



UHASSELT

KNOWLEDGE IN ACTION

Faculteit Bedrijfseconomische Wetenschappen

master handelsingenieur

Masterthesis

The effect of entrepreneur and start-up characteristics on start-up performance: The moderating role of the financing choice

Caro Jans

Scriptie ingediend tot het behalen van de graad van master handelsingenieur, afstudeerrichting accountancy en financiering

PROMOTOR :

Dr. Ine UMANS



UHASSELT

KNOWLEDGE IN ACTION

www.uhasselt.be
Universiteit Hasselt
Campus Hasselt:
Martelarenlaan 42 | 3500 Hasselt
Campus Diepenbeek:
Agoralaan Gebouw D | 3590 Diepenbeek

2019
2020



Faculteit Bedrijfseconomische Wetenschappen

master handelsingenieur

Masterthesis

The effect of entrepreneur and start-up characteristics on start-up performance: The moderating role of the financing choice

Caro Jans

Scriptie ingediend tot het behalen van de graad van master handelsingenieur, afstudeerrichting accountancy en financiering

PROMOTOR :

Dr. Ine UMANS

This master thesis was written during the COVID-19 crisis in 2020. This global health crisis might have had an impact on the (writing) process, the research activities and the research results that are at the basis of this thesis.

Preface

This master thesis is written to obtain the degree of Master Business Engineer with specialization in Finance at Hasselt University.

Finishing this master thesis has been a very instructive process and really enhanced my scientific skills. However, it would not have come about without the skills and knowledge I gained during my study at Hasselt University. Therefore, I would like to sincerely thank everyone who, in a way, contributed to the realization of this master thesis.

More specifically, I really want to thank my promoter, dr. Ine Umans. Thanks to her professional guidance, her thorough feedback and her quick response to all of my questions and remarks, I successfully completed this master thesis.

Furthermore, I would also like to thank my parents, my friends and my partner. Thanks to their support, I have been able to complete this five year program to obtain the degree of Master in Business Engineer.

1. Introduction

Start-ups have a fundamental impact on the overall productivity in our economy. Although most start-ups are small, they create more new jobs than existing companies and they appear to have higher median growth than their more mature counterparts (Bokhari, Chegut, Frenchman, & Tausendschoen, 2018; Corl, 2019; Ritchie & Swisher, 2018; Sanyal & Mann, 2010). The following three criteria are commonly used to define a start-up. The venture's *age* has to be less than five or ten years, depending on the sector. The venture has to strive for *innovation*, not only in its products, but also in its business model. Lastly, the venture should have the *aim to scale*: they need to have the intention to grow their number of employees and the markets they operate in (Steigertahl, Mauer, & Say, 2018).

Since 2015 the number of start-ups in Belgium is increasing, with an absolute record of 100 113 new start-ups established in 2018. This is a 5.3% increase relative to the year 2017. The new number of start-ups in the Flemish region even increased with 11.56% from the year 2017 to 2018 (Unizo, 2019). Although start-ups are clearly gaining popularity and they are known to have an important influence on the economy, there is surprisingly little research available on start-ups (Nofsinger & Wang, 2011; Sanyal & Mann, 2010). A lot of research focuses on small and medium scaled enterprises (SMEs) and on large corporations, but these findings might not be the same when applied to start-ups. Especially when looking at literature on firm performance, much remains to be explored concerning the performance of start-ups.

Previous research states that the entrepreneur's demographic characteristics (i.e. age, education and experience) have a significant impact on both the financing decisions made by the entrepreneur and the success of SMEs (Alharbi, Yahya, & Ahmed, 2018). But because start-ups behave different than SMEs, the relation between these entrepreneurial characteristics and the performance might be different for start-ups. However, results from previous research concerning SMEs is useful to translate some expectations to start-ups.

This master thesis focusses on the entrepreneur's gender, age, education and experience and on the start-up's size and their relation with start-up performance. Based on the existing studies, I expect to find no difference in start-up performance between males and females. They are expected to have similar capabilities to achieve a good start-up performance. Possible differences in start-up performance may be due to the size or the risk of the start-up or the sector in which the start-up operates (Cooper, Javier, & Woo, 1994; Kepler & Shane, 2007; Robb & Watson, 2012; Sabarwal & Terrell, 2008). Furthermore, I expect the entrepreneur's age, education and experience to be positively related to the start-up's performance. These three characteristics are part of the entrepreneur's human capital and previous studies find a positive association between the entrepreneur's human capital and the success of their venture (Alharbi et al., 2018; Bamata, K. Govender, & Fields, 2019; Bosma, Van Praag, & De Wit, 2000; Cassar, 2014; Fairlie & Robb, 2009; Fried & Tauer, 2015; Gottschalk, Greene, & Müller, 2017; Rose, Kumar, & Yen, 2006; Sajilan, Hadi,

& Tehseen, 2015; Stuart & Abetti, 1990; Tanveer, Akbar, Gill, & Ahmed, 2013; Thapa, Thulaseedharan, Goswami, & Joshi, 2008; Waleczek, Zehren, & Flatten, 2018; Zhang, 2008). Although previous literature concerning the relation between the start-up's size and its performance is mixed, I expect these variables to be negatively related because smaller firms have more advantages with speed and flexibility in the fast-changing market environment (Ha-Brookshire, 2009; Robb & Watson, 2012).

However, only looking at the relation between these characteristics and the start-up's performance might limit to an incomplete overview since the start-up's financing choices are related to their performance as well (Cassar, 2004; Pirolo & Presutti, 2010). The success or the failure of a firm depends heavily on its initial financing decisions. The access to entrepreneurial finance and the choice between different financing forms are therefore crucial factors for start-ups (Vaznyte & Andries, 2019). Also the availability of finance for start-ups attracted a lot of attention over recent years (Roper & Scott, 2009). Start-ups are characterized with more information asymmetries between the entrepreneur and the finance provider than mature firms (Cumming, Deloof, Manigart, & Wright, 2019). These information asymmetries are the main reason for start-ups to face a difficulty when trying to attract external finance. Entrepreneurs have to cope with two forms of agency problems caused by these information asymmetries: moral hazard and adverse selection. As a result of these two problems, capital markets only provide little capital to entrepreneurs (Qorraj, 2017). Therefore, more and more financing sources are emerging that are trying to overcome these difficulties (Alemany & Andreoli, 2018; Cumming et al., 2019). Previous studies summarize these new financing sources, and although it is known that they have an impact on start-up performance, little is known about any specific relation between these new financing sources and the performance of the start-up.

However, studies show that the use of debt financing in start-ups is associated with better start-up performance (Åstebro & Bernhardt, 2003; Cole & Sokolyk, 2018; Cumming & Groh, 2018). Therefore, I introduce the use of outside finance as a moderator and argue that when start-ups use outside finance, the effect of the characteristics on performance will improve compared to when they don't use any form of outside finance.

Start-ups are important in our economy but literature concerning factors that impact these start-ups is scarce. Especially the combined effect of both demographic characteristics of the entrepreneur and the use of external financing sources on the start-up performance has, to my knowledge, never been investigated before. Therefore, this paper contributes to the scarce literature about start-ups by not only trying to find factors that are directly associated with start-up performance, but also to look at the moderating effect that outside finance might have on these associations.

In conclusion, this paper aims to find associations between characteristics of both the entrepreneur and the start-up (i.e. gender, age, education, experience and start-up size) with the performance of the start-up. Additionally, the use of outside finance as a moderator is added to these associations to see whether it strengthens them.

2. Literature and hypotheses development

This section first documents the literature on the characteristics of the entrepreneur and the start-up in relation to start-up performance and presents the hypotheses for every relation. Second, the new financing forms that emerged specifically for start-ups are summarized. Additionally, the relation between these financing forms and the performance of start-ups is documented based on the existing literature and a hypothesis is provided. Finally, this section hypothesizes the moderating role of the financing choice on the relation between the characteristics of both entrepreneur and start-up and the start-up performance.

2.1 Characteristics of the entrepreneur and the start-up in relation to start-up performance

Recently, the demographic characteristics of the entrepreneur are found to have a significant impact on the success of a start-up (Alharbi et al., 2018). In the following paragraphs, the relationship between four demographic characteristics of the entrepreneur, being gender, age, education and experience, and the performance of the start-up will be discussed. After this, the relation between the size of the start-up and its performance is discussed as well.

2.1.1 Gender

While there always have been more male entrepreneurs in the past, the number of female entrepreneurs is rising sharply (I. H. Lee & Marvel, 2014). As a consequence, female-owned firms are typically younger than male-owned firms and younger firms have a higher risk of closing compared to older firms (Robb & Watson, 2012). Women also like to keep their businesses smaller on average than their male counterparts. This way they can maintain full control over all aspects of their new business (Achleitner, Braun, & Kohn, 2011; Kwapisz & Hechavarría, 2018). Evidence also shows that females are more risk averse than males and therefore tend to run less risky ventures (Achleitner et al., 2011; Fraser, Bhaumik, & Wright, 2015; Robb & Watson, 2012).

Prior studies concerning the effect of gender on firm performance show mixed results. Some studies find that female-owned firms are less profitable, less likely to grow and thus have worse average outcomes than male-owned firms (Bosma, Praag, Thurik, & Wit, 2004; Fairlie & Robb, 2009; Robb & Robinson, 2014). Other studies however find that female-owned firms are just as likely to survive as male-owned firms and argue that previous studies did not control for important factors that do differ between male and female entrepreneurs: size, risk and the sector in which the business operates. Hence, there appears to be no difference in the ROA (return on assets) between female-owned and male-owned new ventures, and thus female-owned start-ups do not underperform male-owned start-ups (Cooper et al., 1994; Kepler & Shane, 2007; Robb & Watson, 2012; Sabarwal & Terrell, 2008). In line with these last arguments and because I believe that previously found differences in start-up performance between male and female entrepreneurs can be attributed to factors like the start-up size, risk or the industry in which the start-up operates, hypothesis 1A is

formulated as follows: *there is no difference in performance between female-owned and male-owned start-ups.*

2.1.2 Age

Both the probability and the willingness of an individual to become an entrepreneur generally increase until a certain age between 35 and 44 years old and only decrease afterwards. This is due to the opportunity cost of time, which increases with age, and discourages older entrepreneurs to choose for a risky employment like starting a new business (Alharbi et al., 2018; Blanchflower, Oswald, & Stutzer, 2001; Kautonen, Down, & Minniti, 2014; Lévesque & Minniti, 2006). On the other hand, many entrepreneurial resources accumulate with age, which increases the opportunity to start a business. Also individuals' risk averseness decreases with increasing age, meaning that older entrepreneurs would rather accept a risky investment like starting a business (Achleitner et al., 2011; Lin & Wang, 2019).

