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Title: The Effects of Government Funding on Board Turnover in New Ventures

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The Effects of Government Funding on Board Turnover in New Ventures: A Longitudinal Study of Innovative U.S.- Based Venture Boards

Abstract: Research about the governance of new ventures is limited. New venture boards are different from public firm boards as they are usually smaller, less formal and include outside and inside directors. Governments provide financial support to such ventures in order to develop innovative industries. The effect of this government funding on the board of directors of new ventures is unknown. Using the resource-based view (RBV) and signaling theory, two contradicting arguments have been made. From the RBV perspective it is argued that government funding allows ventures to develop resources that are valuable, rare, inimitable and non-substitutable. This should allow the venture to perform better which should lead to a decrease in board turnover. A signaling theory approach suggests that government funding should lead to an increase in board turnover. Government funding signals a venture's potential which increases outsider interference and reduces the need for experienced board members as signals of future potential. Based on a sample of U.S.-based science and engineering ventures incorporating a longitudinal design, it is found that government funding significantly increases board turnover in new ventures in support of signaling theory.

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1. Introduction

Many new ventures do not survive beyond a few years after their founding (Soto-Simeone et al., 2020). Considerable evidence is found however, that shows that government funding can significantly increase the chances of survival of such a new venture (Conti, 2018; Ferrucci et al., 2021; Pellegrini & Muccigrosso, 2017; Zhao & Ziedonis, 2020). New ventures can be described as entrepreneurial private firms that are professionally funded (Garg, 2013). Governments all over the world are supporting new ventures through financial means (Onesti et al., 2022; Zhou et al., 2022). Government funding increases the resources available to a firm and can change characteristics such as the profitability (Onesti et al., 2022), growth (Ferrucci et al., 2021) or performance (Söderblom et al., 2015). Moreover, this funding legitimizes start-ups and draws the attention of other means of funding such as venture capital (VC) (Islam et al., 2018; Söderblom et al., 2015; Zhou et al., 2022).

Even though government funding is a commonly used tool to spur innovation and help new ventures survive and perform (Conti, 2018), it is not yet known what the full effects of government funding are on new ventures. There are in particular no studies yet that dive into the effects of government funding on new venture board turnover. Meanwhile, the board are the ultimate decision makers within such a new venture (Garg & Furr, 2017) and play a major role in the success of a new venture. The boards of these new ventures usually differ much from public firms. They are less formal, smaller in size, can include outside investors and directors are very involved in the development of the venture (Garg, 2013). This context makes it difficult to predict the full effects of government funding on board turnover as this is an area of research that is underdeveloped and therefore in need of further development (Garg & Furr, 2017). Moreover, there is little to no research showing causes of board turnover in these ventures even though the general arguments for board turnover are not likely to coincide with that of new ventures. The current knowledge regarding board turnover is based on bigger, public firms which have a very different board with different board members, issues, responsibilities, and dynamics compared to new venture boards. This severely questions if the general knowledge can be applied to this new context.

Conflicting arguments can be made regarding the effects of government funding on board turnover of new venture boards. Using the resource-based view (RBV) (Barney, 1991), it can be expected that the extra financial resources available to government funded new ventures enables them to invest in developing resources that are valuable, rare, inimitable and non-

substitutable such as patents (Howell, 2017) and human capital (Söderblom et al., 2015). These resources enable the firm to deliver valuable offerings and create a sustained competitive advantage (Barney, 1991). Therefore government funded firms can increase their performance (Colombo et al., 2011; Luo et al., 2021; Onesti et al., 2022; Söderblom et al., 2015) and financial stability (Conti, 2018; Ferrucci et al., 2021; Pellegrini & Muccigrosso, 2017; Zhao & Ziedonis, 2020) of which both should lead to lower board turnover (Fiet et al., 1997; Harrison et al., 1988; Wagner et al., 1984) as both investors and other stakeholders are more satisfied with board members and therefore less inclined to dismiss board members if the firm is performing well.

However, using a signaling theory approach (Spence, 1973), one might argue the opposite effect being true. Government funding signals to investors that a firm is likely to be a successful and a high growth company and especially VC investors therefore want to invest in these ventures that have been legitimized by the government funding (Islam et al., 2018; Söderblom et al., 2015; Zhou et al., 2022). An increase in VC investors likely means more influence of outside directors that are more easily inclined to dismiss board members if the venture is not moving in the direction they want it to move (Boeker & Wiltbank, 2005; Fiet et al., 1997). Moreover, the signal of government funding might reduce the need for board members as a signal of great potential (Colombo, 2021). New ventures might no longer need board members to legitimize the venture if they receive government funding. This means that government funded firms should see an increase in board turnover.

Based on the existing literature it is thus yet difficult to argue a definitive effect of government funding on turnover of the board of new ventures. At this moment, one can argue for contrary effects at best. Therefore, these conflicting arguments in a context of new ventures that is not yet widely explored, leads to the following research question: How does government funding affect board turnover in new ventures?

This article will explore the effects of government funding on new venture characteristics in an attempt to extend the understanding of the inner workings of the governance of new ventures, which can enable a better understanding of new venture development. From the changes that government funding bring in a new firm, it can be tested to what extent it influences turnover of the board. By doing this, it is possible to test if government funded new ventures significantly differ to non-government funded ventures in terms of board turnover.

Moreover in this way it can be tried to get a more definitive answer to the conflicting expected effects.

To answer the research question and to test the hypotheses that have been developed a panel data logit regression has been performed. This analysis has been conducted using data from Crunchbase and BoardEx on new ventures and their board members in the science and engineering industry with a focus on biotechnology and artificial intelligence in the United States. By exploring the relationship between government funding and board turnover, this paper will therefore try to enlarge the existing literature of consequences of government funding on new ventures by looking specifically at the yet unexplored influence on board turnover.

The paper is structured as follows: first, the most important findings in the literature regarding government funding of new ventures is discussed. Government funding is explored using the resource-based view of the firm (Barney, 1991) and signaling theory (Spence, 1973). The characteristics of new venture boards and board turnover are discussed as well. In this section multiple hypotheses are formulated. Second, the methodology section focuses on the way the data has been retrieved and analyzed using quantitative analysis. Third, the findings of the analysis are shown and the hypotheses are tested. Fourth, a discussion follows that includes a conclusion of the most important findings, the implications of these findings, a critical reflection on the limitations of the research and directions for future research.

