Determinants of Survival and Success among Nascent Entrepreneurs: A Cohort Analysis

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Abstract

This paper explores determining factors of startups' survival rate and subsequent factors that play a role in the growth of those start-ups into established firms. We use data from the Panel Study of Entrepreneurial Dynamics (PSED) of five cohorts of 3,910 nascent ventures across four countries; the United States, Australia, Sweden, and China. Our results indicate that (1) survival within the first year seems mainly determined by select procedural activities such as employee recruitment and initiation of financial projections, as well as the age of the team leader and cohort of the firm; (2) gender, education, and growth preference of the firms' leader appear as the biggest predictors of performance after five years; and (3), a positive innovation-performance relationship through R&D prioritization, patenting, and product novelty may exist.

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1 Introduction

Boyer and Blazy (2014) argue that entrepreneurs' knowledge and innovative enthusiasm, along with their ability to attract capital have proven to be a determining factor in fostering economic growth. In 2022, micro-enterprises (from 1 to 5 employees) constituted 55% of Canadian businesses.[1] Despite the lack of sufficient data and research on entrepreneurial dynamics, the mediating impact of innovation and entrepreneurship on the development and growth of economies seems a received idea in both the academic literature and practical applications. In a systemic review of the literature from 1992-2016, Urbano, Aparicio, and Audretsch (2019) find that institutions, encompassing both formal (i.e. governmental policies) and informal (i.e., cultural values), are conducive to entrepreneurial activity, in turn stimulating economic growth. Hence, it is commonly observed that the creation of new enterprises spurs economic growth by identifying market gaps and unmet needs, mobilizing human capital and creating jobs, attracting investment, and raising productivity. This belief often motivates governments to introduce policies aimed at fostering business creation.

However, a high rate of dissolution is a commonly observed issue among new businesses. In the United States, out of every 100 start-ups, only 50 businesses manage to survive the initial three years.[2] Consequently, it seems critical for authorities to not only encourage the establishment of new businesses but also make efforts to minimize the number of business closures. Hence, it becomes pivotal to thoroughly investigate and understand the individual factors that significantly influence the survival of businesses.

The objective of this paper is to provide a better understanding of the intricacies around the dynamic process of business creation. Using outcome data on a sample of 3,910 start-up ventures, from four different countries, we explore how demographic variables, start-up decisions, as well as certain venture strategies, have an impact on the outcome of the business ventures. Our main research questions are: What affects the survival rate of nascent venture start-ups, both one and five years after entry? Among those, what are the determinant factors associated with the startups that do grow to become profitable firms?

A series of theoretical arguments have been put forth over the decades regarding the qualities that define successful entrepreneurship. Jean-Baptiste Say (1803: 1971), as cited in Van Praag (2003) posits qualities such as judgment, determination, and a comprehensive understanding of both the world and the business domain are key to achieving success in entrepreneurship demands, while the Neo-classical economist Alfred Marshall (1930) stresses the importance of proficiency in general and specialized skills, capital, and favor-

1. ISED Canada, 2022
2. Van Praag (2003)

able circumstances. However, Schumpeter (1934) defines the entrepreneur as an innovator. Effective leadership is pivotal for the success of innovations, and entrepreneurial achievements require strong and uncommon motivations for innovation even before embarking on the entrepreneurial journey. As these theories have seldom undergone empirical scrutiny, few studies have sought to test these hypotheses using contemporary data. Our analysis builds upon the groundwork laid by such research, including studies by Van Praag (2003), which delve into the significance of human capital, and by Boyer and Blazy (2014), which center on the impact of innovation in ensuring the survival of entrepreneurial endeavors.

This paper is organized as follows: In the next section, we present a literature review on the determinants of startup survival. Section 3 describes our data set sample. In Sect. 4 and 5, we analyze the adopted methodology and discuss our results, respectively. Section 5 concludes.

