue with presenting our results of the different regression analyses addressing our hypotheses. We end by offering a discussion and conclusion.

THEORY AND HYPOTHESES

The Role of Boards

Decades of research developed a broad arsenal of theories that explains the functioning of boards irrespective of firm size, age and ownership (Zald, 1969; Lynall, Golden, & Hillman, 2003; Li, Terjesen, & Umans, 2018). The most pronounced theories are those that connect to the monitoring and mentoring role of boards in dealing with conflicting stakeholders’ interests. These include agency theory, which assumes opportunistic behavior among managers, and consequently, pictures the board as a monitoring and controlling governance mechanisms that mitigates the agency problems within the firm (e.g. Li, Terjesen, & Umans, 2018; Kim & Cannella, 2008). Meanwhile, stewardship theory suggests that management endeavor to act as stewards of shareholders’ interests, consequently, board’s mentoring rather than safeguarding function becomes of more importance (Davis, Schoorman, & Donaldson, 1997).

Another class of explanations address the resource provision function of the board of directors (Neville, 2011). In this vein, board of directors are an additional organizational body whose members are selected by the firm and who invest their human capital in the firm by providing advice and resources to the founding team and whose interactions are decisive in the formation of the strategic direction of the firm. Furthermore, the board members bring their social capital to the table; establishing contacts with the external environment, and hence, ease the access to resources
otherwise unavailable to the firm, i.e. fulfill their resource dependence task (Li, Terjesen, & Umans, 2018; Kim & Cannella, 2008). In addition, Huse (2007) underlines board’s role in establishment and enhancement of firm’s reputation.

Thus, the two classes of theories represent two different functions that a board of directors offers to the firm. Through the board directors’ human and social capital, new ventures gain access to various resources, establish relationships, develop capabilities and formulate their strategic direction. In addition, because of the instability of new ventures, the monitoring by board members suggests to be significant in establishing appropriate routines, organizational structures and processes, as well as in the urge of frequent changes in strategic directions (Garg, 2013). However, given the challenges specific for new ventures, the resource function of boards are found of more significance than its monitoring function for new ventures (Neville, 2011).

**Resource function of outside board members**

How boards alleviate liability of newness is central to several studies on the role of boards in entrepreneurship (Certo, Covin, Daily & Dalton, 2001; Deutsch & Ross, 2003, see Clarysse, Knockaert & Lockett, 2007; Kim & Cannella, 2008). Taking their point of departure in resource dependence theory (Pfeffer & Salancik, 1978; Hillman & Dalziel 2003), Chen, Kor, Mahoney & Tan (2017) argue that due to their social ties, board members enable access to resources, connections and skills by leveraging their networks. Additionally, a cognitive perspective proposes that boards are a source of cognitive resources – knowledge and skills of the members and their specific characteristics. This perspective takes the board behavior and effectiveness as an outcome of group decision making (Forbes & Milliken, 1999; Rindova, 1999, see Fiegener, 2005).
From a resource provision perspective, the interest turns to board members that do not have another (formalized) role within the new venture, e.g. owner, employee or manager. After all, the resources of these individuals is already mobilized irrespective from board membership. The role of outside directors for a nascent firm is discussed in the literature on entrepreneurship and boards. These studies consider the presence of outside directors as a sign of cognitive variety within a board. Scholars discuss both potential benefits of cognitive variety – the differing, fresh and new perspectives to problem-solving (Rindova, 1999; Fiegener, 2005), and detrimental effects – the hindrance of efficient knowledge utilization because of the loss of cohesion within the board (Forbes & Milliken, 1999).

Although the term outside director is used regularly, there appears to be some variation in how such outside directors are identified. Kor and Misangyi (2008: p. 1345) define outside directors as “non-management members of the board”. Chen et al. (2017) consider outside directors as those board directors that come from outside the focal firm. The most restrictive form identifies outside directors as those board members that come from outside the focal firm, are not family members nor have an employment relation with any of its subsidiaries (Vandenbroucke, Knockaert, & Ucbasaran, 2016; Pearce and Zahra, 1991). In addition to having diverse ways of defining outside directors, the literature uses the terms “independent”, “external” and “outside” directors interchangeably (Li, Terjesen, & Umans, 2018). In this study, we follow Chen et al (2017) and refer to outside directors as those board members that are not employed and not engaged in the management of the focal new venture. Hereto we add the family member restriction from Vandenbroucke et al (2016) and Pearce & Zahra (1991).

Our decision to separate family members from outside board members is supported by the existing literature, which finds a predominant negative relation between the presence of family members
on the board and new venture performance. Particularly, Basly (2007) found a negative relationship between their presence and venture’s internationalization due to their conservatism and lack of relevant knowledge, and Calabrò and Mussolino (2013) found that non-family members of family firms positively affect the venture’s internationalization. Further, Sciascia, Mazzola, Astrachan & Pieper (2013) demonstrate that the presence of family members at the board relates to the internationalization of the new ventures in a J-shape. Therefore, one can consider that drawing on accessibility of family ties and the trust embedded in these relationships, founders may mobilize them irrespective of the resources they can provide (Engel, Kaandorp, & Elfring, 2017; Stam et al., 2014).