2. Literature review

Government Funding

Governments worldwide (Onesti et al., 2022; Zhou et al., 2022) provide funding to a very diverse set of organizations. Both established (Gössling et al., 2017) firms and newer firms (Söderblom et al., 2015), for profit (Armanios et al., 2017) and nonprofit (Luksetisch, 2008) organizations, in all kinds of industries can receive government funding. Funding can be at a very local level (Zhae & Ziedonis, 2020), but can also occur at a national or transnational level, such as the European Union (Dvouletý et al., 2020). This funding is not a recent development either (Toepler, 2018). Governments help these ventures with financial means in order to spur innovation (Conti, 2018; Errico et al., 2023; Hottenrott & Richstein, 2020; Zhou et al., 2022),

employment (Hottenrott & Richstein, 2020; Lerner, 1999) and economic growth (Armanios et al., 2017).

A common effect of government funding found in the literature is that it helps start-ups survive (Conti, 2018; Ferrucci et al., 2021; Pellegrini & Muccigrosso, 2017; Zhao & Ziedonis, 2020). This is due to the fact that these start-ups have more financial resources to develop. Because new ventures that receive government funding have extra financial means, they are able to invest more compared to new ventures that do not receive such funding. The funding can and often will be invested in research and development (R&D) (Errico et al., 2023; Hottenrott & Richstein, 2020; Lerner, 1999). This R&D spending allows a government-backed firm to grow rapidly (Ferrucci et al., 2021; Lerner, 1999), innovate (Conti, 2018; Errico et al., 2023; Hottenrott & Richstein, 2020; Zhou et al., 2022) and produce more patents as a result (Howell, 2017).

The resource-based view of the firm (RBV) recognizes that in industries, when there is a heterogeneity and immobility of resources, it enables firms to create a sustained competitive advantage (Barney, 1991). Firms within the same industry can perform very differently due to the resources available to them if these resources are valuable, rare, inimitable and non-substitutable. By applying the resource-based view to government funding, it becomes clear that firms that receive government funding can gain a competitive advantage as a result of the resources available to them and the way these resources are used.

Patents as a result of this R&D spending and focus on innovativeness can become valuable intangible resources that are unique to the firm and can provide firms with a sustainable source of advantage (Hall, 1992; Hsu & Ziedonis, 2013). A competitive advantage can help a firm grow, perform and be successful. The extra financial means that allow a venture to invest and as a result of that grow, can also lead to start-ups that are supported by governments to become bigger in size than their counterparts (Girma et al., 2010).

By being able to innovate and having the financial means to invest, the start-up that is supported by the government can gain a competitive advantage and increase its performance (Colombo et al., 2011; Luo et al., 2021; Onesti et al., 2022; Söderblom et al., 2015). Related to its performance, a government-funded new venture can increase its productivity (Colombo et al., 2011; Onesti et al., 2022) when, for instance, the venture uses the financial resources to hire more qualified personnel (Onesti et al., 2022). The availability of more personnel and most

notably highly qualified personnel is also a form of human capital which is a valuable, rare, inimitable and non-substitutable resource for sustained competitive advantage (Barney, 1991).

Government funding can help a new venture increase its sales (Lerner, 1999), revenue (Hottenrott & Richstein, 2020; Howell, 2017) and profitability (Onesti et al., 2022) through the ability to commercialize innovative ideas. It is able to deliver innovative offerings in an efficient way by making use of the financial resources to invest. It must be noted that these effects are especially present in innovative new ventures (Ferrucci et al., 2021; Onesti et al., 2022) and are mostly recognized when the government funds are selective (Colomno et al., 2011; Luo et al., 2021).

Apart from the resource-based advantages that a new venture gains through government funding, a second influential consequence can be explored using signaling theory (Spence, 1973). From the view of signaling theory it becomes clear that government funding can help in decreasing information asymmetry (Hottenrott et al., 2018). With limited information, just like it is unknown beforehand to an employer if an applicant will make a good employee (Spence, 1973), it is often unknown to an investor if a new venture will be successful (Hottenrott et al., 2018). Certain signals however can help decrease the uncertainty and help the decision maker make a better informed decision (Connelly et al., 2011).

The government funding signals to other firms and potential investors that the venture is a legitimate firm to invest in (Islam et al., 2018; Söderblom et al., 2015; Zhou et al., 2022). The information asymmetry between the venture's management and the potential investor will decrease since the government trusts this start-up enough to fund it (Hottenrott et al., 2018). This legitimization and decrease in information asymmetry then leads to investors to become more willing to invest in the government funded venture, since the investors know that government funded firms are more likely to succeed, which increases the chances of success even more (Conti, 2018; Howel, 2017; Islam et al., 2018; Lerner, 1999; Söderblom et al., 2015; Zhao & Ziedonis, 2020; Zhou et al., 2022). In this way a new venture as signaler can use the signal of government funding to acquire funding from the receivers which are firms and investors willing to invest in new ventures (Connelly, 2011). Banks are also known to be willing to give out loans more easily to start-ups receiving government funding for these same reasons (Hottenrott et al., 2018). This extra funding can thus help a new venture acquire even more resources to help develop the venture and make it successful. Moreover, prestigious government grants in particular can even help ventures that receive these grants attract more

qualified personnel since it becomes more attractive to work at such a firm (Söderblom et al., 2015). A prestigious grant can in this way be a signal to qualified people that shows that a venture has a certain potential or quality.

Board Turnover

The board of directors of a firm often consists of the chief executive officer (CEO), inside and outside directors (Weisbach, 1988). Within a new venture the CEO is oftentimes (one of) the founder(s) of the venture (Garg & Furr, 2017). The board's task is to monitor the performance of the firm and give advice (Garg, 2013). Inside directors include the CEO and executives, while outside directors are often investors or other related directors (Garg & Furr, 2017).

Before turning to the causes of board turnover, it is important to note that boards of new ventures can be distinguished from public firm boards. A new venture in this paper is a firm that has not yet completed an initial public offering (IPO), is typically small and entrepreneurial (Garg, 2013) and is privately owned and professionally funded (Garg & Furr, 2017). These new ventures can have a board of directors, which is most commonly found in the U.S., but this is not a legal requirement for a venture (Cumming et al., 2010).

A new venture board is usually smaller in size than a public firm board, but the board members are often very involved with the new venture (Garg & Furr, 2017). These board members are much more engaged in the actual strategizing and resourcing than in a public firm board (Zhang et al., 2011). Moreover there is a lack of a formal board leadership structure or formal positions and responsibilities (Garg, 2020). New ventures often have outside directors that are investors such as venture capital (VC) board members (Garg & Furr, 2017). The new venture also depends a lot on outside directors for their substantial knowledge and funding (Garg & Eisenhardt, 2017).

