

# Start-up Performance: Looking for an Explanation in Entrepreneurial Characteristics and Financing Choice

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**Abstract** Although start-ups are gaining popularity and are known to have an important influence on the economy, surprisingly little research is available on these enterprises. One of the topics which remain to be explored concerns the performance of start-ups. So as to gain some insight into this phenomenon, we investigate the influence of characteristics of both the entrepreneur and the start-up (namely gender, age, education, experience, and start-up size). Thereby we base our arguments on the literature of SMEs and large companies, taking into account that start-ups behave differently than SMEs. Based on the translations of these arguments, we come to 5 hypotheses. However, since literature for SMEs and large companies is mixed and finds no unambiguous effect for these characteristics, this focus might limit to an incomplete overview. Therefore, we integrate the use of outside finance as a moderator, so as to find out whether the relations are influenced (strengthened or weakened) by the used financing source. The integration of this moderator is justifiable based on previous studies, where associations can be found between entrepreneurial characteristics and financing decisions on the one hand, but in addition, between financing decisions and performance on the other hand. So, it has been found that a firm's success or failure depends heavily on its initial financing decision. Concerning the population of start-ups, studies show that the use of debt or any other form of external financing is associated with a better start-up performance. Based on a dataset of 117 Belgian start-ups, and making use of quantitative research, only the expected results concerning the level of education and gender could be confirmed. So, it is found that higher levels of education lead to better start-up performance, while no difference is found in the performance of start-ups led by female versus male entrepreneurs. At the same time, no significant interaction between any of the investigated characteristics and outside finance could be found. As such, it could not be confirmed that for start-ups using outside finance, the effect of the characteristics on performance will be different, compared to when they don't use any form of outside finance.

**Keywords:** start-ups, entrepreneurial characteristics, performance, financing choice

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## 1. Introduction

Since 2015 the number of start-ups in Belgium is increasing, with an absolute record of 100.113 new start-ups established in 2018 (Unizo, 2019). So as to define a start-up, the following three criteria are commonly referred to: (1) the venture's age has to be less than five or ten years, depending on the sector; (2) the venture has to strive for innovation, not only in its products but also in its business model; (3) 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. Notwithstanding their small size, start-ups create more new jobs than existing companies, and they appear to have higher median growth than their more mature counterparts (Bokhari et al., 2018).

Although start-ups are gaining popularity and are known to have a fundamental impact on the overall productivity of our economy, there is surprisingly little research available on start-ups (Nofsinger and Wang, 2011). A lot of research focuses on small and medium-sized 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. Thereby, results from previous research concerning SMEs are useful to translate some expectations to start-ups.

This paper contributes to the 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. The access to entrepreneurial finance and the choice between different financing forms are crucial factors for start-ups (Vaznyte and Andries, 2019). Little is known about any specific relation between these new financing sources and the performance of the start-up.

## 2. Literature review and hypotheses development

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

Both the personal characteristics of the entrepreneur and the size of the start-up itself may have an impact on the start-up's performance.

**Gender.** 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 (Robb and 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, like size, risk and the sector in which the business operates. As such, female-owned start-ups do not underperform male-owned start-ups (Robb and Watson, 2012; Sabarwal and Terrell, 2008).

**Age.** 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). 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). Other studies show that with increasing age, the entrepreneur's skills might improve since they learn to manage time more effectively. So 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 and Tauer, 2015; Sajilan et al., 2015).

**Education.** 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). Education provides entrepreneurs with more knowledge and skills which makes the business more successful (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; Zhang, 2008).

**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 (Gottschalk et al., 2017). Other studies however show that firms established by industrial experienced entrepreneurs are less likely to go bankrupt and thus appear to survive longer (Alharbi et al., 2018; Cassar, 2014; Gottschalk et al., 2017).

**Size.** Prior studies show mixed results concerning the relationship between the size of a firm and its performance. Some studies found that the start-up size is statistically related to the chance of survival, or found a positive relation with its profitability (Robb and Watson, 2012). On the contrary, other 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 and Watson (2012) state that smaller firms are more likely to be more profitable. 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.