As Chen et al. (2017: p. 445) point out; “board-level learning from others occurs through appointing outside directors who transfer external market know-how and know-who embedded in other firms and industries”, consequently, the mobility of these individuals infers mobility of experiences (Dokko & Rosenkopf, 2010). Thus, outside directors are the ones serving the resource provision function of the board, as it infers flow of resources previously unavailable to the firm, and given the importance of resource function of the boards for new ventures’ performance (Neville, 2011), our baseline hypothesis is as follows:

_Hypothesis 1: The presence of an outside director in a new venture board is positively associated with the new venture’s performance_

**Industry and board experience**

Board members carry out different functions in the venture. The monitoring function arguable requires different characteristics compared to a more forward-looking strategic function or a resource provision function the board fulfills. This may be the reason that despite our baseline
hypothesis, performance outcomes of having outside directors on the board of new ventures have demonstrated considerable ambiguity (Li, Terjesen, & Umans, 2018). Thus, although we expect a positive relation between the presence of an outside board director in the venture and its performance, we theorize that heterogeneity in the experience of these directors drive some of the performance effects we observe.

This is in line with existing research that indicates that the experience, diversity and tenure of the outside board directors influence the new venture’s performance differently (Vandenbroucke et al., 2016), including how it eases the new venture’s liability of newness (Kor and Misangyi, 2008). Vandenbroucke, Knockaert, and Ucbasaran (2016) study the effects of R&D and engineering experience of outside directors in high-tech firms, and Kor and Misangyi (2008) – outside directors’ managerial experience in the same four-digit industry. Clarysse et al (2007) categorized their experiences as R&D, commercial and financial experiences in an effort to identify the complementarity or substitutability of the actors. Moreover, Chen et al. (2017) disentangle the effects of intra- and extra-industry directorial and managerial experiences of the board members on the firm growth.

However, there is a need for a closer look at the type of human capital outside directors bring. We focus on the presence of relevant human capital, particularly, same industry experience at the board and its impact on the performance of the new venture. We argue that board directors with this experience contribute more to the resource provision and strategy formulation function of the board. Research underlines the importance of industry experience within young firms for the venture’s performance. For example, industry-specific experience is found to explain the
outperformance of spinoff firms\(^2\) (e.g. Phillips, 2002; Dahl & Sorenson, 2013), as it infers having relevant tacit knowledge gained during the years of previous employment, as well as social ties the founder built within, through and outside of the founder’s previous employer in the respective industry (Furlan & Grandinetti, 2016). These initial endowments of the new venture’s founders are the outcomes of their work experience within the same industry as their new venture; thus, industry-specific experience is emphasized as a driver of performance superiority. In a similar vein we argue that as board directors are strategic decision-makers who invest their competences, skills and connections, their industry-specific experience, the resources they provide in conjunction with their functions – their human capital, social ties and reputation – is relevant and explain the growth of new ventures (Kor & Sundaramurthy, 2009). In contrast, a board director’s experience in an unrelated industry may cause cognitive distance and lead to negative performance outcomes due to misconception of the focal industry challenges (e.g. Chen et al., 2017; Kor & Misangyi, 2008). However, it can ignite new collaborations, hence, innovation, and have beneficial outcomes for the venture in case of a reputable board member (Deutsch and Ross, 2003). Still, we hypothesize:

**Hypothesis 2:** The presence of outside board directors with similar industry experience as the new venture is positively associated with its performance.

In addition to industry experience, board directors bring their **directorial** experience from prior board positions to the table. As discussed by Chen et al. (2017), directorial experience infers more intuitive responses to strategic and governance issues, as well as critical assessment of management proposals, thus, these experiences are relevant to the strategy formation and resource provision functions of the board. As such, board member bring valuable knowledge about how to mitigate or

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\(^2\) Spinoff firms are defined as firms established by former employees of incumbent firms in the same industry as their parent firm (e.g., Dahl & Sorenson, 2013).
reduce uncertainty, which is a key element in managing new ventures (Knight, 1921). Therefore, we argue that:

**Hypothesis 3:** The presence of outside board directors with board experience is positively associated with the new venture’s performance.

Thus, we expect a positive association between board directors’ industry-specific, directorial experiences and new venture’s performance. However, there is heterogeneity across industries due to the challenges implied by different levels of environmental uncertainty.

**Environmental context and board member experience**

Board directors often serve as ties linking the firm to its environment and leveraging the (inter)dependences between the two, as they enable access to additional resources, information, foster legitimacy of the firm and advise the management (Pfeffer & Salancik, 1978). Therefore, the organizational responses to environmental conditions are found to be strongly connected to the composition of the boards according to Resource Dependence Theory (Pfeffer, 1972; Hillman et al., 2009). And as a new venture establishment is often associated with uncertainty (Foss, Klein, Kor, & Mahoney, 2008; McMullen & Shepherd, 2006), the question arises to what extent the experience of board directors matters in the alleviation of different degrees of environmental uncertainty new ventures face and what its performance implications are?

Therefore, we test the boundary condition of our prior theorizing across industry domains, as all new ventures within an industry are exposed to a particular environmental context. While research tends to control for the industry effects rather than explore them, we offer a more fine-grained approach that enables investigating how directors’ experiences resonate with
uncertainties within different industries. Thus, this exploration suggests valuable insights instead of “one-size-fits-all” solutions.

Particular industries might set different requirements on what management of a new venture need to do to succeed. Some have to build a reliable technology and securing intellectual property rights whilst others need to generate cash flows early, and obtain a strong position on the market quickly. Subsequently, what is expected from the board of directors will therefore also vary depending on the type of industry in which they operate.