Previous research shows that there exists a positive relation between the age of the entrepreneur and the success of the business (Alharbi et al., 2018). Studies show that with increasing age, the entrepreneur's skills might improve since they learn to manage time more effectively. Some argue that age is positively related with knowledge rather than with business success directly, but this knowledge in turn contributes to a successful business as well (Bosma et al., 2000). From scarce literature, it can be concluded that the entrepreneur's human capital (i.e. entrepreneurial age, skills and knowledge) is positively associated with survival and success of the start-up (Fried & Tauer, 2015; Rose et al., 2006; Sajilan et al., 2015). Therefore, hypothesis 1B is stated as follows: *the age of the entrepreneur is positively related to the performance of the start-up.*

2.1.3 Education

Several studies discover that owners with a higher level of education entail better business outcomes (Fairlie & Robb, 2009). Education provides entrepreneurs with more knowledge and skills which makes the business more successful (Grichnik, Brinckmann, Singh, & Manigart, 2014; Minai, Raza, Bin Hashim, Md Zain, & Ali Tariq, 2018; Sajilan et al., 2015; Waleczek et al., 2018). Indeed, entrepreneurs with a higher level of education seem to enhance the growth and the success of the business, appear to be less risk averse and will survive longer in the market (Achleitner et al., 2011; Alharbi et al., 2018; Grichnik et al., 2014; Zhang, 2008). The literature in general provides strong evidence for a positive relationship between the entrepreneur's level of education and the firm's performance (Alharbi et al., 2018; Bosma et al., 2000; Fairlie & Robb, 2009; Rose et al., 2006; Tanveer et al., 2013; Thapa et al., 2008; Zhang, 2008). Hence, hypothesis 1C is formulated as: *the level of education of the entrepreneur is positively related to the performance of the start-up.*

2.1.4 Experience

The evidence on the effect of experience on the performance of start-ups is mixed. Some studies argue that both new and experienced entrepreneurs have similar firm closure speed. This suggests that being an experienced entrepreneur does not lengthen the firm's existence, nor does it recognizes sooner that the firm is unviable (Gottschalk et al., 2017). Other studies however do find

a positive relation between managers' previous work experience and the success of the firm. Furthermore, studies show that firms established by industrial experienced entrepreneurs are less likely to go bankrupt and thus appear to survive longer (Alharbi et al., 2018; Bamata et al., 2019; Cassar, 2014; Gottschalk et al., 2017). In line with these last arguments and because I believe that previous entrepreneurial experience also fosters the development of many skills and industry-specific knowledge (Waleczek et al., 2018), hypothesis 1D goes as follows: *there is a positive relation between the entrepreneur's previous experience and the performance of the start-up.*

2.1.5 Size of the start-up

Apart from the personal characteristics of the entrepreneur, the size of the start-up itself also might have an impact on its performance. Prior studies show mixed results concerning the relationship between the size of a firm and its performance. Some articles found a positive relation between the firm's size and its profitability (Hall & Weiss, 1967; Scherer, 1973). However, they neglected the possible effects of other factors like market structure, entry barriers or firm strategies (Caves & Pugel, 1980). Additionally, some studies found that the start-up size is statistically related to the chance of survival (Robb & Watson, 2012; Santarelli, 1998). On the contrary, more recent studies, that did control for factors like market structure, entry barriers or firm strategies found a rather ambiguous support for the relation between a firm's size and performance (Lee, 2009). Robb & Watson (2012) state that smaller firms are more likely to be more profitable (Robb & Watson, 2012). Apart from this, Ha-Brookshire (2009) finds that smaller firms have more advantages with speed and flexibility in the fast-changing market environment and therefore survive longer than larger firms (Ha-Brookshire, 2009). In line with these last arguments and because I believe that smaller start-ups have less upfront investment costs and are more flexible compared to larger start-ups, hypothesis 1E is as follows: *there exists a negative relation between the start-up size and the performance of the start-up.*

2.2 Financing forms

Entrepreneurs need capital, not only to convert their ideas into reality by starting a venture, but also for their venture to eventually start growing. However, for start-ups it is unlikely to easily raise external funding since they have no or little collateral, they lack internal cash flows, there is asymmetric information which causes agency problems and their ideas are usually very innovative. These financing constraints limit the growth of the start-ups and threaten their survival. Since most start-ups lack the access to formal capital markets, they are forced to rely on an informal network of family, friends and other financing sources for their initial funding (Achleitner et al., 2011; Robb & Robinson, 2014; Waleczek et al., 2018). Investors that invest in these firms are trying to obtain their return through a capital gain realized on the sale or stock market flotation (IPO) of the venture. Nevertheless, investing in a start-up entails a high risk (Block, Colombo, Cumming, & Vismara, 2018; Cumming et al., 2019). Lately, and especially in the wake of the 2008/2009 financial crisis, new finance providers have emerged because of these difficulties faced by entrepreneurs to raise funds for their start-ups (Block et al., 2018).

First of all, entrepreneurs can make use of a funding source that is *not provided in the market*. This pre-market funding source is called 'bootstrapping' (Alemany & Andreoli, 2018). Bootstrapping is entrepreneurship in its purest form, it is the transformation of human capital into financial capital. It refers to a self-starting process that proceeds without external input. Bootstrapping can consist of the entrepreneurs' own savings, withholding their own salary, personal loans or the support of the three F's: the Family, the Friends and the Fools. The support of the entrepreneur's family and friends is very important, because they know the entrepreneur the best. Having these strong-tie investors investing in the start-up is a positive sign for other investors (Alemany & Andreoli, 2018; N. Berger & F. Udell, 1998). In addition to strong-tie investors, weak-tie investors are for example banks and venture capitalists, with whom the entrepreneurs have a rather formal relationship.

The main advantage of bootstrapping is that entrepreneurs do not have to give away ownership of the company; they retain the complete control of their venture. A disadvantage could be that it only generates small amounts of money. Waleczek et al. (2018) find that the use of owner-financed bootstrapping is negatively related to start-ups' revenues, namely that it is associated with a strong decrease in their revenues. It is also shown that bootstrapping is an individualistic choice of the entrepreneur, and it is not used as a last resort (Grichnik et al., 2014; Waleczek et al., 2018; Winborg, Akademin för ekonomi, Centrum för innovations, & Högskolan i, 2009).

The Pecking Order Theory states that due to information asymmetries and moral hazard, friends and family are the majority investors in start-ups because they know more about the entrepreneur than outside weak-tie investors. Adomzda et al. (2016) however state that there will be more weak-tie investments than strong-tie investments, even if the weak-tie investors require a higher rate of return on their invested capital. They explain that this is due to a social obligation to pay back investments from friends and family (Adomzda, Åstebro, & Yong, 2016; Hechavarría, Matthews, & Reynolds, 2016).

In addition, there are new financing sources that are *provided in the market*. First, an incubator is an organization that provides start-ups with a shared operation space, networking opportunities, mentoring resources and access to shared equipment. Incubators support the search for funding from the start of the seed stage on, but provide no or a small amount of money. Second, an accelerator is an organization that offers start-ups support services and funding opportunities in intense programs that last several months. These programs include mentorship, office space and access to capital and investment in return for start-up equity (Alemany & Andreoli, 2018).

Third, crowdfunding connects those who can give, lend or invest money directly with those who need financing for a specific project. It mostly uses the internet as a platform to connect the investors with the entrepreneurs. The success of crowdfunding efforts is associated with personal networks and the underlying project quality. Having a large personal network increases the success of the crowdfunding campaign, and projects that signal a higher quality level are also more likely to be funded. Crowdfunding can be used as a valuable marketing tool as well, creating interest in new projects in the early stages of development. Furthermore, it can reveal the initial market response to the initiative (Alemany & Andreoli, 2018; Mollick, 2014; OECD, 2015).

Another funding source are business angels. Business angels are private individuals that are mostly experienced entrepreneurs who sold their own venture. They then invest their own money in new and early-stage businesses and draw upon their own business experience and expertise to support these ventures in a variety of ways. Business angels usually invest smaller amounts of money, but they finance more businesses altogether. They are important contributors of bringing innovation into the economy by investing at the earliest stages of ventures' life cycle, long before a typical institution investor would be interested. Business angels' capital is also called 'smart money' because of the value they add through their experience, counseling and networking and because they facilitate the raise of additional funding at a later stage (Alemany & Andreoli, 2018; Tenca, Croce, & Ughetto, 2018).

The last funding sources are venture capital and private equity which are both temporary equity investors. They provide capital to non-listed companies in exchange for equity in the form of shares. Venture capital firms generally target emerging companies in their early stages of development. These companies are mainly technology or science-driven businesses. Because start-ups are not yet selling their products to the market, the level of risk is higher. This however can be compensated for by the unlimited upside if the firm is able to develop in a successful start-up. Equity finance is thus relevant for companies that have a high risk-return profile such as new, innovative and high growth firms (OECD, 2015). Venture capitalists have an advantage over business angels in overcoming the asymmetric information problem and the moral hazard problem because they have more information about the firm and the entrepreneur (Alemany & Andreoli, 2018; Nofsinger & Wang, 2011). Private equity investors, typically referring to investment funds, target mature companies in traditional sectors with already proven business models that are trying to expand their businesses (Alemany & Andreoli, 2018).

2.3 Financing forms in relation to start-up performance

As explained above, the traditional capital market theories are not sufficient to explain start-up financing. Start-up's underlying market imperfections are related to significant information asymmetries between the entrepreneur and the firm's financiers (Cole & Sokolyk, 2018; Waleczek et al., 2018). Capital decisions and the use of debt and equity at start-up appear to have important implications for the operations of the business, risk of failure, firm performance and the expansion potential of the business (Cassar, 2004). The following paragraphs summarize what is known about the relation between the use of these new financing forms and the performance of the start-up, which is still a rather overlooked topic in finance literature.

Only very little research is available concerning the relation between incubators or accelerators and the performance of the start-up. Regarding the incubators, there is a common assumption that they promote firm growth. Firms that stay longer with the incubator appear to not only have higher revenues, but are also less likely to fail (Rothaermel & Thursby, 2005). The research of Schwartz (2011) however does not support this assumption (Schwartz, 2011).

Studies do find a correlation between the accelerator program activities and the performance of start-ups, meaning that the presence of an accelerator appears to increase the performance of the start-up (Bokhari et al., 2018; Qian, Mulas, & Lerner, 2018). Accelerators also help the entrepreneur to attract funding from venture capitalists and business angels. This is a useful aspect since more funding leads to more opportunities to grow and to a higher chance of survival eventually (Fraser et al., 2015).