Based on these findings, we come to the following five hypotheses:

*Hypothesis 1A: There is no difference in performance between female-owned and male-owned start-ups.*

*Hypothesis 1B: The age of the entrepreneur is positively related to the performance of the start-up.*

*Hypothesis 1C: The level of education of the entrepreneur is positively related to the performance of the start-up.*

*Hypothesis 1D: The entrepreneur's previous experience is positively related to the performance of the start-up.*

*Hypothesis 1E: The start-up size is negatively related to the performance of the start-up.*

## 2.2 Financing forms of start-ups in relation to start-up performance

Entrepreneurs need capital, not only to convert their ideas into reality by starting a venture, but also for their venture to eventually grow. However, for start-ups, it is unlikely to easily raise external funding since they have no or little collateral, and they lack internal cash flows. Besides, start-up's underlying market imperfections are related to significant information asymmetries between the entrepreneur and the firm's financiers, which causes agency problems, like moral hazard and adverse selection (Cole and Sokolyk, 2018; Waleczek et al., 2018). As a result, capital markets only provide little capital to entrepreneurs (Qorraj, 2017).

Entrepreneurs can make use of a funding source that is not provided in the market. This pre-market funding source is called 'bootstrapping' (Alemany and Andreoli, 2018). It refers to a self-starting process that proceeds without external input. In addition, many start-ups are forced to rely on an informal network of family, friends and other financing sources for their initial funding (Achleitner et al., 2011; Robb and Robinson, 2014; Waleczek et al., 2018).

These financing constraints limit the growth of the start-ups and threaten their survival. 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 company (Cassar, 2004). More and more financing sources are emerging to overcome these difficulties. Lately, and especially in the wake of the 2008/2009 financial crisis, new finance providers have emerged because of the difficulties faced by entrepreneurs to raise funds for their start-ups (Block et al., 2018).

The following paragraphs summarize what is known about the relation between the use of these new financing sources that are provided in the market and the performance of the start-up, which is still a somewhat overlooked topic in finance literature.

*Incubator and accelerator.* 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, but provide no or a small amount of money. 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 and Andreoli, 2018).

Regarding the incubators, there is a common assumption that they promote firm growth (Rothaermel and Thursby, 2005), although some research does not support this assumption (Schwartz, 2011). Regarding accelerators, the presence of an accelerator appears to increase the performance of the start-up (Bokhari et al., 2018; Qian, Mulas, and Lerner, 2018) and helps the entrepreneur to attract funding from venture capitalists and business angels (Fraser et al., 2015).

*Crowdfunding.* Crowdfunding connects those who can give, lend or invest money directly with those who need financing for a specific project. It primarily uses the internet to connect investors with entrepreneurs. The effect of crowdfunding on the performance of start-ups is inconclusive. Some studies (2018) find that equity-crowdfunded firms have a higher failure rate than non-equity-crowdfunded firms, which can be caused by adverse selection problems (Walthoff-Borm, Vanacker, and 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 failed crowdfunding (Cho, Park, and Sung, 2019).

*Business angels.* Another funding source is business angels, being private individuals that are primarily experienced entrepreneurs who sold their ventures. 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 various ways. 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).

*Venture capital and private equity.* The last funding sources are venture capital and private equity, both temporary equity investors. They provide capital to non-listed companies in exchange for equity in the form of shares. 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, have better financial and operating performance, be more innovative, and be more likely to go public than their non-venture capital-backed peers (Fraser et al., 2015). Companies backed by more reliable venture capitalists are more likely to exit successfully, access public markets faster, and have higher asset productivity at IPOs (Cumming and Groh, 2018). In contrast, other studies found no effect of venture capital backing on post-IPO growth (Fraser et al., 2015).

Private equity investors appear to have positive effects on firm performance. Studies show that private equity-backed firms grow faster, have higher 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, and Verdoliva, 2014).