2 Literature Review

A micro-enterprise essentially comprises an entrepreneur or a group of entrepreneurs who identify a market gap and conceive an idea for a service or product to address this gap. Subsequently, they make various administrative and financial decisions to enter the market. In the realm of comprehensive studies on enterprise survival and development, human capital's significance is often emphasized, as highlighted by Rauch, Frese, and Utsch (2005). However, it is equally vital to consider project-related characteristics and financing factors. If one were to randomly examine an enterprise, its chances of survival and success would be a function of all these variables. This paper aims to review some of the most prominent research on select determining factors that are relevant to our analysis.

In addition, given the high rate of business dissolution among new ventures, researchers have directed their focus toward investigating the factors that contribute to the probability of organizational survival during the early stages. This review delves into three key components of startups in relation to their survival and performance: demographic variables, innovation orientation strategy, and their interactions with other factors.

In the initial phases of business establishment, the enterprise is essentially a reflection of its entrepreneurs. According to Samuelsson and Davidsson (2009), the assertion is made that due to emerging ventures being entities that do not yet exist, it is both logical and pertinent for existing research to concentrate on the attributes of the individuals responsible for their creation. Several studies have explored the connection between prominent demographic aspects, including age, gender, education level, and prior entrepreneurial experience, and how these factors impact the likelihood of startup survival. We discuss these factors in turn.

2.0.1 *Gender*

Gender disparities are apparent in the representation of entrepreneurs within the population. In the United States, females make up only 16% of all entrepreneurs.[3] Westhead (2003) reports that women-owned firms have a higher likelihood of failure and experience lower levels of sales, profits, and employment. Roper and Scott (2009) posits that this discrepancy is often attributed to variations in risk perception and challenges in accessing financing for enterprise creation.

Studies have sought to better understand the possible underlying causes of this discrepancy in representation. Coleman (2007) argues that this can be explained by the more difficult access to capital they experience, leading them to engage in less capital-intensive activities. Focusing on technology-based entrepreneurial activity among small firms, Gicheva and Link (2013) seek to estimate the likelihood of woman-owned firms attracting private investments for the transition of their developed technology into market-ready innovations. They find that (1) female entrepreneurs are 16% less likely to receive private investment funding compared to similar male entrepreneurs, and (2) conditional on receiving private investments, female firm owners are likely to obtain less funding. Moreover, using data from the Global Entrepreneurship Monitor (GEM) in the UK, Roper and Scott (2009) conclude that women have a 7.4% higher tendency to perceive financial barriers in starting up a business compared to men.

Fairlie and Robb (2009) utilize data from the Characteristics of Business Owners (CBO) survey conducted by the US Census Bureau to examine gender disparities in the performance of small businesses concerning different outcomes. Their findings are in line with previous work, revealing that females tend to start their businesses with lower levels of startup capital compared to male-owned firms and tend to operate in different industries, with a higher presence in retail, personal services, and professional services. In addition, female business owners have less prior work experience in family businesses and similar industries, potentially limiting their acquisition of essential business human capital. These factors affect their ability to attract new customers, consequently hampering their efforts to overcome economic challenges faced by their businesses.

2.0.2 *Education*

A higher level of education can work in favor of an entrepreneur with respect to their startup survival. Indeed, findings by Coleman and Kariv (2013) conclude that both educational attainment, work experience, and sufficient startup capital contribute to a firm's survival.

3. Statistica, 2020

Furthermore, a higher level of education, measured in years of schooling, has been shown to be associated with a 16% higher chance of startup survival, as highlighted by Boyer and Blazy (2014). Moreover, Kato and Honjo (2015) find startups led by founders with higher education to have a lower probability of bankruptcy among manufacturing firms in high-tech sectors, but no such effect is observed among businesses in low-tech sectors.

Other research finds previous experience within the same industry as a much stronger predictor. With a sample of 237 Spanish firms within the service industry, Arribas and Vila (2007) highlight both gender and previous work experience in the same role as aspects of human capital that determine business survival, while education did not show any significance. Furthermore, Boyer and Blazy (2014) find that being employed prior to a startup has a significant positive effect on survival as opposed to being unemployed.