There is also uncertainty about the effect of crowdfunding on the performance of start-ups. Walthoff-Borm et al. (2018) find that equity-crowdfunded firms have a higher failure rate than nonequity-crowdfunded firms, which can be caused by adverse selection problems (Walthoff-Borm, Vanacker, & Collewaert, 2018). Other studies find that survival rate, sales growth, employment growth and revenues are higher for start-ups with a successful crowdfunding campaign than for companies with a failed crowdfunding (Cho, Park, & Sung, 2019). Fraser et al. (2015) state that equity crowdfunding has experienced slower growth than other financing forms. This could be because the entrepreneurs lack the support that other types of investors may provide (Fraser et al., 2015).

With regard to business angels, the lack of available data causes problems in assessing the impact of business angels on firm growth. The studies that have been conducted, may be biased due to the use of convenience samples (Fraser et al., 2015).

Evidence from several countries shows a positive relationship between venture capital backed firms and their performance. Venture capitalists are active in providing added value services which causes these firms to grow faster, to have better financial and operating performance, to be more innovative and to be more likely to go public compared with their non venture capital backed peers (Alperovych, Hübner, & Lobet, 2015; Fraser et al., 2015). Companies backed by more reliable venture capitalists are more likely to exit successfully, to access public markets faster and to have higher asset productivity at IPO's (Cumming & Groh, 2018). In contrast, other studies found no effect of venture capital backing on post-IPO growth (Fraser et al., 2015). Within the pool of Belgian venture capital backed firms, being financed by private venture capitalist investors improves the efficiency of the portfolio companies significantly, but being financed by a government-sponsored venture capitalist implies a significant reduction in productivity. Overall, venture capital backing destroys productivity in Belgium, but this comes almost exclusively from government-sponsored venture capitalist backing (Alperovych et al., 2015).

Private equity investors appear to have positive effects on firm performance. Studies show that private equity backed firms grow faster, have a higher level of productivity, sales and profitability, have better long-run market returns and operating performance and are more likely to go public (Battistin et al., 2017). Meles et al. (2014) find that private equity backed firms outperform their matched firms over the post-exit period but their evidence appears to be confined to venture capital backed firms. Explanations for this outperformance are that the private equity investors execute an ex-ante screening in which they create value by reducing the agency costs. Private equity investors

add value to firms by monitoring them closely (Fraser et al., 2015; Meles, Monferrà, & Verdoliva, 2014).

The new financing forms discussed above are apparently not used very often (Cole & Sokolyk, 2018). Bank lending on the other hand appears to be the most common source of external financing for many SMEs and entrepreneurs, also in Flanders (Andries, Rijssegeme, & Roelandt, 2019; Deloof & Vanacker, 2018; OECD, 2015; Robb & Robinson, 2014). Entrepreneurs choose for external debt in order to keep ownership and control of their firms, or they choose for external equity to help share the risk with less risk-averse investors (N. Berger & F. Udell, 1998). Overall, the use of debt financing in start-ups is associated with higher success in terms of survival, employment growth and revenue growth, and with a better subsequent performance (Åstebro & Bernhardt, 2003; Cole & Sokolyk, 2018; Cumming & Groh, 2018). In sum, start-ups that use debt or any other form of external financing are expected to perform better than start-ups that do not use external finance. Furthermore, as explained before, the use of any kind of bootstrapping appears to be negatively related to performance (Cole & Sokolyk, 2018; Waleczek et al., 2018). In line with these expectations, hypothesis 2 is formulated as follows: *there is a positive relation between the use of outside finance and the performance of the start-up.*

2.4 The moderating role of the financing choice

As summarized above, most studies find a positive relation between the use of outside finance and the performance of the start-up (Alperovych et al., 2015; Åstebro & Bernhardt, 2003; Battistin et al., 2017; Cole & Sokolyk, 2018; Fraser et al., 2015). Furthermore, the literature is mixed and finds no unambiguous effect for all the entrepreneur's and start-up's characteristics on start-up performance. In addition, previous studies find associations between the entrepreneur's and start-up's characteristics and the used financing source. Therefore, I expect the use of outside finance to be a moderator that has an explanatory effect in the relation between the characteristics of the entrepreneur and the performance of the start-up. The use of outside finance could strengthen or weaken this relationship. The following hypotheses 3B to 3E include the use of outside finance as a moderator. Figure 1 summarizes the research model.

As explained by hypothesis 1A, I expect no difference in ROA between male and female entrepreneurs (Robb & Watson, 2012; Sabarwal & Terrell, 2008). Therefore, I do not expect any moderating effect from the use of outside finance on this relation.

Based on prior research (Alharbi et al., 2018; Fried & Tauer, 2015; Rose et al., 2006; Sajilan et al., 2015) that finds a positive relation between the age of the entrepreneur and the performance of SMEs, I expect the same positive relation to hold for start-ups. In addition, studies find the use of outside finance to have a positive effect on the performance of the start-up (Alperovych et al., 2015; Åstebro & Bernhardt, 2003; Battistin et al., 2017; Cole & Sokolyk, 2018). Furthermore, studies find an interaction between the age of the entrepreneur and the use of financial capital in a way that

older entrepreneurs use more external finance than younger entrepreneurs (Achleitner et al., 2011; Kautonen et al., 2014). I therefore expect the use of outside finance to be a moderator that might strengthen the positive relation between the entrepreneur's age and the start-up's performance. Hence, hypothesis 3B is formulated as follows: *the financing choice moderates the relation between the age of the entrepreneur and the performance of the start-up such that the choice for outside finance strengthens this positive relationship.*

Based on prior research (Achleitner et al., 2011; Alharbi et al., 2018; Bosma et al., 2000; Fairlie & Robb, 2009; Grichnik et al., 2014; Rose et al., 2006; Tanveer et al., 2013; Zhang, 2008) that indicates that ventures founded by entrepreneurs with a higher level of education perform better, I expect the same positive relation between the level of education and start-up performance. In addition, the use of outside finance appears to have a positive effect on the performance of the start-up (Alperovych et al., 2015; Åstebro & Bernhardt, 2003; Battistin et al., 2017; Cole & Sokolyk, 2018; Fraser et al., 2015; Meles et al., 2014). Furthermore, studies find an interaction between the level of the entrepreneur's education and formal financing sources in a way that the higher the level of education, the more likely entrepreneurs are to employ external financing sources (Zhang, 2008). I therefore expect the use of outside finance to be a moderator that might strengthen the positive relationship between the entrepreneur's level of education and the start-up's performance. Hence, hypothesis 3C is formulated as follows: *the financing choice moderates the relation between the education of the entrepreneur and the start-up's performance such that the choice for outside finance strengthens this positive relationship.*

Based on prior studies (Alharbi et al., 2018; Bamata et al., 2019; Cassar, 2014; Gottschalk et al., 2017) that expect to find a positive relation between previous entrepreneurial experience and the performance of SMEs, I expect the same positive relation between previous entrepreneurial experience and start-up performance. In addition, it has been found that the use of outside finance has a positive effect on the performance of the start-up (Alperovych et al., 2015; Åstebro & Bernhardt, 2003; Battistin et al., 2017; Cole & Sokolyk, 2018; Fraser et al., 2015; Meles et al., 2014). Furthermore, studies find an interaction between previous entrepreneurial experience and the use of external finance in a way that being experienced in establishing a start-up increases the use of external finance (Robb & Robinson, 2014). I therefore expect the use of outside finance to be a moderator that might strengthen the positive relationship between the previous experience of the entrepreneur and the performance of the start-up. Hence, hypothesis 3D is formulated as follows: *the financing choice moderates the relation between the previous experience of the entrepreneur and the start-up's performance such that it strengthens this positive relation when the entrepreneur uses outside finance.*

Prior research states that smaller firms tend to be more profitable (Ha-Brookshire, 2009; Robb & Watson, 2012). Additionally, studies found that the use of outside finance has a positive effect on the performance of the start-up (Alperovych et al., 2015; Åstebro & Bernhardt, 2003; Battistin et al., 2017; Cole & Sokolyk, 2018; Fraser et al., 2015; Meles et al., 2014). Furthermore, studies find an interaction between the size of the start-up and the use of outside finance in a way that larger

start-ups use more outside finance than smaller start-ups (Achleitner et al., 2011). I therefore expect the use of outside finance to be a moderator in the negative relation between the size of the start-up and the start-up's performance that might weaken this negative relation. Hence, hypothesis 3E is formulated as follows: *the financing choice moderates the relation between the size of the start-up and its performance such that this negative relationship will be weakened when choosing for outside finance.*

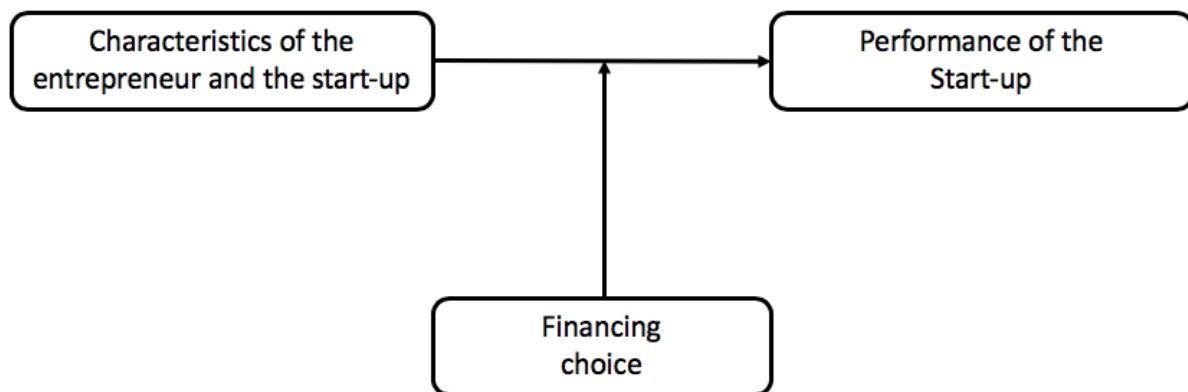


Figure 1: The research model

3. Methodology

3.1 Sample

To empirically test the moderation model, data is combined from two different sources. The data concerning the characteristics of the entrepreneur and their chosen financing forms have been collected by Laveren et al. (2019). This database has been made available by the Research Center for Entrepreneurship and Family Firms. In total, this dataset consists of data from 225 start-ups. The respondents in this dataset are entrepreneurs that founded a start-up in the Flemish region of Belgium between 2015 and 2019. This time horizon indeed matches the description of a start-up (Steigertahl et al., 2018). This dataset is supplemented by linking performance measures from the Belfirst database. However, for some start-ups, the financial statements were not available, the company number was not found in the Belfirst database (this can be the case when the start-up is still in its nascent phase, or already discontinued its activities) or the respondent didn't fill in the (correct) company number in the survey send out by Laveren et al. (2019). Therefore, 98 cases had to be deleted which reduced the total number of start-ups in our dataset to 127. Furthermore, I excluded 10 outliers for the dependent variable ROA that were less than $Q_1 - 1.5IQR$ or greater than $Q_3 + 1.5IQR$ ending up with a dataset of 117 start-ups to conduct the further analyses (Field, 2013).