The difference between ownership and control in public firms that can cause agency problems is much less present in venture boards (Garg, 2013; Garg, 2020; Garg & Furr, 2017; Krause & Bruton, 2014). A large part of ownership resides with the directors in the board. However, this does not necessarily mean that there are less problems within the board. Conflicts between directors can erupt, because in new ventures board members are likely to have different views of what the venture should look like and board members can have very different goals (Forbes et al., 2010; Garg, 2013). Outside directors are often more focused on very fast growth in order to sell the firm or go public (Garg & Furr, 2017). However, founders might be less inclined to sell the venture and might want a more stable growth (Garg, 2013).

Turnover of the board can be seen as a change in board membership through members exiting the board and depending on the definition can also include new members entering the board (Qiang et al., 2023). Here the focus is on board members leaving. CEO turnover is heavily intertwined with the rest of the board, which means that CEO dismissal leads to a very high likelihood that more members of the board will change (Eriksson et al., 2001). The dismissal of CEO's in particular is a topic that is widely discussed in the literature. The following causes for turnover that will be discussed are made in relation to public firms instead of new ventures as there is yet no information available on this topic for ventures.

Board members can be dismissed for a multitude of reasons. Oftentimes a direct reason for board turnover is related to the financial results of the firm (Harrison et al., 1988). Performance in general has an effect on board turnover (Fiet et al., 1997; Harrison et al., 1988; Wagner et al., 1984). Poorly performing firms in any regard are more likely to have an increase in board turnover since people think the governance needs to change in order to increase performance. This effect is stronger for inside directors than outside directors and board members can also leave voluntarily if performance is worsening to protect their reputation (Asthana & Balsam, 2010). Moreover, an often perceived cause for turnover in the board is a poor stock price performance (Coughlan & Schmidt, 1985; Jensen & Murphy, 1990). When a firm performs poorly on the stock market, shareholders will get dissatisfied and can demand changes of leadership hoping to change the course. A decrease in profits (James & Soref, 1981; Osborn et al., 1981) or in sales (Kaplan, 1994) can also be related to an increase in board turnover for similar reasons.

Even though the most obvious causes for turnover in the board are related to financial setbacks, there are other reasons that increase the probability of turnover. Eriksson et al. (2001) found that larger and older firms are more likely to have higher amounts of board turnover. This has to do with the fact that CEO's of larger and older firms have higher compensation levels. Firms that include VC directors in their board of directors also face an increase in board turnover (Boeker & Wiltbank, 2005; Fiet et al., 1997). This is because outside directors like venture capitalists are more independent and objective than inside directors and want to signal that they are heavily involved in the firm (Boeker & Wiltbank, 2005). They may care less about the specific board member as a person and more about their performance.

Increasing the size of the board however, can lead to a decrease in board turnover since it is more difficult to reach consensus and make a difficult decision in a larger and more diverse

board (Fiet et al., 1997). Family involvement in family firms also causes there to be less board turnover if this reduces conflicts between members (González et al., 2019). Conflicts between members and instability are in fact a major source of turnover as board members can not cooperate well and are more inclined to leave or be dismissed in a situation of conflict (Acharya & Pollock, 2021).

The skills of a founder can also be related to board turnover. Higher growth of a new venture leads to an increase in turnover of in particular the founder, because the often relatively unexperienced founder cannot keep up with the development of the firm and the needed skills for such a growth (Rubenson & Gupta, 1992). However, This is only the case in unexpected or extremely high growth which increases the difficulty of keeping up with the changes (Fiet et al., 1997).

Board turnover is also related to organizational crises and scandals. Board members are more likely to exit voluntarily when a firm is facing an internal crisis (Withers et al., 2012). When a firm has to perform a financial restatement because of mistakes made, it increases the chances of board turnover (Arthaud-Day et al., 2006). Moreover, companies that commit fraud see an increase in board turnover, most notably the turnover of outside directors increases (Gao et al., 2017). The board acts this way to signal that it is taking action to change the problematic situation the firm is facing and next to that, board members want to keep their reputation from being harmed by the misconduct (Marcel & Cowen, 2014). Company boycotting is also an effective predictor of board turnover (McDonnell & Cobb, 2020). Directors are likely to leave if the social responsibility that they align with, is being questioned by movements.

Hypotheses Development

Based on the most important findings that have been presented concerning government funding and board turnover, a few hypotheses can be made. By looking at the consequences of government funding for a new venture, different effects on board turnover in such ventures can be thought of. In this section the literature regarding causes of board turnover will be applied to the context of a new venture.

From the RBV perspective, it can be argued that government funded ventures perform better than non-government funded ventures due to the ability of these funded ventures to invest their financial resources in developing resources that are valuable, rare, inimitable and non-substitutable. As new ventures are usually young and develop rapidly, they experience much change and uncertainty (Garg, 2013). The fact is that if there are financial problems and

viability uncertainties in a firm, the board is more likely to change (Harrison et al., 1988). New ventures thus can expect problems in this regard. However, it can be expected that government funding which leads to more stability and better chances of success (Conti, 2018; Ferrucci et al., 2021; Pellegrini & Muccigrosso, 2017; Zhao & Ziedonis, 2020) as a result of having more stable financial means, will lead to less board turnover than when it does not receive government funding.

It is argued that performance can be related to turnover as in a worse performance can increase board turnover (Fiet et al., 1997; Harrison et al., 1988; Wagner et al., 1984). Government funding increases the performance of new ventures (Colombo et al., 2011; Luo et al., 2021; Onesti et al., 2022; Söderblom et al., 2015). These government supported firms have more financial means to invest in R&D (Errico et al., 2023; Hottenrott & Richstein, 2020; Lerner, 1999) and attract human capital (Söderblom et al., 2015) which leads them to develop resources that are valuable, rare, inimitable and non-substitutable such as patents and qualified personnel (Barney, 1991). The reason that a decrease in performance usually leads to an increase in board turnover is because shareholders want to create maximum value and ensure firm viability (Jensen & Murphy, 1990). When a firm is performing poorly this goal will get jeopardized so shareholders want a change in leadership to augment the performance (Coughlan & Schmidt, 1985). In ventures similar processes can be imagined. Even though there are no public shares and shareholders since a venture is still private (Garg, 2013), the owners of the venture, which can be a part of the board (Garg & Furr, 2017), likely still want their venture to be successful and viable. Since these owners are highly involved and have invested their capital, they will likely be satisfied with the board if their venture is performing well financially but active if it is not.