2.0.3 *Innovation, R&D and size*

When contemplating entrepreneurship, particularly successful entrepreneurship, innovation is often considered a key element. This notion stems from a widely held belief that to attain success in the business world, entrepreneurs or small business managers must possess an innovative edge to effectively compete against larger, established rivals. Startups can distinguish themselves from their larger competitors by introducing innovative products tailored to attractive niches, thus generating new demand and avoiding price-based competition. However, according to Boyer and Blazy (2014), while there is substantial empirical evidence supporting the significance of innovation for startup survival, the relationship between innovation and performance is more intricate and context-dependent.

Rosenbusch, Brinckmann, and Bausch (2011) model the development of innovation as a process, categorized into factors that serve as inputs (e.g., financial resources or R&D personnel) and factors that result as outputs (e.g., patents or new products). The level of inputs devoted to innovation varies among firms, but simply investing more resources does not guarantee successful outcomes due to the complexities and risks involved in the innovation process. An innovation orientation can enhance performance, especially in situations of resource scarcity, market entry, and competition with resourceful incumbents, making it particularly relevant to startups. Startups with an innovation orientation may allocate resources to R&D and innovation endeavors, promoting the creation of novel products, services, and patents. For resource-scarce startups, an innovation orientation becomes crucial to attract and secure various forms of resources, such as skilled employees and financial investments, which may otherwise prefer larger established firms.

One avenue for startups is to develop innovations internally through R&D. Compared to pursuing innovation through external collaborations with larger firms, startups can benefit

from reduced liabilities and full appropriation of returns by choosing to develop innovations through internal development. One approach to achieve this is by allocating resources to R&D personnel. Rosenbusch, Brinckmann, and Bausch (2011) argue that R&D investment is positively associated with a firm's competitive advantage and, consequently, its likelihood of survival. In their analysis, Pérez, Llopis, and Llopis (2004) follow a sample of Spanish manufacturing firms from 1990-1998, to investigate the determining factors behind their survival or exit. After controlling for other factors like firm age and size, results showed that firms that had invested in R&D had a 57% lower probability of exit than firms that did not, at any given year. Furthermore, an analysis of the characteristics of exiting Japanese firms by Kimura and Fujii (2003) finds concurring evidence with firms who conducted R&D having a higher likelihood of survival.

Securing patents can serve as an additional valuable asset that ensures a competitive edge for companies. According to a study conducted by Kato, Onishi, and Honjo (2022), which examined a selection of Japanese manufacturing and information services companies, the act of patenting, whether indicated by the accumulation of patent applications or the acquisition of granted patents, not only decreased the likelihood of bankruptcy but also heightened the chances of exiting the market through mergers.

Another set of theoretical arguments suggests a negative net effect of innovation on performance, likely involving further moderators of the relationship. Innovative startups face a greater liability of novelty compared to non-innovative counterparts, as highlighted by researchers like Amason, Shrader, and Tompson (2006). Incorporating innovations in startup processes results in riskier, more complex, and less straightforward ventures indicating the potential for more skewed returns, as evidenced by studies such as Samuelsson and Davidsson (2009).

This phenomenon could be further exacerbated in competitive industries. Esteve-Pérez and Mañez-Castillejo (2008) find that purchasing R&D can put a company at a significant disadvantage, especially in high-tech innovative industries. Developing firm-specific assets through in-house R&D in such industries can be considered crucial for survival. This result supports the notion that the value of a venture's R&D spending is industry-dependent. Moreover, Coleman and Kariv (2013) contend that R&D spending does not significantly improve a firm's chances of survival due to the inherent risks and higher failure rates. Nonetheless, even in light of divergent research perspectives, there is widespread recognition that R&D activities represent crucial resources for developing novel products or processes essential for sustaining a firm.

Another moderator in the innovation-survival relationship is firm size. Holmes, Hunt, and Stone (2010) examine the survival of 781 manufacturing firms post-entry in the northeast

of England, between 1973 and 2001. Their findings reveal a positive relationship between firm growth and innovativeness for larger firms (25+ employees), yet a negative relationship between growth and innovation for smaller firms.

In contrast to the scope of the research by Holmes, Hunt, and Stone (2010), which covered both startups and larger corporations, Boyer and Blazy (2014) offer a more comprehensive understanding of the interplay between innovation and age within the realm of young enterprises (start-ups). They achieve this by examining a data set of 12,771 French micro start-ups across various industries. They investigate the survival rates of innovative compared to non-innovative ventures, taking into account the professional and personal demographic characteristics of the entrepreneurs themselves. Their results find evidence that innovative start-ups have a 10% higher risk of failure at any point than their non-innovative counterparts.