3.2 Measurements

3.2.1 Dependent variable

I use the return on assets (ROA) as the measure for start-up performance. ROA is measured as the ratio of the net income for a particular year divided by the total assets at the end of that year. This measure is the most accepted measure for firm performance in the literature (Meles et al., 2014; Robb & Watson, 2012; Saidu, 2019).

3.2.2 Independent variables

For the variable gender, respondents had to indicate whether they are male or female. Next, the respondents had to indicate what age category they are in (<30, 30-45, 46-55, or >55). Concerning the education variable, entrepreneurs had to indicate the highest degree they attained. Next, entrepreneurs had to indicate whether they already have previous experience in establishing a start-up or not. Finally, I use the number of employees that work in a start-up as an expression for the size of the start-up which is in line with prior studies (Sabarwal & Terrell, 2008). In line with the Eurostat website I state that start-ups with less than 10 persons employed are called micro enterprises and start-ups with more than 10, but less than 50 employees are called small enterprises (Eurostat). Table 1 summarizes the values for all answer options for these independent variables.

3.2.3 Moderator

The moderator *OutsideFinance* has value 1 if the entrepreneur used at least one form of outside finance (this can however be supplemented by any form of inside finance) and 0 if the respondent used only inside financing sources. Outside finance is defined as a cluster of all financing forms provided in the market. In this study, these are: a bank loan, a PMV loan, cash credit, risk capital, a bullet loan, a government guaranteed PMV, leasing, a win-win loan, a vendor loan, a subordinated loan and others. Inside finance on the other hand, are the financing sources that are not provided in the market and these include the entrepreneurs' own savings and money from family and friends.

3.2.4 Control variables

The regression further includes two control variables that might influence the dependent variable ROA. The sector in which the start-up operates and the year in which the start-up was established are used as control variables. The answer options and their values in SPSS for both variables are included in table 1. It is known from previous research that the *sector* in which the start-up operates influences the performance of the start-up. Studies show that the retail and service sector (that tend to be smaller and employ mostly women) have low barriers to entry and high competition and therefore have lower profit margins. On the other hand, manufacturing, wholesale trade and financial services for example are sectors (that are bigger and employ more men) with higher barriers to entry, less competition and higher profit margins (Lee, 2009; Sabarwal & Terrell, 2008; Verheul & Thurik, 2001). Apart from this, also the *start-up's age* is found to be related to its performance (Arend, 2014; Sajilan et al., 2015). Therefore controlling for both the sector and the year in which the start-up started its activities is necessary to get a correct representation of the influence that the independent variables have on the dependent variable.

Since both the sector and the firm's age are categorical variables with more than three categories, these variables are transformed into dummy variables. For the sector, seven dummy variables are created: *industrialD* has value 1 if the sector in which the start-up operates is the industrial sector and 0 else and so on. Similarly, the year in which the start-up was established has five dummy variables: *2015D* has value 1 if the start-up was established in 2015 and 0 else and so on.

Table 1: the number of respondents in % and the values in SPSS for all answer options for the independent variables, the moderator and the control variables.

<i>Variable</i>	<i>Answer options</i>	<i>Value in SPSS</i>	<i>Respondents in %</i>
<i>Gender</i>	Man	1	74.5%
	Woman	2	25.5%
<i>Age</i>	< 30	1	25.2%
	30-45	2	51.4%
	46-55	3	17.1%
	> 55	4	6.3%
<i>Education</i>	Primary school degree	1	5.5%
	Secondary school degree	2	28.2%
	Bachelor degree	3	35.5%
	Master degree	4	30.9%
<i>Experience</i>	First time to establish a start-up	1	66.7%
	Established at least 1 start-up before	2	33.3%
<i>Size</i> (number of employees)	1-5	1	68.8%
	6-10	2	12.5%
	11-50	3	6.2%
	51-100	4	0%
	101-250	5	0%
	More than 250	6	0%
	No employees	7	12.5%
<i>Moderator</i>	Inside	0	See table 2
<i>OutsideFinance</i>	Outside	1	See table 2
<i>Sector (CV)</i>	Industrial sector	1	9.2%
	Agricultural sector	2	3.1%
	Construction	3	19.4%
	Retail	4	11.2%
	Catering industry	5	15.3%
	Service sector	6	24.5%
	Others	7	17.3%
<i>Firm age (CV)</i>	2015	1	8.5%
	2016	2	30.8%
	2017	3	48.7%
	2018	4	10.3%
	2019	5	1.7%

CV = control variable

4. Results

4.1 Descriptive statistics

First, it needs to be checked that there is no significant difference between the frequencies of the characteristics in the dataset that includes the outliers and the dataset without the outliers for outcome variable ROA. Since there is a deviation in percentages for the variables gender and age between the two datasets, the Chi-Square test is used for both variables to confirm the null hypothesis that there is no significant difference in frequencies between the two datasets. Since the null hypothesis can be confirmed, the dataset with exclusion of the outliers is suitable to test the hypotheses.

The descriptive statistics indicate that in this dataset 74.5% of the entrepreneurs is male and the other 25.5% is female (N = 110). The age of the entrepreneur (N = 111) is divided into 4 categories. 25.2% of the entrepreneurs are younger than 30 years old, 51.4% is between 30 and 45 years old, 17.1% is between 46 and 55 years old, and the smallest group, with 6.3%, are entrepreneurs older than 55 years old. To investigate the level of education (N = 110), I look at the highest degree attained by the entrepreneur. 30.9% of the entrepreneurs have a master degree; for 35.5% of the entrepreneurs the highest attained degree is a bachelor degree; 28.2% of the entrepreneurs have a secondary school degree as highest degree and 5.5% of the entrepreneurs only have a primary school degree. Looking at previous entrepreneurial experience (N = 117), I notice that for 66.7% of the entrepreneurs it is the first time they establish a start-up. The other 33.3% indicated that they have already established at least one start-up in the past. To describe the size of the firm, I look at the number of employees (N = 96). 93.8% of the entrepreneurs have no or less than 10 employees and are called micro enterprises. The other 6.2% have more than 10, but less than 50 employees and thus are small enterprises. When looking at the sector in which the start-up operates, most of the start-ups, with 24.5%, are found to be working in the service sector. 19.4% of the start-ups are based in the construction sector, 15.3% in the catering sector, 11.2% in the retail sector, 9.2% in the industrial sector and 3.1% in the agricultural sector. The other 17.3% indicated that they work in another sector. Concerning the age of the start-up, the respondents are asked in what year they are established. 8.5% of the start-ups are established in 2015, 30.8% of the start-ups in 2016, The biggest part of the start-ups, with 48.7%, are established in 2017. 10.3% of the start-ups are established in 2018 and only 1.7% of the start-ups are established in 2019.

Table 2 summarizes the financing forms used by the entrepreneurs for their start-ups (N = 94). Since respondents were allowed to give multiple answers concerning the financing forms they chose, I use multiple response frequencies to find out how many respondents used a specific financing form. 85.1% of the respondents use their own savings, which is a form of bootstrapping, as a financing source. This appears to be the most preferred source of financing in this sample of Flemish start-ups. The second most used financing source is a bank loan, used by 30.9% of the respondents. This is followed by borrowing money from family or friends, which is applicable for 13.8% of the

respondents. These numbers tell us that Flemish start-ups established in 2015 or later mostly do not use new financing sources. When looking at the moderator, it is found that 54.3% or 51 out of the 94 respondents use some form of outside finance (this however might be complemented by inside finance). The other 45.7% of the respondents use only inside financing (i.e. own savings or money from family and friends).

Table 2: descriptive statistics concerning financing choice (N = 94)

	Financing form	Amount (N = 94)	Percentage
Inside finance	Own savings	80	85.1%
	Family & friends	13	13.8%
Outside finance	Bank loan	29	30.9%
	PMV loan	4	4.3%
	Cash credit	10	10.6%
	Risk capital	1	1.1%
	Bullet loan	2	2.1%
	Government guaranteed PMV	4	4.3%
	Leasing	3	3.2%
	Win-win loan	10	10.6%
	Vendor loan	1	1.1%
	Subordinated loan	5	5.3%
	Others	5	5.3%

The ROA is a continuous variable and is expressed in percentages. In this dataset, the minimum value of ROA is -32.63% and the maximum value is 59.36%. Furthermore, ROA has a mean of 12.10% and a median of 10.90%. These values are shown in table 3.

Table 3: descriptive statistics of ROA

	minimum	maximum	mean	median
ROA (in %)	-32.63%	59.36%	12.10%	10.90%

N = 117

Table 4 shows the pairwise correlations from the independent variables, the control variable *firm age*, the moderator and the dependent variable. There is a statistical significant positive correlation between the entrepreneur's age and his or her level of education, between the entrepreneurs' age and his or her previous experience and between the ROA and the entrepreneur's level of education. The control variable *sector* is not included in this correlation matrix because this is a categorical variable with no order. Therefore, any correlation with this variable is of no use in this context. In this correlation matrix, there is no correlation high enough (above 0.80 or 0.90) to give a signal for multicollinearity. However, to be more correct, I calculated the variance inflation factor (VIF) that indicates whether a predictor has a strong linear relationship with the other predictors (Field, 2013). The highest VIF is 3.643 which is far below the suggested threshold of 10 (Myers & Myers, 1990). Therefore, multicollinearity is not a problem in this study.