Conversely, Garg and Furr (2017) question if performance is a reliable cause for CEO replacement, as ventures that perform well also have very high replacement rates of CEO's. However, this effect is only seen in founder CEO succession who run a highly successful venture (Wasserman, 2003). The broader context of a dismissal of the larger board which also includes other inside and outside directors does not necessarily have to show this same effect. The reason why these founder CEO's are dismissed is mostly because they cannot keep up or do not have the skills to run the venture when it is increasingly growing (Rubenson & Gupta, 1992). This argument does not necessarily also relate to other board members as outside directors often have very much and different skills that relate to the venture (Garg & Furr, 2017) and some form of inside directors are needed to successfully run the company.

The increased performance can also be seen in an increase in sales (Lerner, 1999) and profit (Onesti et al., 2022) due to the better offerings these ventures can deliver as a result of the developed resources. A decrease in sales (Kaplan, 1994) and profit (James & Soref, 1981; Osborn et al., 1981) are known causes for board turnover. A better performance and more profit means most of the time that a firm is doing better, and if a firm is doing well it is less likely that the board will be dismissed similar to the argument of financial performance.

Government funding is also known to increase the growth of a venture (Ferrucci et al., 2021; Lerner, 1999) and when firms grow, their boards usually grow in size as well. Moreover more investment rounds for these new ventures often lead to an increase in board size (Garg, 2013) and overall government funded ventures are getting more investments next to the government funding (Islam et al., 2018). In these larger board it is more difficult to reach an agreement with many different members that have different opinions and objectives, so as a result board turnover will decrease as agreeing on dismissing a board member can be a difficult decision (Fiet et al., 1997).

Using the RBV to explain the effects of government funding it can be argued that these ventures face a decrease in financial problems, an increase in performance and an increase in board size. These consequences of government funding should together lead to a decrease in board turnover. Therefore the following hypothesis can be made:

H1: Government funding will reduce turnover of the board in new ventures.

However, there are not only arguments for a decrease in turnover as a consequence of government funding. Based on a different view using signaling theory (Spence, 1973) the reverse might be true.

Due to the attention and legitimation that a venture receives by getting government support, other actors want to invest in the venture as well (Islam et al., 2018; Söderblom et al., 2015; Zhou et al., 2022). The government funding can act as a signal to investors that the venture is worth investing in as it signals the increased likelihood of success and survival of these ventures (Hottenrot et al., 2018, Lerner, 1999). Therefore such a venture is a less risky investment for outside investors and this increases the likelihood of outside investors willing to invest in the venture. However, it can be expected that these outside investors want to have a say in the matters of the venture because they have a great financial interest in the venture's success (Garg & Furr, 2017).

As stated before, outside directors are often investors that are part of the board and can in this way influence the venture (Garg, 2013; Garg & Furr, 2017). This leads to outsiders willing to influence the decision making of the board (Garg & Furr, 2017). Venture capitalists, which are an important source for early-stage funding, are known to closely monitor developments relating to their investments and oftentimes venture capitalists are able to get a seat at the board of the start-up (Garg & Furr, 2017). These venture capitalists can be critical of the venture and can push the venture to fire or hire new board members when the results are not in line with expectations (Boeker & Wiltbank, 2005; Fiet et al., 1997). Moreover, outside directors are known to be more objective in their assessment of board members and are less reluctant to dismiss board members when they do not achieve the wanted results (Boeker & Wiltbank, 2005).

Goals of outside directors such as venture capitalists do not completely align with that of inside directors and founders (Garg, 2013). Venture capitalists often want the venture to quickly grow in order to perform an initial public offering (IPO) or sell the firm via mergers and acquisitions (M&A) (Garg & Furr, 2017). The founders of these firms and the inside directors might be more inclined to grow in a steady way and keep being a private company, or want to have their own vision that they set at the beginning come to fruition (Garg, 2013). These differences in visions of the future of a venture can possibly lead to conflicts between directors. A result of conflicts is that an increase in turnover becomes more likely (Acharya & Pollock, 2021).

Next to the signal of government funding is also entrepreneurial/board member signaling. Board members in a venture can act as a signal towards investors that a venture is managed well and will therefore likely be successful (Colombo, 2021). Board member characteristics can reduce information asymmetry as investors can observe some characteristics of board members that will likely make the firm perform better such as identity, behavior, experience, knowledge, skills etc. (Beckman et al., 2007; Colombo, 2021; Ko & McKelvie, 2018). To evaluate what ventures to invest in, investors will partially base their argumentation on these specific founders or board members (Busenitz et al., 2005; Plummet et al., 2016). It can be imagined that the signal of government funding reduces the need for board member signaling. As a firm receives government funding, it already signals to investors that it is a venture worth investing in and it might therefore not need the signaling function of adequate board members anymore. This does not necessarily mean that the signal of board members will get replaced entirely as a combination of both can increase funding even more (Plummet et al. 2016), but these members might become less of a necessity for ventures. It can therefore be expected that

government funding will legitimize a venture and in turn reduce the need for having an extensive amount of experienced board members.

Government funding is shown to make a start-up grow faster (Ferrucci et al., 2021; Lerner, 1999). This can be explained once again by the financial support and attention given by investors. This growth can be so big that the founders cannot keep up with the changes and will have to leave (Rubenson & Gupta, 1992) and this might be especially present as a result of a combination of both government funding and other investors investing in the venture. This growth also increases the size of the firm compared to a start-up that does not receive government funding. Bigger firms often have a higher turnover due to the fact that the CEO and the board have less control in a bigger firm (Eriksson et al., 2001).

By taking a signaling theory perspective it can be argued that government funding leads to an increase in outsider intervention, an increase in potential conflicts, a decrease in the need for board members as a signal and an increase in growth and size. Therefore it can be expected that government funding will increase the turnover of the board.

H2: Government funding will increase turnover of the board in new ventures.

3. Methodology

Data

To test both hypotheses, data has been retrieved regarding new ventures that receive government funding in some form. Because it is often mentioned in the literature that the effects of government funding on a new venture are most influential in innovative firms (e.g. Ferrucci et al., 2021; Onesti et al., 2022), the scope for this research is limited to science and engineering industries with a focus on biotechnology and artificial intelligence (AI). Biotech is an industry characterized by a lot of government grants (Kolympiris et al., 2014), because these firms can have a huge impact on the future health of people (Evens & Kaitin, 2017). Besides, it is an industry characterized by a lot of innovation and potential (Evens & Kaitin, 2017). Artificial intelligence is a relatively novel industry that shows future potential and the United States is funding this sector as part of its strategy to stay ahead globally (Abadi et al., 2020; Reis et al., 201). A primary reason for government funding found in the literature is often to support innovation (Conti, 2018) which makes the selected industries a perfect sample for research efforts in this field.