Hyytinen, Pajarinen, and Rouvinen (2015) find concurring evidence within a similar sample of 1,165 Finnish startups in their early stages of creation, showing innovative ventures to have a 6-7% lower survival rate than their non-innovative counterparts. Furthermore, they add to the literature by exploring entrepreneurs' risk attitudes as a possible moderator of the innovation-survival relation. Their findings confirm this conjecture, showing that the interaction between startup innovativeness and entrepreneurs' personal preference for risk leads to a further reduction in the survival prospects of their startups.

It is important to note that these findings are not universally applicable and appear to be context-dependent given opposing outcomes across studies. In their meta-analysis, Rosenbusch, Brinckmann, and Bausch (2011) propose a hypothesis suggesting a stronger positive association between innovativeness and small business performance for younger ventures. Their empirical findings eventually support this proposition: Younger ventures may stand to benefit more from being innovative. Their adaptability, driven by less rigid routines, enables them to respond more promptly to changes in the operating environment and fosters a more entrepreneurial orientation.

Although certain findings exhibit consistency, a number of studies, especially concerning the innovation-performance relationship, appear to yield conflicting outcomes moderated by factors such as size, as highlighted by Boyer (2014), and potentially other unexplored variables. The realm of entrepreneurship research, especially within the context of early-stage entrepreneurship, necessitates further exploration. This paper endeavors to enhance the existing body of knowledge by delving into the impact of (1) human-related, (2) venture-specific, and (3) startup procedural variables on business survival and performance, both at one and five years after initiation. This investigation seeks to provide a more comprehensive understanding of the interplay between survival and performance dynamics across different

phases of establishment.

3 Methodology and Estimation

Bendig and Hoke (2022) posit that growing attention and awareness are being given to selection bias in empirical studies on innovation and entrepreneurship, with its mitigation leading to enhanced validity and the ability to establish causal inferences. Sample selection bias may arise because certain startups may be more likely to survive or be included in the data set based on factors that are not directly observable or not included in the model. The estimation model suggested by Heckman (1979) allows us to correct for such bias, mitigate missing data, and obtain more accurate estimates of the determinants of startup survival.

The first stage of our estimation model is the selection equation, which models the probability of selection into the sample. In our analysis, this would be the probability of startup survival. A general form of the selection equation is:

$$Pr(D_{it} = 1 \mid Z_{it}) = \Phi(Z_{it}\beta)$$

where the probability that a certain observation is observed (1) or not observed (0) in the sample is based on observable and potentially unobservable characteristics. Therefore, Z_{it} represents a vector of explanatory variables that influence the selection process and $Pr(D_{it} = 1 \mid Z_{it})$ represents the probability of being selected into the sample given the observed characteristics Z_{it}, β is a vector of parameters to be estimated, and $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution.

The selection criteria encompass all pertinent variables of interest, categorized into three groups: startup activities, demographic factors, and venture specifics. Each variable will be discussed in detail in the following section. The initial group comprises tasks linked to the business establishment. We posit that these variables exclusively forecast startup survival and have no impact on performance. Therefore, we omit them from the measurement equation to satisfy the model's exclusion restriction. This decision is underpinned by two primary considerations. Firstly, our estimation assumes that at least one variable directly influences the studied outcome. By excluding this variable, we safeguard against confounding the relationship between regressors and the dependent variable.

The assumption that all startup procedural variables are related to survival and not performance can have drawbacks, given that the two are closely intertwined, particularly in the early stages of business creation. For example, receiving initial revenue income could be an indication of high performance in the first months after entry, but unlikely to be correlated with sales revenue in subsequent years. Moreover, certain startup procedures may

be more likely to correlate with performance than others. For instance, startups that secure funding are presumably more promising business prospects than those that do not, and are thus more likely to expand and generate higher sales revenue.