**Debt financing.** The new financing forms discussed above are not used very often (Cole and Sokolyk, 2018). Bank lending, on the other hand, appears to be the most common source of external financing for many SMEs and entrepreneurs (Andries, Rissegeme, and Roelandt, 2019; Deloof and Vanacker, 2018; Robb and Robinson, 2014). Entrepreneurs choose external debt to keep ownership and control of their firms, or they choose external equity to help share the risk with less risk-averse investors. Overall, debt financing in start-ups is associated with higher success in terms of survival, employment growth, and revenue growth and with better subsequent performance (Cole and Sokolyk, 2018; Cumming and 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, while the use of any bootstrapping appears to be negatively related to performance (Cole and Sokolyk, 2018; Waleczek et al., 2018). Based on these findings, we come to the following hypothesis:

*Hypothesis 2: There is a positive relation between the use of outside finance and the performance of the start-up.*

### 2.3 The moderating role of the financing choice

While prior studies showed a relationship between the entrepreneur's and start-up's characteristics, and the performance of SMEs (as discussed in section 2.1), results are mixed and the effects are not crystal clear. A possible reason for these ambiguous results is that the relationship between the characteristics and performance is affected by unobserved moderating factors. Given the expected positive relationship between the use of outside finance and performance, we argue that the use of outside finance is a potential moderator affecting the relationship between the characteristics and the start-up performance. The use of outside finance can strengthen or weaken this relationship.

As we expect no difference in start-up performance between male and female entrepreneurs (see hypothesis 1A), we do not expect a moderating effect from the use of outside finance on this relationship.

As discussed in section 2.1, we expect start-ups with older entrepreneurs (*age*), entrepreneurs with a higher level of education (*education*), and more experienced entrepreneurs (*experience*) to show better performance. Additionally, the use of outside finance appears to have a positive effect on the performance of the start-up (e.g. Battistin et al., 2017). We, therefore, expect that the use of outside finance will strengthen the positive relationship between age, education, and experience on the one hand and performance on the other hand. Regarding the size of the start-up (*size*), we expect larger start-ups to be less profitable than smaller start-ups (as discussed in section 2.1). However, given that the use of outside finance might lead to better start-up performance, we argue that the use of outside finance can weaken the expected negative relationship between start-up size and performance.

These arguments lead to the following four hypotheses:

*Hypothesis 3B: The financing choice moderates the relation between the entrepreneur's age and the start-up's performance such that the choice for outside finance strengthens this positive relationship.*

*Hypothesis 3C: The financing choice moderates the relation between the entrepreneur's education and the start-up's performance such that the choice for outside finance strengthens this positive relationship.*

*Hypothesis 3D: The financing choice moderates the relation between the previous experience of the entrepreneur and the start-up's performance such that the choice for outside finance strengthens this positive relationship.*

*Hypothesis 3E: The financing choice moderates the relation between the size of the start-up and its performance such that the choice for outside finance weakens this negative relationship.*

### 3. Methodology

#### 3.1 Sample

To empirically test the moderation model, data is combined from two different sources. So as to collect the data concerning the characteristics of the entrepreneur and their chosen financing forms, use was made of an existing database of the Research Center for Entrepreneurship and Family firms (RCEF). The respondents in this dataset are 225 entrepreneurs that founded a start-up in the Flemish region of Belgium between 2015 and 2019. This dataset is supplemented by linking performance measures from the Belfirst database. Since the financial statements were not available for some start-ups, 98 cases had to be deleted, which reduced the total number of start-ups to 127. Furthermore, 10 start-ups were excluded because of outliers for the dependent variable ROA ending up with a dataset of 117 start-ups to conduct the further analyses.

#### 3.2 Measurements

**Dependent variable.** The return on assets (ROA) - the ratio of the net income for a particular year divided by the total assets at the end of that year – is used as the measure for start-up performance, as it is the most accepted measure for firm performance in the literature (Meles et al., 2014; Robb and Watson, 2012; Saidu, 2019).

**Independent variables.** Respondents had to indicate whether they are male or female (gender), what age category they are in (age), the highest degree they attained (education), whether they have previous experience in establishing a startup (experience), and the number of employees that work in the start-up (as an expression for the size of the start-up which is in line with prior studies, Sabarwal and Terrell, 2008). The latter is a continuous variable, while the personal characteristics are categorical variables.

**Moderator.** The moderator OutsideFinance has value 1 if the entrepreneur used at least one form of outside finance (any form of inside finance can supplement this) and 0 otherwise. Outside finance is defined as a cluster of all financing forms provided in the market, including 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.