Crunchbase has been used to acquire data about company specifics such as: founding date, amount of funding, location etc. Only the companies that were established in the last 7 years have been chosen to make sure that the companies are still relatively young. Only companies headquartered in the United States have been chosen, because these companies are more likely to have a board in the beginning stages (Cumming et al., 2010) and there is only a one-tier board structure in the U.S. (Millet-Reyes & Zhao, 2010) which reduces difficulties in interpreting board turnover. Moreover, the U.S. context is also most commonly used in the literature discussed which is focused on the board of directors. However, this does not mean that the support is only from the U.S. government for these ventures. The European Commission for instance also supports some ventures headquartered in the United States. Based on these criteria, the search led to an initial amount of 754 new ventures that receive grants in one way or another. Upon further inspection, it was found that some of these ventures only received grants from non-profit organizations such as the Bill and Melinda Gates Foundation (Bill & Melinda Gates Foundation, n.d.) and not from the government. Although these grants might have an interesting effect on new ventures, they are outside the scope of this paper. It was found that there is a broad range of government institutions that are giving grants to these science and engineering ventures, for instance from the national institute of health or the ministry of defense.

Using the final dataset of companies retrieved from Crunchbase, the companies that were relevant for this study were then inserted into the BoardEx database. BoardEx is a database specifically designed for data on boards of firms. This made it possible to get data on the turnover of the board, turnover dates, director roles, etc. BoardEx does not contain information on all existing companies and therefore could not find data on all the relevant companies found by Crunchbase. Only 187 companies remained after putting the data into BoardEx. This data did not always include all needed information on directors and their positions. In order to fill in some missing dates of positions, the websites of the specific companies were used in combination with LinkedIn searches on individuals.

Dependent variable

The dependent variable is board turnover. This variable is a binary, yes or no variable that describes board members leaving the new venture. This variable has been retrieved by looking at the end dates of board members in the venture. If no end date was given, it is assumed that the person still works as a director at the venture.

Independent variable

The independent variable used in this paper is government funding. This variable is analyzed at a categorical level since it is not differentiated how much government funding a venture is receiving, but rather if a venture is receiving government funding or not. For the sake of this analysis, it is most interesting to look at differences between receiving government funding in one year or not to determine the effects following this funding. This variable has been transformed to dummy variables for use in the analysis.

Control variables

The control variables are variables which are not of primary interest but might influence the outcome and are therefore controlled in the analysis (Bernerth & Aguinis, 2016). By adding extra control variables, it might be possible to increase the fit of the model and control for more and different relationships (Hair et al., 2019). Next to that, it might be possible to uncover extra effects that are not previously known. Venture size is included based on the amount of employees. Because only indications and no exact numbers of employees are available, dummy variables were created based on these indications. The dummy variables for size are: small, medium and large. Where small is estimated to be between 1 and 10 employees, medium between 11 and 50 employees and large 50 and more employees. Age of the venture is a metrically scaled variable that can be calculated based on the data available and ranges from 0-7 years because that is the selected timeframe for the data. In the dataset there are firms that have only recently been founded but also firms that have been operating since 2017. This makes the dataset unbalanced.

The number of funding rounds can signal what stage a firm is in. This might legitimize a firm and signal to new investors that it might be worth it to invest in the venture. This, in turn can go both ways in terms of board turnover for the venture. More VC involvement can cause problems in terms of conflicts of interest (Forbes et al., 2010; Garg, 2013) which can increase turnover of board members (Acharya & Pollock, 2021). But more investment can help the firm invest in developing sources of competitive advantage, which can increase performance and decrease turnover (Fiet et al., 1997; Harrison et al., 1988; Wagner et al., 1984).

Total number of founders could also relate to turnover. As founders usually have board positions (Garg & Furr, 2017), if there are more founders, more members of the board can be dismissed. Furthermore, the total amount of funding a venture has received can be argued to be related. Similar to the argument of the RBV in terms of government funding, overall funding

can increase the ability of ventures to gain a competitive advantage (Barney, 1991) and perform better financially decreasing the turnover (Fiet et al., 1997; Harrison et al., 1988; Wagner et al., 1984). Next, the number of investors. One might argue that the number of investors can be related to turnover. As an increase in all types of investors could potentially cause conflicts of interest (Forbes et al., 2010; Garg, 2013) which can increase turnover of board members (Acharya & Pollock, 2021).

Method

In order to perform the needed analysis on the data, the data has been transformed into panel data. Panel data allows analysis of longitudinal data of both dependent and independent variables that can change over time (Hair et al., 2019). Moreover, panel data can accommodate a large number of units over different time periods which suits the data. In this case the 187 companies are measured yearly over a time period of about 7 years which means that the total observations is 1214. As not every company has existed for the full time period, the amount of observations does not correspond with 187 companies times 7 years.

The quantitative method used to test the hypotheses is a logistic regression analysis accommodating for panel data. This method is used as it can measure dependency between multiple independent variables and a binary dependent variable (Hair et al., 2019). In this case there is one dependent variable and an independent variable with control variables. It is used here to test if there is some statistical relationship between government funding and board turnover in the sample of new ventures. Moreover, the analysis should enable explaining observations.

Ethics and limitations

To take the privacy of companies and individuals into account, the specific names of board members or companies used in the analysis will not appear in this paper even though much of the data is to some degree publicly available. There will be no contact details or other information that allows tracing individuals or companies. If specifics need to be addressed, these names will be anonymized. Due to limitations of the databases, not every existing and relevant venture can be included in the analysis, but there still is a sufficient sample size to perform the analysis.