_Hypothesis 4: Industry specificities moderate the relationship between board member experiences and new venture performance._

Furthermore, the uncertainty in a particular industry domain might point to particular hurdles that the new ventures needs to overcome. The instability of industry sales, firm turnover in an industry, industry concentration, initial investment requirements or initial equity size of new ventures in general, as well as R&D expenditures and number of patents in an industry can point to different aspects of environmental uncertainty of an industry. Particularly, they indicate the unpredictability of demand, competitive uncertainty and dynamic changes in an industry (Kor, Mahoney, & Watson, 2008). Moreover, they infer firms’ increased dependence on the external environment, hence their reduced control over resources (Buvik & Gronhaug, 2000) and more resource commitment. This is especially salient in case of new ventures.

Recent research addresses the relationship between the new venture founders’ human capital and performance outcomes across different types of industries with different levels of uncertainty, investment requirements and profitability (e.g. Nielsen, 2015). The mechanisms behind the
relationships are the founders’ absorptive capacity and adaptability in uncertain and changing environments due to their industry-specific knowledge and respective networks (e.g. Nielsen, 2015). New ventures thus need to adapt. The extra effect of dynamic technological changes in the industry poses the need of more inputs in terms of human capital to increase the speed of strategic decision-making (Buvik & Gronhaug, 2000; Unger, Rauch, Frese, & Rosenbusch, 2011; Sarasvathy, 2008; Nielsen, 2015).

Finally, research suggests that in high-velocity environments, the availability of advice from an experienced individuals facilitates speed in strategic decision making, and the speedier the strategic decision-making, the greater the performance of the firm (Eisenhardt, 1989). In the context of new ventures, the need for speedy strategic decisions is more urgent, as new ventures are more vulnerable due to their lack of resources, established connections, and legitimacy, i.e. liabilities of newness (Stinchombe, 1965). Analogous to these considerations, outside directors with industry experience as strategic decision-makers help better and faster navigation through higher-uncertainty and high-velocity industries and therefore, support the performance of new ventures. Hence, we hypothesis:

**Hypothesis 5a:** In high-uncertainty industries, industry-specific experience of outside directors is positively associated with new venture’s performance.

**Hypothesis 5b:** In low-uncertainty industries, industry-specific experience of outside directors is not significantly related to the new venture’s performance.
DATA AND METHODS

Data

To test our hypotheses we rely on a merger between four registers, all administered by Statistics Norway. This merger occurs through the unique person and firm identifiers. Besides merging across different registers, we are able to track firms and individuals over time. First, we use the firm register that contains detailed information on all firms in the Norwegian economy, including financial indicators, date of establishment, industry, and geographic location. This database forms the starting point to identify new ventures. Second, we merge this dataset with the shareholder register; this database has an overview on who owns how many shares in Norwegian public and private limited company. Based on this database we identify owners of the new started ventures. Third, Statistics Norway administers a register with all board members of Norwegian organizations that are required to have a board. Fourth, for all individuals, including owners and board members, it is possible to obtain detailed demographic information including family relations from the personal register, the only requirement is that these individuals have to be residing in Norway. Finally, the linked employer-employee register allows us to identify who is employed for which company at which moment in time; subsequently, we can track the career of all individuals in the register.

Sampling procedure

In the first step in our sample selection procedure, we identify new ventures established in the period 2005 to 2013. We restrict ourselves to this period because of data availability restrictions. Accurately identifying new ventures in the firm register is not a straightforward task. A common
starting point to identify new ventures is by identifying the first registration of a new firm identification number. However, relying on this measure also means we would include ventures that appear to be established companies, but went through a change that required a new registration (e.g. merger and acquisition, international expansion, corporate spinoff, or change of ownership). Subsequently, in addition to the registration date we impose several restrictions before we identify this newly registered venture as a genuine new venture.

First, we remove all instances where we could trace the firm identifier in the years prior to their registration. Second, we remove all instances where established ventures have a majority ownership and thus have the power to overrule any decision made by individual entrepreneurs. While we argue that these are interesting new economic activities worth studying, we are interested in independent new ventures run by individual entrepreneurs or team of entrepreneurs. Besides looking at ownership, we also identify the previous employment relation of owners and employees associated with the new venture. When we observe a large flow of workers co-moving for the same employer to a newly registered ventures we also remove these firms from our sample. Despite all these restrictions, we have a small set of new registered ventures that are relatively large in the year of founding all startups with more than 50 employees in the year of founding are therefore excluded.

The sample consists of new ventures with different organizational forms. Since we are interested in studying the effect of boards, we limit our sample to include only new ventures that are registered as a limited company (AS in Norwegian). Together with sole proprietorship, this is the largest category of new ventures. However, limited corporations have a legal requirement to install a board of directors. Furthermore, we impose some industry restrictions and remove all new ventures that
are active in public sector industries including healthcare and education, and in industries that are heavily regulated, i.e.: finance, agriculture, utility services, and real estate. We also exclude all new ventures where we have no industry information.

**Identifying Entrepreneurs**

After we selected a sample of new ventures, we identified the entrepreneurs behind these startups. By relying on the register, we can only identify individuals with a formalized relation to the new ventures. Entrepreneurs might have formalized this relation in different forms, but in our case we proxy the entrepreneur role by identifying the owners of the new venture. We identify these owners by relying on the Norwegian shareholder register. This register makes a distinction between human and non-human legal entities who have an ownership share.

Some of these non-human owners are established firms with real activities. However, in many instances, these non-human legal entities are holding companies with little or no economic activities (i.e. no employees, no sales); often owned by one or a few individuals. In this case, the owners of the holding company are considered the ultimate owner of the new venture and thus an entrepreneur.