Additionally, the model relies on the assumption of error term non-correlation. Endogeneity concerns can emerge if the selection process correlates with the outcome variable, causing the error term in the measurement equation to correlate with the selection process. To counter this, we incorporate pertinent variables into the selection equation and exclude them from the measurement equation. This approach enables the model to mitigate this correlation, effectively addressing endogeneity concerns. The distribution of the error term μ is assumed to be standard normal.

The second stage of the estimation model involves the measurement equation which analyzes the relationship between the outcome variable and independent variables of interest, considering the selection process. This equation is often a linear regression model, and it helps control for the potential bias introduced by the sample selection. The general form of the measurement equation is:

$$Y_{it} = X_{it}\gamma + \mu_{it}$$

where Y_{it} is the outcome variable of interest (e.g., a firm's sales revenue or employment), X_{it} and γ are the vectors of independent variables that are of interest in explaining the outcome variable and their parameters, respectively, and μ is the error term. In our specification of the model, Y_{it} takes the values of the log of sales revenue in the first set of regressions, and the number of jobs created in the latter set, both after one ($t = 1$) and five years ($t = 5$). The vector X_{it} includes all demographic and venture characteristics, excluding startup activities as mentioned previously.

We are interested in assessing the startup survival rate at two points in time, thus two sets of regressions are run. The first estimates $Pr(D_{i1} = 1|Z_{i1})$ and $Y_{i1} = X_{i1}\gamma$ at $t = 1$, while the second estimates $Pr(D_{i5} = 1|Z_{i5})$ and $Y_{i5} = X_{i5}\gamma + \mu_{i5}$ at $t = 5$. The former produces the coefficients of selector and measurement variables, β and γ, relating to the dependant variable Y_{i1} at $t = 1$, while the latter yields the corresponding values, relating to the dependant variable Y_{i5} at $t = 5$, conditional on the startups surviving after one year. Given that some explanatory variables are time invariant (i.e., gender, cohort country, product novelty, etc.), the corresponding Z_{i1} and Z_{i5} values will be identical. Furthermore, both the selector Z_{i5} and measurement X_{i5} variables contain Y_{i1}.

The Heckman two-stage estimation model frequently employs Maximum Likelihood Estimation (MLE) because of its thorough and robust handling of sample selection bias and its efficient parameter estimation. The likelihood function, outlined below, is formed by

considering the probabilities from both sample selection and outcome equations. The MLE process entails iteratively refining the parameters for both stages to maximize the combined likelihood of the observed data.

$$L(\theta) = \prod_{i=1}^{N} [\Phi(Z_{it}\beta) \cdot \phi(\mu_{it})] \cdot \prod_{i=1}^{N} \left[\frac{1}{\sqrt{2\pi}} \exp\left(-\frac{(Y_{it} - X_{it}\gamma)^2}{2} \right) \right]$$

θ represents the parameter vector and N is the number of observations. The function involves the cumulative distribution function $\Phi(x)$ of the standard normal distribution and the probability density function $\phi(x)$ of the standard normal distribution. The remaining parameters, Z_{it},β,μ_{it}, Y_{it},X_{it} and γ are all introduced earlier.

The likelihood function captures the joint probability of observing the data given the specified parameters. It combines the probabilities of sample selection and the outcome equation, accounting for the potential relationships and biases introduced by the sample selection process. When examining the correlation of the error term, denoted as ρ, in both regression sets, observing a substantial deviation from zero would underscore the need to use a selection equation for precise outcome estimation. This would in turn support the use of the Heckman two-stage model instead of a standard OLS estimation.

4 Data

Our analysis is based on a harmonized data set by the Panel Study of Entrepreneurial Dynamics (PSED) of five separate cohorts in four different countries; The United States, Australia, Sweden, and China. The data set provides extensive information on the demographics, activities, and outcomes of 3,910 venture enterprises, from their entry into the start-up process up to 6 years (72 months).[4]

All ventures underwent a screening process to validate their eligibility to be included in the cohort as active nascent entrepreneurs in the process of business creation. After that, waves of interviews were carried out on an annual basis, to keep up with the activities and status of the venture. Despite some variation in the timing of the data collection associated with the five cohorts, procedures were taken to provide harmonized outcomes (see data set