Table 4: pairwise correlations (N = 117)

Variable	1	2	3	4	5	6	7	8
1 Gender	1							
2 Age	-0.046	1						
3 Education	0.178	0.205*	1					
4 Experience	-0.141	0.217*	-0.023	1				
5 Size	-0.023	-0.026	0.156	0.000	1			
6 Firm age	0.087	0.102	0.022	-0.014	0.077	1		
7 Moderator	0.065	0.108	-0.123	0.099	-0.055	-0.048	1	
8 ROA	0.083	-0.037	0.212*	-0.173	0.168	-0.003	-0.195	1

* p < 0.05

4.2 Regression results

To test hypothesis 1A, I do a univariate analysis between the gender of the entrepreneur and the ROA by using the independent sample t-test in SPSS. The null hypothesis suggests no difference in ROA between male and female entrepreneurs, while the alternative hypothesis states that there is a difference between males and females in ROA. However, this independent sample t-test gives no significant result ($t = -0.861$; $p\text{-value} = 0.391$). This means that there is no statistical difference in ROA between the two groups and thus the null hypothesis can be accepted. Therefore, hypothesis 1A that there is no difference in ROA between male and female entrepreneurs is confirmed. To test hypotheses 1B to 1E, a multivariate regression analysis is executed between the four independent variables (age, education, experience, size) and the dependent variable ROA. The binary control variables are also included in this regression, but both for the sector and for the firm age, one category is left out in order to avoid perfect multicollinearity. This left-out variable is the reference category for the other dummies. For dummy *firm age*, the first year, 2015, is left out of the regression. For the *sector*, the most used category, i.e. the service sector, is left out of the regression. The results of this analysis are shown under model 1A in table 5.

Model 1A:

$$ROA = \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Experience + \beta_4 Size + \beta_5 IndustrialD + \beta_6 AgriculturalD + \beta_7 ConstructionD + \beta_8 RetailD + \beta_9 CateringD + \beta_{10} OtherSectorD + \beta_{11} 2016D + \beta_{12} 2017D + \beta_{13} 2018D + \beta_{14} 2019D + \varepsilon$$

The relation between the level of education of the entrepreneur and the ROA is positive and statistically significant at the 5% level ($\beta = 0.230$; $SD = 2.228$; $t = 2.119$). Therefore, I accept hypothesis 1C saying that start-ups of entrepreneurs with a higher level of education have a higher ROA. There is no statistical significant relation to be found between any of the other variables and the ROA. Therefore, I cannot accept hypothesis 1B, 1D and 1E.

Table 5: regression results for model 1A and model 1B

Variable	Model 1A			Model 1B		
	β	SD	t	β	SD	t
Age	0.026	2.644	0.230	0.074	4.014	0.434
Education	0.230	2.228	2.119*	0.276	3.188	1.773†
Experience	-0.160	4.088	-1.562	0.017	6.757	0.105
Size	0.082	1.016	0.772	0.127	1.467	0.829
IndustrialD (CV)	0.017	7.470	0.151	0.027	7.706	0.225
AgriculturalD (CV)	0.044	11.414	0.418	0.044	11.934	0.399
ConstructionD (CV)	0.058	6.174	0.442	0.046	6.497	0.347
RetailD (CV)	-0.033	6.833	-0.288	-0.023	7.316	-0.188
CateringD (CV)	-0.160	6.468	-1.283	-0.131	6.738	-1.008
OtherSectorD (CV)	-0.189	6.193	-1.583	-0.154	6.513	-1.228
2016D (CV)	-0.064	7.246	-0.351	-0.066	7.525	-0.358
2017D (CV)	0.204	7.026	1.098	0.221	7.256	-0.358
2018D (CV)	-0.164	9.122	-1.162	-0.185	9.857	-1.279
2019D (CV)	-0.015	20.118	-0.136	-0.030	21.447	-0.258
Moderator <i>outside</i>				0.528	18.806	1.074
Age*outside				-0.087	5.330	-0.257
Education*outside				-0.087	4.589	-0.231
Experience*outside				-0.502	9.078	-1.381
Size*outside				-0.016	2.154	-0.087
		$R^2 = 0.244$			$R^2 = 0.276$	
		Adjusted $R^2 = 0.112$			Adjusted $R^2 = 0.088$	
		F = 1.846; p = 0.046			F = 1.468; p = 0.124	

† p < 0.10 * p < 0.05

Dependent variable = ROA

CV = control variable

N = 117

To test the moderating effects in hypotheses 3B to 3E, model 1A is expanded by adding the moderator *OutsideFinance* and the corresponding interaction terms. These interaction terms are formed by multiplying the moderator with every independent variable included in the model. In model 1B the four independent variables, all but one dummy of the control variables, the moderator and the four interaction terms are included.

Model 1B:

$$\begin{aligned}
 ROA = & \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Experience + \beta_4 Size + \beta_5 IndustrialD + \beta_6 AgriculturalD \\
 & + \beta_7 ConstructionD + \beta_8 RetailD + \beta_9 CateringD + \beta_{10} OtherSectorD + \beta_{11} 2016D \\
 & + \beta_{12} 2017D + \beta_{13} 2018D + \beta_{14} 2019D + \beta_{15} OutsideFinance + \beta_{16} (Age * OutsideFinance) \\
 & + \beta_{17} (Education * OutsideFinance) + \beta_{18} (Experience * OutsideFinance) \\
 & + \beta_{19} (Size * OutsideFinance) + \varepsilon
 \end{aligned}$$

The ordinary least squares (OLS) regression results are shown under model 1B in table 5. First of all, the relation between the level of education and the ROA is now statistically significant at the 10% level ($\beta = 0.276$; $SD = 3.188$; $t = 1.773$) again confirming hypothesis 1C. Although a p-value smaller than 0.05 gives stronger evidence in favor of the hypotheses, a p-value between 0.05 and 0.10 gives weak evidence in favor of the hypotheses (Hair, Joseph, Babin, & Anderson, 2010). Next, model 1B shows that moderator *OutsideFinance* is not statistically significant. Therefore, hypothesis 2 that expected a positive relation between the use of outside finance and the performance of the start-up cannot be accepted. Furthermore, there is no significant interaction between any of the independent variables and the moderator. Therefore, none of the hypotheses 3B to 3E can be accepted.

Furthermore, the R^2 is 0.244 in model 1A and 0.276 in model 1B. This means that 24.4% of the variance in the dependent variable ROA is explained by model 1A. In model 1B, the R^2 increases to 27.6%, but this is mainly caused because additional variables are added in this model and it does not mean that adding these variables improves the fit of the model. Therefore, it is better to look at the adjusted R^2 since this measure does not necessarily increase when a new variable is added. The adjusted R^2 of model 1A is 0.112 which means that the variables in this model explain the variance in ROA by 11.2%. For model 1B, the adjusted R^2 is 0.088, hereby explaining 8.8% of the variance in ROA (Field, 2013; Stock & Watson, 2015).

The F-ratio is a measure of how much the model has improved the prediction of the outcome compared to the level of inaccuracy of the model. It compares the regressed model with the zero predictor variables and decides whether the added coefficients improved the model (Field, 2013). In model 1A, the F-value is 1.846 with a corresponding p-value of 0.046. Since this value is smaller than the alpha level of 0.05, the independent variables in model 1A reliably predict the dependent variable ROA. Model 1B has a F-value of 1.468 with a corresponding p-value of 0.124 which indicates that this model does not give a reliable prediction of the dependent variable.

4.3 Robustness check

Many studies either look at the effect of the characteristics of the entrepreneur (age, education and experience) on the start-up's performance or they look at firm specific characteristics (size) and their effect on performance but they do not look at both entrepreneurial and firm specific characteristics in the same model (Alharbi et al., 2018; Ha-Brookshire, 2009; Lee, 2009; Orlitzky, 2001; Tanveer et al., 2013). Therefore, there might be a different effect on start-up performance when distinguishing between these two groups.

I therefore tested two additional models. In the first model (model 2A), only the independent variables linked to the entrepreneur are included, i.e. age, education, and experience. In the second model (model 2B), only the independent variable linked to the start-up is included, i.e. size. For both models a regression without and with moderation is tested.

Model 2A without the moderation only includes the three independent variables linked to the entrepreneur and all but one dummy of the control variables.

Model 2A without moderation:

$$ROA = \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Experience + \beta_4 IndustrialD + \beta_5 AgriculturalD + \beta_6 ConstructionD + \beta_7 RetailD + \beta_8 CateringD + \beta_9 OtherSectorD + \beta_{10} 2016D + \beta_{11} 2017D + \beta_{12} 2018D + \beta_{13} 2019D + \varepsilon$$

The results of this regression are shown under model 2A without moderation in table 6. In this model there is again a positive relation between the level of education of the entrepreneur and the ROA at the 5% significance level ($\beta = 0.236$; $SD = 2.104$, $t = 2.389$) which again confirms hypothesis 1C. Furthermore, this model finds a negative relation between the previous experience of the entrepreneur and the ROA that is statistically significant at the 10% level ($\beta = -0.180$; $SD = 3.879$, $t = -1.883$). However, hypothesis 1D expected a positive relation between previous experience and ROA thus this hypothesis cannot be confirmed. There are no other statistically significant relations in model 2A, thus hypotheses 1B and 1E are not confirmed either.

Looking at model 2A with moderation, both the moderator and the interaction terms for every independent variable linked to the entrepreneur are added to the previous regression.

Model 2A with moderation:

$$ROA = \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Experience + \beta_4 IndustrialD + \beta_5 AgriculturalD + \beta_6 ConstructionD + \beta_7 RetailD + \beta_8 CateringD + \beta_9 OtherSectorD + \beta_{10} 2016D + \beta_{11} 2017D + \beta_{12} 2018D + \beta_{13} 2019D + \beta_{14} OutsideFinance + \beta_{15} (Age * OutsideFinance) + \beta_{16} (Education * OutsideFinance) + \beta_{17} (Experience * OutsideFinance) + \varepsilon$$

The regression results are shown by model 2A with moderator in table 6. Only the relation between the level of education of the entrepreneur and the ROA is statistically significant at the 10% level ($\beta = 0.269$; $SD = 3.165$, $t = 1.739$) which again confirms hypothesis 1C. However, there are no other significant predictors for the dependent variable ROA, meaning that hypotheses 3B to 3D cannot be confirmed.

In model 2B the relation between the characteristic linked to the start-up and the start-up's performance is tested. First I look at the model without moderation that only includes the independent variable size and all but one dummy of the two control variables.

Model 2B without moderation:

$$ROA = \beta_0 + \beta_1 Size + \beta_2 IndustrialD + \beta_3 AgriculturalD + \beta_4 ConstructionD + \beta_5 RetailD + \beta_6 CateringD + \beta_7 OtherSectorD + \beta_8 2016D + \beta_9 2017D + \beta_{10} 2018D + \beta_{11} 2019D + \varepsilon$$

The regression results are shown under model 2B without moderation in table 6 but give no significant result. I extend this model by adding the moderator and the interaction term formed with size to look at the model with moderation.