An overall requirement for any owner, both human and non-human entities, is that they have at least a 10 percent ownership share; only a small share of owners and a few new ventures are removed based on this restriction. While we mostly emphasize the entrepreneurs behind the new ventures, we also take into consideration whether the new venture has a minority ownership of an established firm. We excluded new registration where established firms have a majority ownership in an earlier step. All new ventures where we cannot identify at least one entrepreneur are excluded.
from our sample. After identifying the entrepreneurs, we merge this information with the individual and employer-employee linked register to identify their demographic characteristics and career history.

**Identifying Members of the Board of Directors**

As already mentioned, it is a legal requirement for all limited companies to have a board of directors, but who has a seat in this board is at the discretion of the owners and other stakeholders. To identify the board of directors for the new venture, we merge the firm identification number of the new venture with the firm identification number in the board membership dataset to identify all individuals that have a seat on the board at the year of founding. Besides identifying if they are a board member we have information on whether the individual is listed as the chairperson of the board. Similar as with entrepreneurs, we remove all new ventures where we cannot identify a board of directors. When we have identified these board members, we merge this information with the individual and employer-employee linked register to identify demographic characteristics and career (board) history of these board members.

**Final sample**

Based on all the above-mentioned sample restrictions and requirements we end up with a final sample of 70,297 new ventures.

**Variables**

**New venture performance**

In our analysis, we investigate the relationship between board member characteristics and the performance of new ventures (i.e. their growth). To measure this performance we rely on a series
of measures commonly when measuring performance of new ventures, namely, yearly sales or equity. For these measures, we identify the level in all of the years the new venture was active. Therefore, besides levels we are also able to identify growth on these indicators.

**Inside and outside board directors.**

Based on the career history it is possible to identify whether the board member is also the owners, manager or employee of the new venture, which would classify this individual as an inside board member. Furthermore, it is common practice to invite family members to take a seat on the board. As previously mentioned, existing research have found a negative relation between family board members and new venture performance (Basly, 2007; Calabrò and Mussolino, 2013, Sciascia et al. 2013). Thus, we identify whether there is a family relation between the owner and the outside board member. In our case family members is restricted to parents, siblings, children and spouse so the share of family members might for this reason be underreported. We created a dummy variable indicating whether the new venture has family members in the board.

By exclusion, we consider all other board members as outside board members. Here we follow Chen et al.’s (2017) definition of outside director. The board of director variables are on the level of the board, so we created a measure on inside and outside board size. Since we can identify the chairperson of the board is we also create a dummy variable whether one of the owners is the chairperson of the board.

**Experience of board of directors**

*Board experience.* Since we are able to track the career history of board members, it is possible to identify if members in the board of directors have experience in sitting on a board. We create a dummy variable indicating whether there is board experience among the outside board members.
Industry experience. The career history also allows us to identify whether board members have experience from work from the same industry as the focal venture. We consider industry experience to be present among the outside board member if one outside board member has previous experience in the same four-digit NACE industry code.

Entrepreneur and New Venture characteristics

Based on the information of ownership we created a measure that indicates the size of the founding team, proxied by the number of personal owners in the new ventures. Afterwards, we created a set of measures on the characteristics of these entrepreneurs and entrepreneurial team, i.e.: the average age of the owners, share of female owners, share of owners with a graduate degree or higher. Because we identify family relations among owners, we create a dummy indicating it is a family business if more than half of the owners are in family with one of the other founding members.

Since we can track the career history of the entrepreneur, we can also identify if one of the entrepreneurs has previous work experience in the same industry – same four-digit industry code. If this is the case, the new venture is regarded an entrepreneurial spinoff.

Besides personal owners, we are also able to identify whether the new venture has an established firm as a minority shareholder. We might expect that such ownership relation is positively related with new venture performance. In addition to identify whether there is a company owner, we also specify if a person in the entrepreneurial team has or had an employment relation with the company owner. In this case, we created a dummy variable that indicates such parent firm.

For all these new ventures, we created a series of year, industry and regional variables. First, we created a dummy variable that indicates the year of founding. For industry, we control for two-digit
NACE industry code. Besides merely controlling for industry, we created measures indicating whether the startup is active in manufacturing and business services, and more knowledge intensive sectors like high tech manufacturing and knowledge intensive services. Finally, we created dummy variables indicating the labor market region in which the startup is located.

**Descriptive statistics**

The total sample in our analysis consist of 70,297 startups over the period 2005 to 2013. As Figure 1 illustrates, the number of new ventures vary between 5234 new venture establishments in 2009 to over 13,000 in 2012. We can explain this large jump in 2012 and 2013 by a change in the capital requirements for registering a limited company; this decreased from 100.000 NOK to 30.000 NOK. We are confident that this is a main driver behind the increase as this growth in the number of new venture can only be observed among limited companies and not among new ventures that are registered as sole proprietorship. Because of this lower capital requirement, we expect less-endowed entrepreneurs to register a new business. This is confirmed as the average level of performance for these new ventures is lower.

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Insert Figure 1 about here

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In Table 1, we present the descriptive statistics for the entrepreneurial team and new venture characteristics that we will include in our analysis. The average size of the team of owners is 2.33 and the majority of the new ventures (65 percent) are ventures owned by a team. In 25 percent of the cases, the new ventures is identified as a family business; that is, the owner team is dominated by members of the same family. Thus, around 40 percent of the owner teams are family team. The
average age of the owners is just over 42 years. In six percent of the observations, an established firm is registered as a minority owner.

Over a quarter of the new ventures are owned by an entrepreneur with experience in the same industry. Approximately 1 percent (or 20 percent of the company owners) the previous employer of one of the owners has a minority share in the new venture. Just over 31 percent of the new ventures have a women among the entrepreneurs and the average share of women involved in the new ventures is 19 percent. Close to 17 percent of the new ventures have at least one entrepreneur who is a university graduate, averaging 11 percent of the total sample of owners. Only a small share of new ventures are active in manufacturing, while around 35 percent are active in business services. This leaves a large share of new venture that are active in construction, retail and wholesale.