Testing assumptions and data analysis

Before testing the actual hypotheses, it is needed to analyze the data in order to check the quality of the data and the necessary assumptions of a logit model using panel data. Starting with the missing data, a large amount of data is missing in the dependent variable. The most likely reason for this much missing data is because some of the ventures in the dataset either have no board at all and can therefore not have board turnover data or because these ventures are small, private and relatively new. BoardEx does not always have data on all companies and individual board members in these cases. Other variables show little missing data except for funding amount and number of founders. To test if there are problems related to the randomness of the missing data, Little's MCAR (Little, 1988) test has been performed. This test returned a χ^2 value of 209.563 with a p value of 0.00, meaning the test is significant. This means that the randomness of the missing data can be classified as missing at random (MAR) (Little, 1988). There has been no imputation even though the data is not MCAR. This is because the software Stata already largely accommodates for missing data in a xtlogit model (Young & Johnson, 2015). Moreover, multiple imputation should not drastically improve the model. The missing data on a variable is within the companies over the entire observation period in combination with the same companies having missing data on multiple control variables which makes imputation using only a few other observations unreliable. The drawback however is that as a result of no imputation, quite some cases have been deleted which seriously reduces the amount of valid cases. In this instance, an initial amount of 47.7 percent of cases were deleted which reduces the amount of 1214 observations to 635 and the amount of companies from 187 to 120 based on the missing values for the dependent variable. Adding all control variables furthermore decreases the observations from 635 to 459. This will likely result in a decrease in statistical power as well (Hair et al., 2019).

To detect possible outliers in the sample, Mahalanobis distance is used (Hair et al., 2019). Based on all the variables relevant for the analysis, the Mahalanobis distance is calculated for each observation. The resulting numbers were then transformed by using the degrees of freedom in order to be able to interpret the results. Using a conservative significance probability level of 0.001, there was a significant difference found for the venture number 136. The reason this venture is detected as an outlier is because of the extreme value of total funding amount of almost 2 billion dollars and a total number of investors of 40. To make sure that this result was not due to data entry or measurement mistake, the data was checked using news articles and the publicly available company information. After careful consideration it was found that the

data in the dataset is valid and is not caused by some mistake. As a result it is possible to conclude that this outlier is a true outlier. Therefore it is decided to not delete this outlier.

Other assumptions of logistic regression are of not much relevance in this case (Hair et al., 2019). Independence of observations is not possible, since panel data is used to estimate the model. The linearity of the logit can be tested for continuous variables. This means that age in years, total funding amount, number of founders, number of investors and number of funding rounds have all been tested using the Box-Tidwell procedure (Box & Tidwell, 1962). New variables are created based on the product of the variable and the log of the same variable. These variables are then added to the logit model that is used for testing the hypotheses. The added variables all show a nonsignificant effect, meaning that the assumption of linearity of the logit is not violated. This means that no further transformation of variables is needed and the assumption of linearity of the logit is accepted.

The independent variables were also tested for multicollinearity. The variance inflation factors (VIF) across the variables range from 1.02 to 3.38 which falls well below the threshold of 10 (Myers, 1990). Moreover the tolerance values across the variables range from 0.295876 to 0.984284 which is higher than the value 0.1 that is at least needed (Menard, 1995). This means that multicollinearity is of no particular concern in this case.

4. Findings

Descriptives

Table 1 includes the descriptives of the variables used over the different models. The dependent variable includes a lot of missing data. Moreover, the mean shows a value of 0.08 This can be interpreted as a very low occurrence of turnover across the data as a director leaving the firm is coded as a 1 and a director not leaving the firm is coded a 0. Dummy variables can be seen by the minimum value of 0 and maximum of 1. Next to this, by looking at the means of the different sizes it is possible to see group sizes. The most occurring size of the ventures in the dataset is small. As the sizes are dummy variables based on the same variable, both valid and missing cases are the same. The number of investors includes the total of different individuals, organizations etc. having invested in the venture. Total funding amount includes all funding from all funding types a venture has received. The number of funding rounds has to do with the different types of funding rounds combined, such as seed, series A, series B etc.

Variable	Valid	Missing	Mean	Standard Error	Standard Deviation	Range	Minimum	Maximum
Turnover	635	579	0.08	0.011	0.277	1	0	1
Funding Type	1214	0	0.24	0.012	0.43	1	0	1
Size Small	1206	8	0.57	0.014	0.495	1	0	1
Size Medium	1206	8	0.35	0.014	0.476	1	0	1
Size Large	1206	8	0.08	0.008	0.273	1	0	1
Age in Years	1214	0	2.92	0.06	2.089	7	0	7
Number of Investors	1207	7	4.75	0.169	5.876	39	1	40
Number of Founders	939	275	2.06	0.035	1.082	6	1	7
Total Funding Amount	1110	104	42833406.13	6267220.504	208802870.3	1998975000	25000	1999000000
Number of Funding Rounds	1214	0	3.53	0.075	2.628	16	1	17

Table 1: Descriptive Statistics

	Age in Years	Turnover	Size Small	Size Medium	Size Large	Funding Type	Number of Funding Rounds	Number of Investors	Total Funding Amount	Number of Founders
Age in Years	1									
Turnover	0.0183	1								
Size Small	0.0029	-0.1049	1							
Size Medium	-0.0344	0.0375	-0.8423	1						
Size Large	0.0547	0.1166	-0.3433	-0.217	1					
Funding Type	0.0431	0.0923	0.0174	-0.0182	0.0002	1				
Number of Funding Rounds	0.0298	0.0571	-0.1519	-0.0177	0.306	0.1769	1			
Number of Investors	0.0276	0.1257	-0.3177	0.0371	0.5097	0.0377	0.6436	1		
Total Funding Amount	0.0323	0.1021	-0.2137	-0.0089	0.4003	-0.0262	0.155	0.5801	1	
Number of Founders	-0.0354	-0.018	-0.1146	0.0512	0.1129	0.0403	0.2744	0.2533	0.1755	1

Table 2: Correlation Matrix

Base model

The base model is a random-effects logit model that includes the dependent variable and all of the control variables that were expected to correlate with the dependent variable turnover based on the literature and the argumentation in the methodology section. However, by looking at the model, no significant relationships can be identified between any of the controls and the dependent variable yet. For size, small has been chosen as reference category because larger firms should see an increase in turnover based on the literature. Nevertheless, neither sizes show a significant difference from the small size. The model as a whole is not significant either, as based on the Wald χ^2 there is a p value of 0.3620 which does not lie within the 5% significance level. This means that it is not possible to predict turnover by only using the prespecified control variables.