Model 2B with moderation:

$$ROA = \beta_0 + \beta_1 Size + \beta_2 IndustrialD + \beta_3 AgriculturalD + \beta_4 ConstructionD + \beta_5 RetailD + \beta_6 CateringD + \beta_7 OtherSectorD + \beta_8 2016D + \beta_9 2017D + \beta_{10} 2018D + \beta_{11} 2019D + \beta_{12} OutsideFinance + \beta_{13} (Size * OutsideFinance) + \varepsilon$$

The regression results are shown under model 2B with moderation in table 6 but give no statistically significant results.

Apart from these extended models, I also checked the multivariate models that only include one independent variable and its interaction term, supplemented by the moderator and the control variables. Again I only find a positive significant result for the model with education ($ROA = \beta_0 + \beta_1 Education + \beta_2 OutsideFinance + \beta_3 (Education * OutsideFinance) + \beta_4 IndustrialD + \beta_5 AgriculturalD + \beta_6 ConstructionD + \beta_7 RetailD + \beta_8 CateringD + \beta_9 OtherSectorD + \beta_{10} 2016D + \beta_{11} 2017D + \beta_{12} 2018D + \beta_{13} 2019D + \varepsilon$) at the 10% significance level with $\beta_1 = 0.272$ with a p-value of 0.076.

Previous research shows that the most used financing source in Flanders appears to be a bank loan (Laveren, Steijvers, & Umans, 2019). Therefore, additional tests are executed to check the effect of a bank loan as a moderator on the relation between several entrepreneurial and start-up characteristics and the performance of the start-up. Hence, I construct a new moderator *BankFinance*. While outside finance is defined as any form of finance provided by the market and moderator *OutsideFinance* has value 1 if the entrepreneur uses at least one source of outside financing and value 0 if only inside financing sources are use, moderator *BankFinance* only entails the use of a bank loan and has value 1 if the start-up use a bank loan (this however can be supplemented by any other financing source) and value 0 when the start-up uses no bank loan. This model is called model 2C and consists of the four independent variables, moderator *BankFinance*, four interaction terms formed with the independent variables and moderator *BankFinance* and all but one dummy of both control variables sector and firm age.

Model 2C:

$$\begin{aligned}
 ROA = & \beta_0 + \beta_1 Age + \beta_2 Education + \beta_3 Experience + \beta_4 Size + \beta_5 IndustrialD + \beta_6 AgriculturalD \\
 & + \beta_7 ConstructionD + \beta_8 RetailD + \beta_9 CateringD + \beta_{10} OtherSectorD + \beta_{11} 2016D \\
 & + \beta_{12} 2017D + \beta_{13} 2018D + \beta_{14} 2019D + \beta_{15} BankFinance + \beta_{16} (Age * BankFinance) \\
 & + \beta_{17} (Education * BankFinance) + \beta_{18} (Experience * BankFinance) \\
 & + \beta_{19} (Size * BankFinance) + \varepsilon
 \end{aligned}$$

The results of this regression are outlined under model 2C in table 6. The relation between the level of education and the ROA is again positive statistically significant at the 5% level ($\beta_2 = 0.314$; SD = 2.608; t = 2.469). Furthermore in this model both the moderator *BankFinance* ($\beta_{15} = 0.836$; SD = 20.315; t = 1.712) and the interaction term *Education*BankFinance* ($\beta_{18} = -0.659$; SD = 5.500; t = -1.694) are statistically significant at the 10% level. Hence, in this model 2C with moderator *BankFinance*, the use of a bank loan is positively related to the ROA. On the other hand, the interaction term *Education*BankFinance* is negatively related to ROA which implicates that the positive relation between education and ROA is weakened when entrepreneurs use a bank loan.

Variable	Model 2A						Model 2B						Model 2C		
	Without moderation			With moderation			Without moderation			With moderation			β	SD	t
β	SD	t	β	SD	t	β	SD	t	β	SD	t				
Age	0.010	2.491	0.097	0.068	3.988	0.403							0.018	3.350	0.124
Education	0.236	2.104	2.389*	0.269	3.165	1.739†							0.314	2.608	2.469*
Experience	-0.180	3.879	-1.883†	-0.007	6.610	-0.043							-0.140	4.959	-1.153
Size							0.119	1.055	1.108	-0.063	7.534	-0.347	0.131	1.135	1.106
IndustrialD (CV)	-0.018	7.211	-0.175	0.030	7.654	0.256	0.070	7.800	0.595	0.061	7.917	0.511	0.043	7.652	0.359
AgriculturalD (CV)	0.007	11.132	0.070	0.035	11.828	0.324	0.054	11.864	0.500	0.077	12.185	0.697	-0.006	11.917	-0.056
ConstructionD (CV)	-0.025	5.508	-0.233	0.023	6.357	0.178	0.036	6.116	0.288	0.016	6.367	0.127	0.029	6.406	0.227
RetailD (CV)	-0.100	6.404	-0.992	-0.045	7.080	-0.372	0.015	7.184	0.129	0.003	7.492	0.026	0.007	7.063	0.055
CateringD (CV)	-0.233	5.819	-2.226	-0.154	6.591	-1.211	-0.156	6.651	-1.241	-0.141	6.768	-1.105	-0.174	6.596	-1.367
OtherSectorD (CV)	-0.226	5.522	-2.156	-0.181	6.327	-1.480	-0.120	6.442	-0.991	-0.098	6.607	-0.788	-0.191	6.571	-1.510
2016D (CV)	-0.043	7.220	-0.242	-0.074	7.446	-0.402	-0.063	7.412	-0.349	-0.063	7.534	-0.347	-0.028	7.647	-0.151
2017D (CV)	0.180	7.041	0.978	0.216	7.196	1.148	0.160	7.287	0.849	0.150	7.384	0.792	0.185	7.249	0.975
2018D (CV)	-0.081	8.779	-0.589	-0.185	9.753	-1.287	-0.124	9.589	-0.853	-0.123	10.103	-0.847	-0.243	10.157	-1.629
2019D (CV)	-0.090	14.904	-0.863	-0.002	20.476	-0.019	0.022	21.002	0.119	0.003	21.909	0.027	-0.030	20.617	-0.269
Moderator <i>outside</i>				0.440	18.200	0.926				-0.136	6.029	-0.884			
Age*outside				-0.126	5.242	-0.377									
Education*outside				-0.030	4.463	-0.081									
Experience*outside				-0.433	8.868	-1.218									
Size*outside										-0.012	2.147	-0.068			
Moderator <i>bank</i>													0.836	20.315	1.712†
Age*bank													0.336	6.343	0.916
Education*bank													-0.659	5.500	-1.694†
Experience*bank													-0.262	10.093	-0.797
Size*bank													-0.243	3.379	-1.402

Model 2A		Model 2B		Model 2C
Without moderation	With moderation	Without moderation	With moderation	
R ² = 0.215 Adjusted R ² = 0.108 F = 2.019; p = 0.027	R ² = 0.265 Adjusted R ² = 0.099 F = 1.594; p = 0.087	R ² = 0.153 Adjusted R ² = 0.042 F = 1.379; p = 0.198	R ² = 0.173 Adjusted R ² =0.038 F = 1.285; p=0.239	R ² = 0.298 Adjusted R ² = 0.115 F = 1.632; p = 0.071

Table 6: regression results of models 2A, 2B and 2C

† p < 0.10 * p < 0.05

Dependent variable = ROA

CV = control variable

N = 117

5. Discussion and conclusions

5.1 Discussion

The first main result of this study is that it finds a positive relation between the entrepreneur's level of education and the start-up's performance. This means that the higher the degree that the entrepreneur attained, the better the start-up performs. This is in line with other studies that find strong evidence for a positive relation between the entrepreneur's level of education and firm performance (Alharbi et al., 2018; Bosma et al., 2000; Fairlie & Robb, 2009; Rose et al., 2006; Tanveer et al., 2013; Thapa et al., 2008; Zhang, 2008). A higher level of education contributes to the development of entrepreneurial knowledge and skills which not only helps entrepreneurs to make the right decisions for their start-up, but also increases the likelihood of a successful business (Achleitner et al., 2011; Grichnik et al., 2014; Minai et al., 2018; Sajilan et al., 2015; Waleczek et al., 2018).

The second result of this study is that it finds no difference in start-up performance between male and female entrepreneurs. Although previous research concerning this topic gives mixed results, this study confirms my own expectations as well as the results of previous studies that found no difference in performance between males and females (Cooper et al., 1994; Kepler & Shane, 2007; Robb & Watson, 2012; Sabarwal & Terrell, 2008). On the other hand, some studies found a difference in performance between male and female entrepreneurs (Bosma et al., 2004; Fairlie & Robb, 2009; Robb & Robinson, 2014). This difference however may be caused by their lack of controlling for important factors like size, sector or risk that differ between males and females (Lee, 2009; Sabarwal & Terrell, 2008).

In contrast, this study finds no significant relation between the entrepreneur's age and the start-up's performance. Previous research concerning this topic is scarce and there is no unequivocal proof for a positive relation between age as a direct exposure and start-up performance (Bosma et al., 2000; Fried & Tauer, 2015; Rose et al., 2006). Some studies consider age as part of the entrepreneur's human capital and find a positive relation between this human capital and the start-up's performance. This way however, they do not measure the direct influence of age on performance because other factors (i.e. skills and knowledge) are included in this relation too (Rose et al., 2006). Currently, it is unclear what direct effect the entrepreneur's age might have on the performance of the start-up.

Furthermore, I argued that there is a positive relation between the entrepreneur's previous experience and start-up performance. However, findings from these analyses find no evidence to support this hypothesis. Previous research concerning this topic is mixed. Since every start-up is different and their outcome uncertainty is high, it is very difficult to capitalize on prior learning (Gottschalk et al., 2017).

Neither does this study find significant evidence to confirm that the size of the start-up is negatively related to the performance of the start-up. Again, previous research shows mixed results concerning this relationship. I believe, along with other researches, that other factors like market structure, entry barriers or firm strategies also influence the relationship between start-up size and performance (Caves & Pugel, 1980).

Furthermore, these analyses did not find any significant interaction between any of the independent variables and moderator OutsideFinance in moderation model 1B, thereby not confirming any of the hypotheses 3B to 3E. When an interaction term is not significant we do not find a combined effect of these two variables on the dependent variable (Field, 2013). The adjusted R^2 of both model 1A and model 1B is rather small. Only a part of the variance in the dependent variable is explained by the variables in these models. Therefore, there might be other factors not included in these models that influence the ROA as well. Since this is an innovative research topic, no other supportive literature could be found.