**Control variables.** The analysis further includes two control variables, being the sector and the year in which the start-up was established. It is known from previous research that the sector in which the start-up operates influences the performance of the start-up (Lee, 2009; Sabarwal and Terrell, 2008). Also, the start-up's age is found to be related to its performance (Sajilan et al., 2015). Since both the sector and the firm's age are categorical variables with more than three categories, these variables are transformed into dummy variables.

### 4. Results

#### 4.1 Descriptive statistics

The descriptive statistics indicate that 74.5% of the entrepreneurs are male, 51.4% are between 30 and 45 years old, 30.9% have a master degree, for 66.7% it is the first time they establish a start-up, and 93.8% of the entrepreneurs have no or less than 10 employees.

Concerning the financing sources, 85.1% of the respondents use their own savings, which is a form of bootstrapping. This appears to be the most preferred source of financing in our sample. The second most used financing source is a bank loan, used by 30.9% of the respondents, followed by borrowing money from family or friends.

When looking at the moderator, it is found that 54.3% of the 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).

Multicollinearity is not a problem in our data, as no correlation is above 0.80, and the highest VIF is 3.643.

#### 4.2 Regression results

To test hypothesis 1A, a univariate analysis was performed between the gender of the entrepreneur and the ROA by using the independent sample t-test. Based on the absence of significant results, hypothesis 1A is confirmed.

To test hypotheses 1B to 1E, a multivariate regression analysis is executed between the four independent variables and the dependent variable ROA. The binary control variables are also included in this regression, but these results are not mentioned in Table I, as no results were significant.

As can be concluded from model A in Table I, the relation between the level of education of the entrepreneur and the ROA is positive and statistically significant at the 5% level. Therefore, hypothesis 1C -saying that start-ups of entrepreneurs with a higher level of education have a higher ROA- can be accepted. There is no statistically significant relation between any of the other independent variables and the ROA, so hypotheses 1B, 1D, and 1E cannot be accepted.

**Table 1:** Regression results

Variable	Model A		Model B	
	Beta	SE	Beta	SE
Age	0.026	2.644	0.074	4.014
Education	0.230	2.228 *	0.276	3.188 †
Experience	-0.160	4.088	0.017	6.757
Size	0.082	1.016	0.127	1.467
OutsideFinance			0.528	18.806
Age * OutsideFinance			-0.087	5.330
Education * OutsideFinance			-0.087	4.589
Experience * OutsideFinance			-0.502	9.078
Size * OutsideFinance			-0.016	2.154
	R <sup>2</sup> = 0.244 Adjusted R <sup>2</sup> = 0.112 F = 1.846; p = 0.046		R <sup>2</sup> = 0.276 Adjusted R <sup>2</sup> = 0.088 F = 1.468; p = 0.124	

Dependent variable = ROA

N = 117

† p < .10. \* p < 0.05. \*\* p < 0.01

SE = standard error

To test the moderating effects in hypotheses 3B to 3E, model A is expanded by adding the moderator OutsideFinance and the corresponding interaction terms (formed by multiplying the moderator with every independent variable included in the model).

As can be concluded from model B in Table 1, the ordinary least squares (OLS) regression results show that the relation between the level of education and the ROA is statistically significant, again confirming hypothesis 1C. Next, model B shows that moderator OutsideFinance is not statistically significant. Therefore, hypothesis 2, which 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. So, none of the hypotheses 3B to 3E can be accepted.

## 5. Discussion and conclusions

For our economy, start-ups are crucial. To guide these companies in their process to success, insight into this group is necessary. However, this target group has received little attention in the literature. Therefore, this research focuses on the determinants of their success.

This study examines relations between the 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.

This lack of results might be due to some limitations, which provide interesting suggestions for future research. We suggest future studies to focus on recruiting larger datasets, on performing a longitudinal follow-up, to focus on the start-up team or potential start-up investors... so as to stress the importance of the start-up's financing choices for their performance. Furthermore, we encourage future research to investigate the studied phenomena in different countries to grasp potential cultural differences that might impact the start-up's performance such as the extensiveness of the financial ecosystem. Also, cultural value differences on the individual level such as risk averseness and assertiveness might interact with the use of outside finance and influence the start-up's performance.

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