In the bottom of the table we show the descriptives on our measures of performance. On average, the startup generates 2.5 million NOK of sales in the first year and has an equity of 250,000 NOK. On average, sales has increased by 150% while average equity has increased by 37,000 NOK. The distribution, however, tends to be very much skewed, which means that only a small share of new venture increase their sales and the amount of capital they raised.

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Insert Table 1 about here
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In Table 2, we present an overview on the board of director characteristics. All new ventures have inside board members and unsurprisingly one of the owners is in nearly all instances the chairperson of the board (91 percent). The presence of owners in the board of directors can also be confirm when looking at the size of the inside board of directors which is only marginally small
than the average size of owners in the new venture. As we already hinted upon, family members are common among board members, in this case nearly half of the board of directors consist out of family members. On average 28 percent of the new ventures have at least one outside board member. The average outside board member size is 0.38. Conditional on having an outside board, this number would be 1.29 on average, which indicates that the majority of new venture with an outside board only have one outside board director. Indeed, only 7 percent of the new ventures, and 22 percent of ventures with at least one outside board member, have more than one outside director.

When taking a closer look at the characteristics of these outside board members there are hints that indicate that boards are not often used strategically. First, only 5 percent of the board contain a person with industry experience, while 12 percent of boards have an outside director with board experience involved and 14 percent of the board have an outside director with managerial experience.

To measure environmental uncertainty, we conducted a principal component analysis on the industry level, which is in line with previous studies (Dess and Beard 1982; Nielsen 2015). The variables included the following industry indicators: the growth and its volatility (employees and sales); level of profits and variation in profits; average level of assets; concentration of sales; number of establishments; R&D investments and R&D employees, as well as capital intensity. As a result, we arrived at five principal components (see Table 4) that classify industry environments
as follows: industries with high entry barriers, with concentrated sales, fast-growing but volatile ones, R&D intensive, and capital-intensive industries.

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Insert Table 4 about here
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RESULTS

In Table 4, we present the results of our set of OLS regressions, analysis on absolute growth in sales and equity. Model 1 and Model 2 present the baseline model where we only include the number of outside board members at a board. Before elaborating on the relation between these performance measures and the size of the outside board, we briefly discuss some general patterns among the other variables.

Similar industry experience of entrepreneurs is systemically associated with overall higher growth of sales, and larger owner teams are associated with both higher sales and equity growth. In case the new venture is characterized as a family business or the owner is the chairperson of the board, growth of the new venture tends to be negative. The effects of other characteristics of the new venture (team) differ across the models. Higher average age of the owners’ team, as well as a higher share of female among owners is associated with lower sales growth. Rather unexpectedly, a higher share of owners with a graduate degree is associated with lower levels of sales. Otherwise, we see that minority corporate ownership positively contributes to sales growth.

If we turn our attention to board characteristics, we confirm previous findings about family members in the board. We demonstrate that this is negatively associated with sales growth, while in Model 2 and 4 there is a positive association with equity growth. This might be because firms
that have more equity tend to be larger and require a larger board, which also involve family members. Concerning our main variable of interest, outside board, the findings of Model 1 and 2 (Table 1) suggest that the number of outside board members is associated with higher levels of equity and sales growth. However, in Model 3 and 4, the relation between the number of outside directors and sales growth is non-significant while positive for equity growth. However, in subsequent models, the findings are non-consistent for both sales and equity growth. This suggests some inconclusiveness of findings of our baseline hypothesis on the positive effect of outside board on performance.

However, as we mentioned before, the heterogeneity of directors’ experiences may drive this ambiguity. In confirmation to this, in Model 3 and 4, we observe that industry and prior directorial experiences of outside directors are positively related to sales growth. Thus, we can confirm Hypothesis 2 and 3 in terms of sales growth. However, the experiences hardly explain the equity growth in this overall model.

Comparing and contrasting the results in manufacturing and business services industries, the relationships become much clearer. The industry experience effect is significantly and positively associated with both sales and equity growth in the manufacturing and the association turns upside-down in the business services. Meanwhile, the board experience is negatively associated with equity growth and positively – with sales and equity growth in business services. Apparently, the relations open up differently in different industries that can be explained by industry specific characteristics and requirements.

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Insert Table 4 about here

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In Table 5 we run subsample analysis based on our principal component analysis, five groups of industries are separated representing different types of environmental uncertainty. In manufacturing industries, we demonstrate an inversed U-shape relationship between the height of entry barriers and the relevance of directors’ industry experience for the sales growth. In industries with high entry barriers, boards with industry experience are associated with raising more equity.

In manufacturing industries characterized with higher concentrated sales, boards with industry experience are related to higher sales growth, while not equity growth. In volatile growth industries, boards’ industry experience is associated with both higher sales and equity growth. In R&D-intensive manufacturing industries, boards’ industry experience is associated with higher equity raised, while there is no association with higher sales. However, here the nature of the new ventures per se infers the low level of sales growth, as here sales are not the primary focus of new ventures. They build the technology and they need equity to sustain the venture until the focus shifts to commercialization and sales. Therefore, the board directors’ role is more salient in equity growth.

Similarly, in capital-intensive manufacturing industries, the primary focus for the new ventures is raising equity, and here, the directors’ industry experience associates with equity rather than sales growth.