4. Reynolds, Paul D. (Paul Davidson), Curtin, Richard, Hechevarria, Diana, Tian, Li (Rachel), Samuelsson, Mikael, and Davidsson, Per. Panel Study of Entrepreneurial Dynamics, PSED: A Five Cohort Outcomes Harmonized Data Set, 4 countries, 1998-2011. Inter-university Consortium for Political and Social Research [distributor], 2022-05-19. https://doi.org/10.3886/ICPSR38154.v1

for more details). For our study, we are primarily concerned with the outcome of the start-up at two points in time (one and five years after entry), in terms of whether the start-up is still active, along with a number of possible start-up procedural activities, as well as team- and venture-related variables.

4.1 Measures of Firm Performance

Measuring the performance of nascent firms poses a challenge for empirical research in entrepreneurship due to its multidimensional nature. Past researchers have employed various measures to evaluate performance, encompassing firm revenues, employee and customer growth, sales, and internationalization extent. It has been observed that dimensions of performance that are highly relevant for some nascent firms may be irrelevant for others.

A strong advantage of using the PSED harmonized cohort data set is the abundance of variables available, allowing us to assess the performance of nascent firms from multiple perspectives. For our analysis, we look at firm performance in terms of sales revenue and jobs created, at one and five years after entry. We use both sales revenue and job creation as proxies to assess the survival rate of ventures.

In order to achieve accurate and comparable results, all revenue figures must be adjusted for inflation and in uniform currency. To do this, we divide sales revenue by the purchasing price parity index of each country and year and further divide by the US CPI in order to convert it into US dollars (Consumer Price Index with 2023 base year) which is exactly one and five years from the date which screening was completed (i.e., for the Australian cohort with a screening completed date of April 2008, the US CPI of April 2009 and April 2013 are used). As such, all sales revenue is converted to 2023 USD.[5]

4.2 Explanatory Variables

Explanatory variables are grouped into three categories; startup activities, demographic variables, and venture strategies. Table 1 presents a description of all variables included with their respective names in the original data set.

4.2.1 Demographic Variables

Due to a sizable amount of missing data on other members, only the demographic information of the first team member (TM1 for short) of the start-up is included in the analysis. Team member 1 refers to the first individual involved in the startup. This could be the sole owner,

5. The US CPI was obtained from the Federal Reserve for Economic Data (FRED) and the PPP index was taken from OECD Data

or possibly one of the founders. For the sake of simplicity, we will henceforth designate this individual as the team leader throughout this paper. We extract the gender, age, and educational attainment of that individual. The gender dummy variable denotes 1 for males and 2 for females. Across all cohorts, 53.9% of first-team members were male, as shown in Table 2. The average age was 39.7 years, with the youngest being just 17 and the oldest being 83 years old. Moreover, the average team size was 1.7 persons. The variable for the educational attainment of the team leader is divided into four categories based on the maximum education level by number of schooling years; (1) High school (up to 12 yrs), (2) Post high school pre-college (13 to 15 yrs), (3) College degree (16 yrs), and (4) Graduate experience (17 to 20 yrs).

4.2.2 Startup Activities

The data set initially contained 61 startup activities relating to all aspects of setting up a business, starting from giving the idea serious thought up until the fifth team member/employee starting full-time work. However, not all activities are common across cohort projects. After harmonization and adjustment, a total of 18 startup activities are presented. We limit the list to include thirteen procedures that we deem to be relevant to our analysis given our review of the literature. These dummy variables are (1) giving the venture serious thought, (2) hiring an initial employee, (3) the owner devoting their full-time work to the start-up, (4) applying for supplier credit, (5) initiating financial projections, (6) defining the markets to enter, (7) initiating a business plan, (8) receiving funding from external sources, (9) purchasing any supplies or inventory, (10) acquiring a registration number, (11) leased or acquired major assets, (12) received initial revenue, income and (13) promoted products or services. Other variables were not included either due to significant missing data or due to being deemed not necessarily pertinent in business creation today (i.e., setup phone book listing). Table 2 provides the mean of all activities, indicating the most and least common procedures undertaken by all ventures.