5.2 Practical implications

The results of this study entail some practical implications that are valuable for different stakeholders. First of all, now that it is known that entrepreneurs with a higher education achieve better start-up performance when establishing a start-up, future entrepreneurs might be encouraged to obtain a good degree. Entrepreneurs acquire valuable skills and knowledge during their education that helps them establish a successful start-up (Bosma et al., 2000; Fried & Tauer, 2015; Sajilan et al., 2015). Successful start-ups in turn create more jobs and contribute to our economy (Bokhari et al., 2018; Corl, 2019; Ritchie & Swisher, 2018; Sanyal & Mann, 2010). Furthermore, also potential investors benefit from these results. Investors that are looking for a start-up to invest in are encouraged to not only look at the financials or the characteristics of the start-up itself, but to also consider the degree or the education of the entrepreneur.

5.3 Limitations and future research directions

This study is not without limitations. Nevertheless, these limitations provide interesting suggestions for future research. First, the models in this study contain many variables. Model 1B for example, contains 19 variables. Normally, it is assumed that for every variable in the regression, a minimum of 20 cases should be available (Field, 2013). However, in this study only 117 cases are included which makes this study underpowered and causes type II errors. There are two reasons why the analyses could only include this few cases. First, I was dependent to the number of start-ups in the dataset from Laveren et al. (2019). To create more statistical power, future studies should focus on recruiting larger datasets. Second, this study is also limited due to the lack of available financial data of the start-ups. When start-ups are still in their nascent phase, they have not published their financial statements. Furthermore, the Belgian law obliges companies to publish their financial

statements, but allows some exceptions under certain conditions like for example micro-enterprises (less than 10 employees) that have unlimited liability (Eurostat; TCM). Therefore, I suggest future studies to compose questionnaires that include some questions concerning the start-up's financial records or to carefully select start-ups that have published their financial statements.

Next, this is a cross-sectional study, without longitudinal follow-up data. When there is a longitudinal follow-up, the long term effect of the entrepreneur's or start-up's characteristics on the firm performance is investigated further and not only associations but also causations can be predicted. Therefore, I recommend future researches to do a longitudinal follow-up on the start-up performance.

Furthermore, a recent study shows that crowd investors evaluate the characteristics of the management team of start-ups before investing in the start-up. Venture capitalists on the other hand place great value on the teams' experience in running new ventures (Shafi, 2019). To complement this literature, it might be interesting to investigate whether other investors also look at characteristics of the start-up team and not only at the financials of the start-up itself before investing in the start-up. In addition, it might also be interesting to explore whether investment decisions also depend on the characteristics of potential start-up investors themselves, such as their education or previous experience, instead of only on the financials of the start-up or on the characteristics of the entrepreneur.

5.4 Conclusions

This study examines relations between characteristics of the entrepreneur and the start-up (gender, age, education, experience and start-up size) and the performance of the start-up and whether these relations are influenced (strengthened or weakened) by the use of outside finance as a financing source. The main findings of this study are (1) a positive relation between the level of education of the entrepreneur and the performance of the start-up and (2) no difference in start-up performance between male or female entrepreneurs. In conclusion, the level of education of the entrepreneurs seems to be an important factor to enhance the start-up's performance.

- Achleitner, A.-K., Braun, R., & Kohn, K. (2011). New venture financing in Germany: Effects of firm and owner characteristics. *Zeitschrift für Betriebswirtschaft*, 81(3), 263-294. doi:10.1007/s11573-011-0441-3
- Adomdza, G. K., Åstebro, T., & Yong, K. (2016). Decision biases and entrepreneurial finance. *Small Business Economics*, 47(4), 819-834. doi:10.1007/s11187-016-9739-4
- Aleman, L., & Andreoli, J. J. (2018). *Entrepreneurial finance: the art and science of growing ventures*. Cambridge: Cambridge University Press.
- Alharbi, R. K., Yahya, S. B., & Ahmed, E. R. (2018). Characteristics of manager's and SMEs performance: the role of access to finance as a moderator. *International Journal of Engineering & Technology*, 7(4), 5115-5119.
- Alperovych, Y., Hübner, G., & Lobet, F. (2015). How does governmental versus private venture capital backing affect a firm's efficiency? Evidence from Belgium. *Journal of Business Venturing*, 30(4), 508-525. doi:10.1016/j.jbusvent.2014.11.001
- Andries, P., Rijssen, L., & Roelandt, J. (2019). De financiering van jonge ondernemingen in Vlaanderen 2019.
- Arend, R. J. (2014). Entrepreneurship and dynamic capabilities: how firm age and size affect the 'capability enhancement-SME performance' relationship. *Small Business Economics*, 42(1), 33-57. doi:10.1007/s11187-012-9461-9
- Åstebro, T., & Bernhardt, I. (2003). Start-up financing, owner characteristics, and survival. *Journal of Economics and Business*, 55(4), 303-319. doi:[https://doi.org/10.1016/S0148-6195\(03\)00029-8](https://doi.org/10.1016/S0148-6195(03)00029-8)
- Bamata, H., K. Govender, K., & Fields, Z. (2019). An empirical study of optimal access to external finance by small and medium enterprise start-ups. *Problems and Perspectives in Management*, 17(3), 242-258. doi:10.21511/ppm.17(3).2019.20
- Battistin, E., Battistin, E., Bortoluzzi, P., Bortoluzzi, P., Buttignon, F., Buttignon, F., . . . Vedovato, M. (2017). Minority and majority private equity investments: firm performance and governance. *Journal of Management & Governance*, 21(3), 659-684. doi:10.1007/s10997-016-9364-2
- Blanchflower, D. G., Oswald, A., & Stutzer, A. (2001). Latent entrepreneurship across nations. *European Economic Review*, 45(4), 680-691. doi:10.1016/S0014-2921(01)00137-4
- Block, J. H., Colombo, M. G., Cumming, D. J., & Vismara, S. (2018). New players in entrepreneurial finance and why they are there. *Small Business Economics*, 50(2), 239-250. doi:10.1007/s11187-016-9826-6
- Bokhari, S., Chegut, A., Frenchman, D., & Tausendschoen, I. (2018). Is innovation really in a place? Accelerator program impacts on firm performance.
- Bosma, N., Praag, M. v., Thurik, R., & Wit, G. d. (2004). The value of human and social capital investments for the business performance of startups. *Small Business Economics*, 23(3), 227-236. doi:10.1023/B:SBEJ.0000032032.21192.72
- Bosma, N., Van Praag, M., & De Wit, G. (2000). Determinants of successful entrepreneurship. In: EIM Zoetermeer.
- Cassar, G. (2004). The financing of business start-ups. *Journal of Business Venturing*, 19(2), 261-283. doi:10.1016/S0883-9026(03)00029-6
- Cassar, G. (2014). Industry and startup experience on entrepreneur forecast performance in new firms. *Journal of Business Venturing*, 29(1), 137-151. doi:10.1016/j.jbusvent.2012.10.002
- Caves, R., & Pugel, T. (1980). *Intraindustry differences in conduct and performance; viable strategies in US manufacturing*. .
- Cho, Park, & Sung. (2019). The Study on the Difference in Corporate Performance and Employment Outcomes According to the Results of Equity-Based Crowdfunding Investment. *Journal of Open Innovation: Technology, Market, and Complexity*, 5(4), 83. doi:10.3390/joitmc5040083
- Cole, R. A., & Sokolyk, T. (2018). Debt financing, survival, and growth of start-up firms. *Journal of Corporate Finance*, 50, 609-625. doi:<https://doi.org/10.1016/j.jcorpfin.2017.10.013>
- Cooper, A. C., Javier, G.-G. F., & Woo, C. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing*, 9(5), 371-395. Retrieved from <https://EconPapers.repec.org/RePEc:eee:jbusvent:v:9:y:1994:i:5:p:371-395>
- Corl, E. (2019). How startups drive the economy. *Medium*. Retrieved from <https://medium.com/@ericcorl/how-startups-drive-the-economy-69b73cfbae1>
- Cumming, D., Deloof, M., Manigart, S., & Wright, M. (2019). New directions in entrepreneurial finance. *Journal of Banking and Finance*, 100, 252-260. doi:10.1016/j.jbankfin.2019.02.008
- Cumming, D., & Groh, A. P. (2018). Entrepreneurial finance: Unifying themes and future directions. *Journal of Corporate Finance*, 50, 538-555. doi:10.1016/j.jcorpfin.2018.01.011
- Deloof, M., & Vanacker, T. (2018). The recent financial crisis, start-up financing and survival. *Journal of Business Finance & Accounting*, 45(7-8), 928-951. doi:10.1111/jbfa.12319