In environments with concentrated sales, directors’ industry experience is primarily associated with sales growth. While in technologically uncertain, resource- and investment-demanding environments, equity growth is more important. This is where it is more important to have board experiences for the purpose of building the business and mobilizing funding, not necessarily raising sales.
Thus, how sales and equity grow, depends very much on the level of environmental uncertainty the new ventures face and the extent to which experiences embedded in the board can be relevant and can alleviate the uncertainty. Roughly, in less uncertain industries, board directors’ experiences play a lesser role for the new venture’s sales and equity growth, possibly because the entrepreneurs can overcome these problems on their own.

Concerning services industries, one pattern that is especially salient is that board’s industry experience across all degrees of different types of uncertainties inferred by the five types of industries, turns to be either negatively or non-significantly associated with equity growth, as services infer less of resource commitment or intensity. This can be explained by the new service ventures to be naturally aimed at the sales growth. In higher-than-median level of uncertainty, service ventures’ sales growths are only positively and significantly associated with directors’ board experiences.

Insert Table 5 about here

DISCUSSION AND CONCLUSION

This study provides insights on the role that boards of directors’ play for new venture growth, and in particular, how experience of board members associates with the performance of new ventures across different industries.

While there is a longstanding interest in understanding how boards function in firms, recent research explores the role of boards in the setting of new ventures. Yet, investigating this comes
with particular challenges. First, identifying new ventures is challenging and subsequently many studies rely on small sample survey based research. Second, due to the challenges of identifying startups most research focuses on small rather than new ventures (Li et al., 2018). While most new ventures are small, not all small ventures are new, which puts restriction in identifying the relation to board members. Second, board membership data is not easily obtainable. By relying on the Norwegian register, we have the possibility to identify truly new ventures, as well as identify who are board members in these new ventures.

In the setting of new ventures, the importance of board directors is mainly due to their resource provision function, as they are carriers of relevant human and social capital. In addition, they act as strategic decision makers that hints at their potential ability to affect the survival and growth of new ventures.

In the paper, we estimate to what degree the board of directors influence the performance of new ventures. First, boards seem seldom to be used strategically to mobilize external resources, which is demonstrated by the fact that most boards are either entirely made of inside board members, i.e. owner, manager or employee, or involve family members to one of the owners. Furthermore, even in the instance of involving outside board members the size of the board is often limited to one individual.

However, from a resource provision perspective we expect that outside board members stand out since this individual provides access to resources that otherwise would not be available to the startup. We argue that the presence of outside board members is positively related to new ventures’ performance. However, our findings are less conclusive on this point. Albeit, this led us to explore in more detail, which type of experience these board members bring to the table.
More specifically, other things being equal, we reason that it is industry experience from same industry as the new venture and board experiences of directors, which jointly drive the new venture’s performance. The underlying mechanisms are that through this experience board members bring both (access to) relevant skills and resources as well as creating legitimacy in establishing relations with suppliers, customers, possible venture capital and other resource providers. Indeed, based on our empirical analysis, we find support for these arguments. Thus, rather than having outside board members as such, one should take into account the type of experience of these board members in order to make a difference on the new ventures performance.

Also, we argue that the context in which these new ventures operate also cause that certain board experience is weighted more important than others. We demonstrated this by more deliberately looking into the particular industry the new venture operates. Indeed, the role of industry experience is more pronounced in manufacturing compared to services.

Furthermore, the environmental context might also place constrains that board directors can alleviate depending on the level of uncertainty the startup is confronted with. In industries that are characterized by low uncertainty and high stability, the entrepreneur would be more capable of maneuvering on his/her own. However, in high-uncertainty environments directors’ experiences can help to alleviate the vulnerability of new ventures and beneficially affect their growth. The findings point at the relevance and need of certain types of experiences of board directors depending on the type of uncertainty new ventures face. Apparently, the relations open up differently in different industries that can be explained by industry specific characteristics and requirements. Particularly, services industry can be characterized by less resource commitment, investments and less dependence on input resources as opposed to manufacturing industry (Brouthers et al., 2002). In the face of uncertainty, this can infer manufacturing firms’ reduced
control over flow of resources, hence the need of better adaptability (Buvik & Grønhaug, 2000) and of ties to the external environment to mobilize the resources. In terms of technological uncertainty, service industry is less patentable than manufacturing, therefore one can assume less resource commitment by the firms in an attempt to keep up with technological changes. Therefore, the firm turnover in services industry can be higher due to less resource commitment required (Brouthers et al., 2002) that leads to higher competitive uncertainty. This together with new ventures’ need to immediately conduct sales to survive increases its urgency to reach out to customers that enhances in the face of demand uncertainty.

This is particularly salient in the contrast between services and manufacturing industries. Industry experience matters in manufacturing, and board experience matters in services. Manufacturing assumes a clearer direction of actions in the initial stage, however, as it is resource demanding, resource mobilization is the aspect making new ventures vulnerable here. Directors’ industry-specific human capital can help the entrepreneur to navigate industry specificities, and their social capital and reputation – to get those resources.

In services, new ventures’ primary purpose is to reach out to customers, and as services may have blurry boundaries and be related to many industries, directors’ competence to build strategy rather than their industry-specific experience may be of more relevance. These are the rationales of what boards should deliver “here and now”, as the new ventures have the urgency to survive in the earliest stages of their lives. Thus, the mechanisms behind the venture growth in terms of sales and in terms of equity are different depending on the nature of uncertainty within industries.