Turnover	Coefficient	std. Error	z	p	95% Confidence Interval	
Age in Years	0.0706938	0.0882395	0.80	0.423	-0.1022525	0.2436401
Number of Founders	-0.1210152	0.1771285	-0.68	0.494	-0.4681808	0.2261503
Total Funding Amount	2.94e-11	1.00e-09	0.03	0.977	-1.94e-09	2.00e-09
Total Number of Investors	0.0375156	0.0470092	0.80	0.425	-0.0546207	0.129652
Number of Funding Rounds	-0.048934	0.0975757	-0.50	0.616	-0.2401788	0.1423108
Size Large	0.9807502	0.593028	1.30	0.192	-0.4938021	2.455302
Size Medium	0.4342433	0.4659683	0.93	0.351	-0.4790377	1.347524
Wald Chi2	7.68					
Prob > chi2	0.3620					
Log likelihood	-134.29092					
Likelihood ratio	1.91					

Table 3: Base model

Hypotheses testing

In order to test the hypotheses it is necessary to add the independent variable of funding type. This variable differentiates between a year that a venture receives government funding and a year that it does not. The results of this model are reported in table 4. By looking at the new

model that includes the independent variable, it is possible to observe a rather large difference from the previous model. First of all, the entire model is marginally significant this time. A p value of 0.0630 for the entire model is close to a conservative significance level of 0.05. Moreover the already observed effects of the controls in the based model stay mostly similar. Once again, none of the control variables show a significant relationship with the dependent variable of turnover.

The most important finding of this model however is the significant correlation found between the independent variable and the dependent variable. The model shows a significant positive relationship between funding type and turnover. This means that government funding increases the chances of turnover. The odds ratio based on the coefficient shows that the odds of turnover is almost 3 times more if a firm receives government funding in the same year than the odds when it does not receive government funding. To further analyze the size and interpretability of the effect, it is possible to use the margins in Stata. Margins enable specifying values for the independent variable to compute the probability of turnover occurring for a venture that has certain values. Margins can in this way make it clear what the effect of a change in value of a predictor is on the dependent variable (Williams, 2012). In this case, using marginal effects at means (MEM), it is possible to see that a year that a venture receives government funding, will experience a 9.4 percentage points higher probability of turnover than a year where it does not receive such funding. The probability of turnover in this way increases from 6.4% to 15.8% when receiving government funding. MEM assumes that all other predictors are at their mean value in this interpretation (Williams, 2012). It is also possible to calculate this effect using average marginal effects (AME). This uses all data instead of taking the means of the variables and compares the differences between a set of all years receiving government funding and no years receiving this funding. The AME results show that government funding increases the probability of turnover by 9.7 percentage points. Both margins measures show a very similar result in that government funding will increase the probability of experiencing turnover by over 9 percentage points.

Based on these findings, hypothesis 2 stating: “*Government funding will increase turnover of the board in new ventures*” is supported by the data. Furthermore, this means that hypothesis 1 stating: “*Government funding will reduce turnover of the board in new ventures*” is rejected.

Turnover	Coefficient	std. Error	z	p	95% Confidence Interval	
Age in Years	0.0666245	0.0918692	0.73	0.468	-0.113436	0.2466849
Funding Type	1.097292	0.3752859	2.92	0.003	0.3617455	1.832839
Number of Founders	-0.1323015	0.1835882	-0.72	0.471	-0.4921277	0.2275247
Total Funding Amount	1.18e-10	1.05e-09	0.11	0.911	-1.95e-09	2.18e-09
Total Number of Investors	0.043026	0.0493982	0.87	0.384	-0.0537927	0.1398447
Number of Funding Rounds	-0.0930417	0.1044023	-0.89	0.373	-0.2976665	0.1115831
Size Large	1.121723	0.7921318	1.42	0.157	-0.4308269	2.674273
Size Medium	0.4534487	0.4820571	0.94	0.347	-0.491366	1.398263
Wald Chi2	14.81					
Prob > chi2	0.0630					
Log likelihood	-130.06054					
Likelihood ratio	2.31					

Table 4: complete model

Supplementary analysis

In the analysis above, a random-effects logit is used. However, a fixed-effects model could also show valuable insights as a fixed-effects model already controls for all fixed effects that do not change over the time period (Bell & Jones, 2014). First, the results of the fixed effects model illustrated in table 5 once again shows a significant effect of funding type on turnover. Moreover, age in years is once again not significant. This further supports the rejection of hypothesis 1 and supports hypothesis 2 that states that government funding will increase board turnover. The fixed-effects model also shows to be more significant as a whole and shows a better log likelihood value for model fit. The other control variables are not incorporated into the fixed-effects model as these are fixed variables that do not change and as stated before, this type of model does not support such variables. The fixed-effects model controls for effects that stay the same over time but have not been measured. This model shows a similar result as the random-effects model. Therefore there is even more reason to believe that the results are robust.

	Random-Effects model	Fixed-Effects model
Observations	459	191
Groups	88	38
Age in Years p value	0.468	0.107
Age in Years coefficient	0.0666245	0.1887007
Funding Type p value	0.003	0.005
Funding Type coefficient	1.097292	1.131456
Prob > chi2	0.0630	0.0022
Log Likelihood	-130.06054	-48.345471

Table 5: comparison random-effects and fixed-effects

The most important reason for choosing a random-effects model instead of a fixed effects model is because the fixed effects model eliminates more than 50% of the total observations as these observed ventures do not show any turnover and thus do not differentiate over time. Furthermore, the random-effects model in this case increases the statistical power. A random-effects model can incorporate control variables that do not change over time unlike the fixed-effects model, which is helpful for this particular analysis. This allows possible extra explanation of the causes of board turnover. To confirm the choice for a random-effects model for the analysis, a Hausman test (Hausman, 1978) has been performed. This tests whether fixed-effects and random-effects models are significantly different from each other. The test returned a value of 0.1254 which does not reject the null hypothesis of the models significantly differentiating from each other. This means that the models are not too different from each other to favor one over the other. The random-effects model can thus be used based on this test.

5. Discussion

Research about the effects of government funding on the governance of new ventures is limited. By applying the existing literature about board member turnover to the context of new ventures, two contradicting arguments have been made. The first argument based on the RBV states that a decrease in turnover can be expected. This is because a venture that receives government funding will perform better due to the ability to develop resources that are rare, valuable, inimitable and non-substitutable. The second argument is based on signaling theory and predicts an increase in board turnover as a result of government funding. Government funding can act as a signal to legitimize a venture to outsiders. This reduces the need for board members to act as a signal and increases the interference of VC investors.