- Eurostat. Small and medium-sized enterprises (SMES). *European Commission*. Retrieved from <https://ec.europa.eu/eurostat/web/structural-business-statistics/structural-business-statistics/sme>
- Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: evidence from the Characteristics of Business Owners survey. *Small Business Economics, 33*(4), 375.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*: sage.
- Fraser, S., Bhaumik, S. K., & Wright, M. (2015). What do we know about entrepreneurial finance and its relationship with growth? *International Small Business Journal, 33*(1), 70-88. doi:10.1177/0266242614547827
- Fried, H. O., & Tauer, L. W. (2015). An entrepreneur performance index. *Journal of Productivity Analysis, 44*(1), 69-77. doi:10.1007/s11123-015-0436-0
- Gottschalk, S., Greene, F. J., & Müller, B. (2017). The impact of habitual entrepreneurial experience on new firm closure outcomes. *Small Business Economics, 48*(2), 303-321. doi:10.1007/s11187-016-9780-3
- Grichnik, D., Brinckmann, J., Singh, L., & Manigart, S. (2014). Beyond environmental scarcity: Human and social capital as driving forces of bootstrapping activities. *Journal of Business Venturing, 29*(2), 310-326. doi:10.1016/j.jbusvent.2013.02.006
- Ha-Brookshire, J. E. (2009). Does the firm size matter on firm entrepreneurship and performance?: US apparel import intermediary case. *Journal of Small Business and Enterprise Development, 16*(1), 132-145. doi:10.1108/14626000910932926
- Hair, J., Joseph, F., Babin, B., & Anderson, R. (2010). A GLOBAL P-ERSPECT-IVIE."
- Hall, M., & Weiss, L. (1967). Firm size and profitability. *The Review of Economics and Statistics, 319-331*.
- Hechavarría, D. M., Matthews, C. H., & Reynolds, P. D. (2016). Does start-up financing influence start-up speed? Evidence from the panel study of entrepreneurial dynamics. *Small Business Economics, 46*(1), 137-167. doi:10.1007/s11187-015-9680-y
- Kautonen, T., Down, S., & Minniti, M. (2014). Ageing and entrepreneurial preferences. *Small Business Economics, 42*(3), 579-594. doi:10.1007/s11187-013-9489-5
- Kepler, E., & Shane, S. (2007). Are male and female entrepreneurs really that different? *Small Business Research Summary Report No. 36 to the US Small Business Administration Office*. Retrieved from http://webarchive.loc.gov/all/20100616094927/http://www.sba.gov/advo/research/rs309t_0t.pdf
- Kwapisz, A., & Hechavarría, D. M. (2018). Women don't ask: an investigation of start-up financing and gender. *Venture Capital, 20*(2), 159-190. doi:10.1080/13691066.2017.1345119
- Laveren, E., Steijvers, T., & Umans, I. (2019). Starten versus overnemen van een zaak: een onderzoek bij recent gestarte ondernemingen. *Onderzoeksrapport Agentschap Innoveren en Ondernemen, 33 p*.
- Lee. (2009). Does Size Matter in Firm Performance? Evidence from US Public Firms. *International Journal of the Economics of Business, 16*(2), 189-203. doi:10.1080/13571510902917400
- Lee, I. H., & Marvel, M. R. (2014). Revisiting the entrepreneur gender-performance relationship: a firm perspective. *Small Business Economics, 42*(4), 769-786. doi:10.1007/s11187-013-9497-5
- Lévesque, M., & Minniti, M. (2006). The effect of aging on entrepreneurial behavior. *Journal of Business Venturing, 21*(2), 177-194. doi:10.1016/j.jbusvent.2005.04.003
- Lin, S., & Wang, S. (2019). How does the age of serial entrepreneurs influence their re-venture speed after a business failure? *Small Business Economics, 52*(3), 651-666. doi:10.1007/s11187-017-9977-0
- Meles, A., Monferrà, S., & Verdoliva, V. (2014). Do the effects of private equity investments on firm performance persist over time? *Applied Financial Economics, 24*(3), 203-218. doi:10.1080/09603107.2013.872758
- Minai, M. S., Raza, S., Bin Hashim, N. A., Md Zain, A. Y., & Ali Tariq, T. (2018). Linking entrepreneurial education with firm performance through entrepreneurial competencies: A proposed conceptual framework. In (Vol. 21, pp. 1-9). Arden: Jordan Whitney Enterprises, Inc.
- Mollick, E. (2014). The dynamics of crowdfunding: An exploratory study. *Journal of Business Venturing, 29*(1), 1-16.
- Myers, R. H., & Myers, R. H. (1990). *Classical and modern regression with applications* (Vol. 2): Duxbury press Belmont, CA.
- N. Berger, A., & F. Udell, G. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance, 22*(6), 613-673. doi:10.1016/S0378-4266(98)00038-7

- Nofsinger, J. R., & Wang, W. (2011). Determinants of start-up firm external financing worldwide. *Journal of Banking & Finance*, 35(9), 2282-2294. doi:<https://doi.org/10.1016/j.jbankfin.2011.01.024>
- OECD. (2015). *New Approaches to SME and Entrepreneurship Financing*.
- Orlitzky, M. (2001). Does Firm Size Comfound the Relationship Between Corporate Social Performance and Firm Financial Performance? *Journal of Business Ethics*, 33(2), 167-180. doi:10.1023/A:1017516826427
- Pirollo, L., & Presutti, M. (2010). The Impact of Social Capital on the Start-ups' Performance Growth. *Journal of Small Business Management*, 48(2), 197-227. doi:10.1111/j.1540-627X.2010.00292.x
- Qian, K., Mulas, V., & Lerner, M. (2018). *Supporting Entrepreneurs at the Local Level : The Effect of Accelerators and Mentors on Early-Stage Firms*: World Bank, Washington, DC U6 - ctx_ver=Z39.88-2004&ctx_enc=info%3Aofi%2Fenc%3AUTF-8&rft_id=info%3Aid%2Fsummon.serialssolutions.com&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=book&rft.title=Supporting+Entrepreneurs+at+the+Local+Level+%3A+The+Effect+of+Accelerators+and+Mentors+on+Early-Stage+Firms&rft.au=Qian%2C+Kathy&rft.au=Mulas%2C+Victor&rft.au=Lerner%2C+Matt&rft.series=Finance%2C+Competitiveness+and+Innovation+in+Focus&rft.date=2018-09-06&rft.pub=World+Bank%2C+Washington%2C+DC&rft.externalDBID=n%2Fa&rft.externalDocID=oai_openknowledge_worldbank_org_10986_30384¶mdict=en-US U7 - Book.
- Qorraj, G. (2017). ENTREPRENEURIAL VENTURES UNDER INFORMATION ASYMMETRY IN TRANSITION COUNTRIES. *Dynamic Relationships Management Journal (DRMJ)*, 6(1), 27-34. doi:10.17708/DRMJ.2017.v06n01a01
- Ritchie, B., & Swisher, N. (2018). The big small: the economic benefits of startups. *University of notre dame*. Retrieved from <https://ideacenter.nd.edu/news-events/news/the-big-small-the-economic-benefits-of-startups/>
- Robb, A. M., & Robinson, D. T. (2014). The Capital Structure Decisions of New Firms. *Review of Financial Studies*, 27(1), 153-179. doi:10.1093/rfs/hhs072
- Robb, A. M., & Watson, J. (2012). Gender differences in firm performance: Evidence from new ventures in the United States. *Journal of Business Venturing*, 27(5), 544-558. doi:<https://doi.org/10.1016/j.jbusvent.2011.10.002>
- Roper, S., & Scott, J. M. (2009). Perceived financial barriers and the start-up decision: An econometric analysis of gender differences using GEM data. *International Small Business Journal*, 27(2), 149-171. doi:10.1177/0266242608100488
- Rose, R. C., Kumar, N., & Yen, L. L. (2006). THE DYNAMICS OF ENTREPRENEURS' SUCCESS FACTORS IN INFLUENCING VENTURE GROWTH. *Journal of Asia Entrepreneurship and Sustainability*, 2(2), 133.
- Rothaermel, F. T., & Thursby, M. (2005). University-incubator firm knowledge flows: Assessing their impact on incubator firm performance. *Research policy*, 34(3), 305-320. doi:10.1016/j.respol.2004.11.006
- Sabarwal, S., & Terrell, K. (2008). *Does Gender Matter for Firm Performance? Evidence from Eastern Europe and Central Asia*. Retrieved from
- Saidu, S. (2019). CEO characteristics and firm performance: focus on origin, education and ownership. *Journal of Global Entrepreneurship Research*, 9(1), 1-15. doi:10.1186/s40497-019-0153-7
- Sajilan, S., Hadi, N. U., & Tehseen, S. (2015). Impact of Entrepreneur's Demographic Characteristics and Personal Characteristics on Firm's Performance Under the Mediating Role of Entrepreneur Orientation. *Review of Integrative Business and Economics Research*, 4(2), 36.
- Santarelli, E. (1998). Start-up size and post-entry performance: the case of tourism services in Italy. *Applied Economics*, 30(2), 157-163.
- Sanyal, P., & Mann, C. L. (2010). *The financial structure of startup firms: The role of assets, information, and entrepreneur characteristics*. Retrieved from
- Scherer, F. M. (1973). The Determinants of Industrial Plant Sizes in Six Nations. *The Review of Economics and Statistics*, 55(2), 135-145. Retrieved from <https://EconPapers.repec.org/RePEc:tpr:restat:v:55:y:1973:i:2:p:135-45>
- Schwartz, M. (2011). Incubating an Illusion? Long-Term Incubator Firm Performance after Graduation. *Growth and Change*, 42(4), 491-516. doi:10.1111/j.1468-2257.2011.00565.x
- Shafi, K. (2019). Investors' evaluation criteria in equity crowdfunding. *Small Business Economics*. doi:10.1007/s11187-019-00227-9
- Steigertahl, L., Mauer, R., & Say, J.-B. (2018). EU start-up monitor.
- Stock, J. H., & Watson, M. W. (2015). *Introduction to econometrics* (3 ed. Vol. 2015: 2). Boston, Mass: Pearson.

- Stuart, R. W., & Abetti, P. A. (1990). Impact of entrepreneurial and management experience on early performance. *Journal of Business Venturing*, 5(3), 151-162. doi:[https://doi.org/10.1016/0883-9026\(90\)90029-S](https://doi.org/10.1016/0883-9026(90)90029-S)
- Tanveer, M. A., Akbar, A., Gill, H., & Ahmed, I. (2013). Role of personal level determinants in entrepreneurial firm's success. *Journal of Basic and Applied Scientific Research*, 3(1), 449-458.
- TCM. Het publiceren van de jaarrekening van een Belgische onderneming. Retrieved from <https://www.tcm.be/nl/het-publiceren-van-de-jaarrekening-van-een-belgische-onderneming/>
- Tenca, F., Croce, A., & Ughetto, E. (2018). BUSINESS ANGELS RESEARCH IN ENTREPRENEURIAL FINANCE: A LITERATURE REVIEW AND A RESEARCH AGENDA. *Journal of Economic Surveys*, 32(5), 1384-1413. doi:10.1111/joes.12224
- Thapa, A., Thulaseedharan, A., Goswami, A., & Joshi, L. P. (2008). Determinants of street entrepreneurial success. *Journal of Nepalese Business Studies*, 5(1), 85-92.
- Unizo, G., UCM. (2019). Starters atlas 2019 [Press release]. Retrieved from <https://graydon.be/downloads/report-startersatlas-2019>
- Vaznyte, E., & Andries, P. (2019). Entrepreneurial orientation and start-ups' external financing. *Journal of Business Venturing*, 34(3), 439-458. doi:10.1016/j.jbusvent.2019.01.006
- Verheul, I., & Thurik, R. (2001). Start-Up Capital: "Does Gender Matter?". *Small Business Economics*, 16(4), 329-346. doi:10.1023/A:1011178629240
- Waleczek, P., Zehren, T., & Flatten, T. C. (2018). Start-up financing: How founders finance their ventures' early stage. *Managerial and Decision Economics*, 39(5), 535-549. doi:10.1002/mde.2925
- Walthoff-Borm, X., Vanacker, T., & Collewaert, V. (2018). Equity crowdfunding, shareholder structures, and firm performance. *Corporate Governance: An International Review*, 26(5), 314-330. doi:10.1111/corg.12259
- Winborg, J., Akademin för ekonomi, t. o. n., Centrum för innovations, e.-o. I., & Högskolan i, H. (2009). Use of financial bootstrapping in new businesses: a question of last resort? *Venture Capital*, 11(1), 71-83. doi:10.1080/13691060802351248
- Zhang, G. (2008). The choice of formal or informal finance: Evidence from Chengdu, China. *China Economic Review*, 19(4), 659-678. doi:10.1016/j.chieco.2008.09.001