The insights we offer are relevant for all who are engaged with building new ventures and who offer support services, for example, entrepreneurs, policy makers and facilitators of entrepreneurial
activities. In the latter, we specifically point to incubators and accelerators to seek and screen for relevant skills, competences and connections at the new ventures’ boards of directors in order to extract the most out of these strategic entities. Besides relevant in the setting of appointing board members, our findings may also be relevant in setting up other related functions like mentorship programs.

Our study is not without limitations. First, in the empirical set-up we cannot make strong claims of causality. We may expect selection effects to occur where ‘high-quality’ entrepreneurs that are most likely to succeed are able to mobilize a board with particular kinds of characteristic. Second, we only investigate board members that were present at founding; however, depending on the stage of the lifecycle a new venture is in, the entrepreneur (or any of its stakeholder) may add relevant board members at a later time in the process.

As for future research trajectories, it is relevant to be more explicit in identifying board composition and capital of high-growth oriented ventures. Currently, we focus on all new ventures and seek to understand the performance of the “average startups”, but as most aspects of policy and strategy of entrepreneurship, the interest is on the high growth entrepreneur. We see this as a fruitful path of investigation.
REFERENCES


Figure 1: Number of new ventures and boards of directors with outside board members by year
Table 1: New venture and entrepreneur characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of owners</td>
<td>2.33</td>
<td>1.65</td>
</tr>
<tr>
<td>Owner team</td>
<td>0.65</td>
<td>0.48</td>
</tr>
<tr>
<td>Family business</td>
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<td>0.44</td>
</tr>
<tr>
<td>Average age of owner</td>
<td>42.43</td>
<td>9.49</td>
</tr>
<tr>
<td>Minority ownership company</td>
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</tr>
<tr>
<td>Entrepreneurial Spinoff</td>
<td>0.25</td>
<td>0.43</td>
</tr>
<tr>
<td>Previous young business owner</td>
<td>0.30</td>
<td>0.46</td>
</tr>
<tr>
<td>Involvement Parent Company</td>
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</tr>
<tr>
<td>Female owner</td>
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</tr>
<tr>
<td>Share female owner</td>
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<tr>
<td>Highly educated owner</td>
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<td>0.38</td>
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<tr>
<td>Share highly educated owner</td>
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<td>0.28</td>
</tr>
<tr>
<td>High-tech manufacturing</td>
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<tr>
<td>Knowledge intensive services</td>
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<td>0.45</td>
</tr>
<tr>
<td>Manufacturing</td>
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<td>0.20</td>
</tr>
<tr>
<td>Business Services</td>
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<td>0.35</td>
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<td>Sales_y1</td>
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<tr>
<td>Equity_y1</td>
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<td>Sales_growth y0-y1</td>
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<td>4905.83</td>
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<tr>
<td>Equity growth y0-y1</td>
<td>37.12</td>
<td>1207.370</td>
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</table>

3 n=70,297; means and standard deviations are presented in percentages of the sample, in decimal form, with the following exceptions: number of owners; average age of owner, as well as share female owner that point at the average share of female owners within a venture and in the sample; analogously, share highly educated owner that point at the average share of owner with university degree within a venture and in the sample.
## Table 2: Characteristics of boards of directors in new ventures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>S.d.</th>
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<tbody>
<tr>
<td>New ventures with inside board members</td>
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<tr>
<td>Owner-chairman of the board</td>
<td>0.91</td>
<td>0.29</td>
</tr>
<tr>
<td>New ventures with family board members</td>
<td>0.41</td>
<td>0.49</td>
</tr>
<tr>
<td>New ventures with outside board members</td>
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<td>0.45</td>
</tr>
<tr>
<td>Inside board of directors (size)</td>
<td>2.37</td>
<td>0.95</td>
</tr>
<tr>
<td>Family board of directors (size)</td>
<td>0.46</td>
<td>0.60</td>
</tr>
<tr>
<td>Outside board of directors (size)</td>
<td>0.38</td>
<td>0.70</td>
</tr>
<tr>
<td>Outside board of directors team</td>
<td>0.07</td>
<td>0.25</td>
</tr>
<tr>
<td>Outside board /w similar industry experience</td>
<td>0.05</td>
<td>0.21</td>
</tr>
<tr>
<td>Outside board /w directorial experience</td>
<td>0.12</td>
<td>0.33</td>
</tr>
<tr>
<td>Outside board /w managerial experience</td>
<td>0.14</td>
<td>0.34</td>
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</table>
Table 3: Principal Component of Environmental Uncertainty