Based on a sample of innovative U.S. new ventures measured over a time period of 7 years, a panel data logit analysis has been performed. Multiple models have been used to test the effect of government funding on board member turnover. It is found that the presence of government funding significantly increases the likelihood of board member turnover. This finding supports hypothesis 2 stating: “*Government funding will increase turnover of the board in new ventures.*” and rejects hypothesis 1 stating: “*Government funding will reduce turnover of the board in new ventures.*”

The finding has serious implications for both the RBV and signaling theory that were applied to this setting. The argument of the RBV does not hold according to the findings. Government funded new ventures might perform better financially (Colombo et al., 2011; Luo et al., 2021; Onesti et al., 2022; Söderblom et al., 2015), but this does not decrease board turnover. The theory states that good financial performance should satisfy shareholders and reduce the need for switching directors (Coughlan & Schmidt, 1985). However, this effect cannot directly be translated from the public firm to these new ventures. An explanation for this difference can be the difference in ownership. In the context of a new venture, ownership rests with only a few individuals that are also often heavily involved and in an influential role (Garg, 2013). The owners of the venture do not necessarily seek the highest returns for shareholders, but are looking for growth and future potential (Garg & Furr, 2017). This means that achieving short-term high performance is not necessarily as important as in a public firm where a large group of shareholders’ opinions need to be taken into account (Coughlan & Schmidt, 1985; Jensen & Murphy, 1990). These new venture owners might actually be more willing to switch directors when they don’t agree with them about the vision of the company or when they no longer feel the need for these directors to provide them with financial resources and knowledge. So in the short-term, financial results are not as influential for board turnover. Nevertheless, the RBV can possibly explain board member turnover using financial measures in the long-term. At a certain moment the venture needs to show positive results in order to stay in business.

The arguments based on signaling theory are closer to the found results. It is explained that the government funding can legitimize a new venture which increases the attention of outside investors (Islam et al., 2018; Söderblom et al., 2015; Zhou et al., 2022). The venture can therefore acquire investments without the need of experienced well known board members. The signal of government funding can in this way (partially) replace the previous signal of a well-managed venture using experienced directors. It is noticed within the data that there is indeed a presence of outside investors such as VC investors. These outsiders can heavily

influence the board of directors as these investors can become directors in the board themselves (Garg & Furr, 2017). Once again, different goals can lead to problems as outside directors goals often do not align with that of the founders and inside directors (Garg, 2013). This can change board membership as people can be dismissed or leave on their own. The scope of conflicts and the signaling function is not directly measured, but the finding that government funding leads to a higher likelihood of board member turnover is in line with the expectations of a signaling theory approach.

Next to this main finding, multiple control variables were used in the model. In contrast to the effect of an older firm having more turnover as mentioned by Eriksson et al. (2001), it is found that firm age does not have a significant effect on board turnover. This can possibly be explained by the short time period of 7 years that has been used for the analysis of this research. This time span might not have been long enough for ventures to significantly differentiate. Moreover, the existing literature is based on more established firms and does not specifically relate to the new venture context of this research.

The effect of larger firms having more turnover (Eriksson et al., 2001) is not found either. Based on employee counts, no significant difference between sizes were found. Other control variables that were tested include total funding amount, number of investors, number of funding rounds and number of founders. No effects were found to be significant for these variables. The supplementary analysis furthermore added a fixed-effects model which reduces omitted variable bias as it controls for all unobserved variables that stay the same. This analysis showed similar results to the random-effects model and furthermore supports the finding that government funding increases board turnover.

Practical implications

This research has highlighted important consequences of government funding on new ventures. As government funding might seem an easy and riskless opportunity for new ventures, it does have considerable consequences for the governance of the venture. The founders of the venture need to realize that government funding will have serious consequences for the development of the venture. Government funding increases the ability of their venture to develop more quickly and successfully. However, the government funding will also increase attention from outside investors. This increased attention and legitimization can reduce the need to have directors that would have signaled a high potential venture. Nevertheless, the inclusion of outside investors can decrease the power of the initial founders and can bring conflicts of

interest. Most importantly, government funding increases the likelihood of board member turnover in these ventures. So, founders should take into account that asking for and accepting funding will have effects on their need for and configuration of the board of directors.

Directors of a new venture will now know that their time might be more limited when the venture attracts government funding. Especially when these directors were brought into the company as a signal, they have to realize that their position can get jeopardized. Directors could however also focus on attracting government funding in order to leave the venture in a legitimate way. If directors want to focus their attention on something else, government funding can be a good way to reduce their need for the venture and leave.

Limitations

This research has considerable limitations. First, even though the effect of government funding on board turnover becomes quite clear in the analysis. The underlying effects are not necessarily completely known. Quantifying and measuring signaling to confirm this effect is difficult. Part of the likely explanation for the effect that was found resides in the VC investor. However, the ratio inside and outside directors is not known in the dataset. It is known that the dataset covers both types, but it lacks exact numbers. Therefore it is difficult to say much about VC investors purely on the basis of the data.

Second, It is quite clear that government supported ventures usually outperform those that do not receive such funding. This effect is mostly found when funding is selective. This brings the question if government agencies are not just simply “picking the winner” (Cantner & Kösters, 2012). The effectiveness (Kösters, 2010) and precise allocation (Cantner & Kösters, 2012) of government subsidies to innovative start-ups is being questioned. Funding by governments would be allocated to companies that would have succeeded without that funding nonetheless and the funding is not always distributed in a fair and objective way.

Third, financial performance plays a big part in the explanation of the RBV. Moreover it plays a big part in the literature regarding turnover in established firms. However in the analysis, a direct financial result measure is not used. This is because financial measures are rare, inconsistent and vague for ventures that are small and that were founded recently as they do not publicly publish their results. Therefore it is not possible to conclude that the entire argument related to the RBV is inherently wrong, however the signaling argument is stronger based on the results.

Directions for further research

As this research has been performed in a context of new ventures which is underdeveloped in the literature, there is much opportunity for further research. In this research, the characteristics of the venture have been the main focus. Personal characteristics of directors were mostly left out, but can be an interesting aspect to take into account. Some personal characteristics might make directors more or less inclined to leave by themselves or dismiss other directors. New venture boards are very different from public firm boards and include different type of directors. Therefore, it would be interesting to see if these personal effects can also be translated to the context of new ventures or if different effects can be seen because of the new context. Qualitative research could also increase the understanding of the reasons for board member turnover. As qualitative research can go into more specific details about the personal reasons for board turnover. It can also get more insights into the inner workings and dynamics of new venture boards of which much is still relatively unknown.

It can also be insightful to perform a similar study to this one focusing on a different location. This research was only performed using data of ventures based in the United States, however a different location could also lead to different effects. As the U.S has a one-tier board structure as opposed to a two-tier board structure in Europe for instance. This difference could lead to different results for board turnover. Moreover, VC investments are quite common in the U.S. but are not that common in Europe for instance, where a lot of ventures depend largely on loans (Bottazzi & Da Rin, 2002; Hottenrot et al., 2018). This will likely change the dynamics of the board of a new venture as VC investors will play a less influential role in these locations.

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