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Comp2</th>
<th>Comp3</th>
<th>Comp4</th>
<th>Comp5</th>
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<td>Growth (employment)</td>
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<td>Growth (sales)</td>
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<td>Volatility growth (sales)</td>
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<td>Average Profits</td>
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<td>S.E. profits</td>
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<tr>
<td>Mean assets</td>
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<tr>
<td>Share of R&amp;D</td>
<td>0.7911</td>
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<td></td>
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<tr>
<td>R&amp;D workers</td>
<td>0.6004</td>
<td></td>
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<tr>
<td>Number of firms</td>
<td>-0.3655</td>
<td></td>
<td></td>
<td>0.4405</td>
<td></td>
</tr>
<tr>
<td>Capital Intensity</td>
<td></td>
<td></td>
<td></td>
<td>0.7972</td>
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</tr>
<tr>
<td>Share of turnover (top 8)</td>
<td>0.6044</td>
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<tr>
<td>Sales concentration HHI</td>
<td>0.5649</td>
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<table>
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<tr>
<th>Classification</th>
<th>High Entry</th>
<th>Concentrated Sales</th>
<th>Volatile growth</th>
<th>R&amp;D intensive</th>
<th>Capital Intensive</th>
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### Table 4: OLS regression board experience and new venture growth measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1 Baseline</th>
<th>Model 2 Experiences</th>
<th>Model 3 Manufacturing</th>
<th>Model 4 Business Services</th>
<th>Model 5 Baseline</th>
<th>Model 6 Experiences</th>
<th>Model 7 Manufacturing</th>
<th>Model 8 Business Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales year of founding (log)</td>
<td>219.326***</td>
<td>219.660***</td>
<td>318.369***</td>
<td>159.213***</td>
<td>219.326***</td>
<td>219.660***</td>
<td>318.369***</td>
<td>159.213***</td>
</tr>
<tr>
<td>equity size at founding (log)</td>
<td>-6.275</td>
<td>-6.131</td>
<td>23.912***</td>
<td>-30.068+</td>
<td>-6.275</td>
<td>-6.131</td>
<td>23.912***</td>
<td>-30.068+</td>
</tr>
<tr>
<td>size owner team</td>
<td>257.103***</td>
<td>47.192***</td>
<td>255.714***</td>
<td>47.000***</td>
<td>50.1</td>
<td>45.36</td>
<td>11.84</td>
<td>6.98</td>
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<tr>
<td>Average age owner team</td>
<td>-10.019***</td>
<td>0.428</td>
<td>-10.403***</td>
<td>0.446</td>
<td>-8.066*</td>
<td>-0.745</td>
<td>0.96</td>
<td>1.13</td>
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<td>Corporate involvement</td>
<td>431.200***</td>
<td>9.12</td>
<td>379.782***</td>
<td>13.301</td>
<td>1.185.993***</td>
<td>174.473***</td>
<td>260.402***</td>
<td>74.84</td>
</tr>
<tr>
<td>Entrepreneurial spinoff</td>
<td>634.355***</td>
<td>-41.657***</td>
<td>612.094***</td>
<td>-39.282***</td>
<td>382.298+</td>
<td>0.859</td>
<td>316.117***</td>
<td>-61.577*</td>
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<tr>
<td>Young business owner experience</td>
<td>-60.97</td>
<td>-6.738</td>
<td>-6.285</td>
<td>-6.659</td>
<td>209.575</td>
<td>43.467***</td>
<td>-78.232+</td>
<td>-22.781</td>
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<tr>
<td>Parent Company involvement</td>
<td>623.819**</td>
<td>-101.903*</td>
<td>629.563***</td>
<td>-103.738*</td>
<td>1.156.476***</td>
<td>124.317***</td>
<td>40.28</td>
<td>23.20</td>
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<tr>
<td>Owner-chairman of the board</td>
<td>-551.700***</td>
<td>12.826</td>
<td>-519.365***</td>
<td>11.575</td>
<td>-287.543</td>
<td>4.374</td>
<td>-471.789**</td>
<td>34.57</td>
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<tr>
<td>size family board</td>
<td>-108.690***</td>
<td>48.115***</td>
<td>-104.141***</td>
<td>47.033***</td>
<td>-449.830*</td>
<td>-1.702</td>
<td>-199.912***</td>
<td>34.068</td>
</tr>
<tr>
<td>size outside board</td>
<td>73.143*</td>
<td>73.531***</td>
<td>-13.631</td>
<td>80.213***</td>
<td>-354.439*</td>
<td>12.743</td>
<td>-66.305+</td>
<td>126.608***</td>
</tr>
<tr>
<td>W/ outside director industry experience</td>
<td>-300.768***</td>
<td>-41.805+</td>
<td>2201.127***</td>
<td>100.097+</td>
<td>-278.201*</td>
<td>-249.765***</td>
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<td>52.72</td>
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<tr>
<td>W/ outside director board experience</td>
<td>256.456**</td>
<td>33.212</td>
<td>489.861</td>
<td>88.567***</td>
<td>350.454***</td>
<td>121.401***</td>
<td>46.27</td>
<td>43.39</td>
</tr>
<tr>
<td>Constant</td>
<td>-67.11</td>
<td>-162.335</td>
<td>-94.79</td>
<td>-156.606</td>
<td>1131.278</td>
<td>-79.212</td>
<td>57.13</td>
<td>-233.345</td>
</tr>
<tr>
<td>R-sq</td>
<td>0.06</td>
<td>0.01</td>
<td>0.06</td>
<td>0.01</td>
<td>0.16</td>
<td>0.13</td>
<td>0.11</td>
<td>0.01</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>0.06</td>
<td>0.01</td>
<td>0.06</td>
<td>0.01</td>
<td>0.12</td>
<td>0.08</td>
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<td>0.01</td>
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<tr>
<td>N</td>
<td>60,676</td>
<td>67,845</td>
<td>60,676</td>
<td>67,845</td>
<td>21,129</td>
<td>24,228</td>
<td>21,129</td>
<td>24,228</td>
</tr>
</tbody>
</table>

Standard errors in parenthesis
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001
Table 5: Board experience and new venture growth measures

<table>
<thead>
<tr>
<th>Sample</th>
<th>Manufacturing Sales growth</th>
<th>Manufacturing Equity Growth</th>
<th>Business Services Sales growth</th>
<th>Business Services Equity Growth</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Above median</td>
<td>4th Quantile</td>
<td>1st quantile</td>
<td>4th Quantile</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td></td>
<td>Above median</td>
<td>4th Quantile</td>
<td>1st quantile</td>
<td>4th Quantile</td>
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</tbody>
</table>
|        | Above median              | 4th Quantile                | 1st quantile                  | 4th Quantile                | 1st quantile                  | Above median              | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Quantile | 1st quantile | 4th Qua