4.2.3 Venture-Specific

Our data set included a number of variables that provided insight into a certain strategy or characteristic of the venture to ensure its prospects of survival. The variables included as strategies are (1) patenting, (2) R&D spending, (3) product innovation, (4) attitudes toward startup ambitions, and (5) exporting intensity. For instance, patenting protects intellectual property and excludes others from legally making, using, or selling a startup's product or service. We argue the dummy variable denoting whether a startup has invested in acquiring a

patent, can be an indication of innovation output, being produced as insurance protection in line with a novel technology or service in development. Furthermore, Cotei and Farhat (2018) asserts that maintaining intellectual property rights frequently signals growth potential to acquirers, rendering these firms more appealing candidates for acquisition.

As for R&D expenditure, our variable indicates whether Research and Development (R&D) spending was a major priority for the firm. In other words, the ventures' primary strategy involved heavy investment in developing and designing a certain product or technology. Furthermore, the dummy variable relating to product innovation specifies whether the venture's product or service was available 5 years ago or not.

Regarding the attitudes toward startup ambitions, we examine the team leaders' inclination toward growth. This binary indicator offers insight into the aspirations of the team leader—whether they are satisfied with maintaining the startup's current size (0) or are inclined to vigorously pursue its expansion (1). In the initial stages of business creation, striving to maximize growth often entails significant risk-taking. Consequently, this approach by the team leader could be viewed as a proxy for their risk appetite.

In a general sense, exporting intensity refers to the extent or degree to which a company engages in international trade activities by selling its products or services to foreign markets. In this context, it can be viewed as a measure of the venture's level of involvement in exporting its product and is expressed as the percentage of total revenue sales that come from local (less than 20mi), regional (less than 100 mil), national (+100 mil), and international markets.

5 Results

This section presents the results of our analysis. Figure 1 illustrates the final outcome of all 3,311 startups included across six years after entry. After 72 months, 30% of businesses remained in the operating startup phase, 27% quit the venture and 26% grew to become self-sufficient firms, with revenues exceeding operating costs. The remaining 17% constituted startups that did not report their status at some point along the way and thus deemed missing. Furthermore, approximately 60% of exits and 70% of firm births occur within the first 24 months. This would imply it as a critical period for business survival, highlighting the importance of our one-year regressions in attempting to understand this phenomenon.

In order to better understand the factors at play during this period and in the years after, we turn to our Heckman estimation model analysis. We begin by discussing the selection criteria for venture survival. Tables 3 and 5 provide the results of the first set of regressions for both, sales revenue and jobs created, one year after entry. The China cohort

was dropped from both estimations due to the presence of complete missing observations in both performance variables after a five-year period.

Several startup procedures have been identified as important indicators of the likelihood of a new venture's survival within its initial year, whether measured by sales or job generation. Hiring an employee exhibited a statistically notable and positive impact on both sales earnings and job opportunities. Additionally, projecting financial estimates, procuring significant assets, and securing external funding were all correlated with higher sales figures. Similarly, when startup owners invested their personal funds, a comparable impact on job creation was observed. Interestingly, the act of purchasing supplies displayed an adverse influence on sales, while business owners expressing serious contemplation about their enterprise had an unfavorable effect on job establishment.

The analysis revealed that age and team size both had an adverse effect on survival, via sales and job creation respectively. This suggests that the initial decision to hire multiple employees and expand the team to 3 to 5 individuals was linked to reduced prospects of survival. Additionally, companies led by individuals holding a college or graduate degree exhibited an elevated probability of successfully navigating their inaugural year.

Furthermore, a notable cohort effect was identified, revealing that startups from the 2005 US and 1999 Sweden cohorts exhibited a greater propensity for survival in contrast to the 1999 US cohort. The Australian sample yielded diverse outcomes, indicating that its startups had an increased chance of scaling their workforce but faced a reduced likelihood of achieving robust sales performance. These outcomes are likely influenced by latent disparities across countries, such as variations in regulations, procedural distinctions in business creation, and potential cultural disparities in attitudes toward entrepreneurship.

Aside from the process of selection, specific variables linked to the startup team were revealed to exert a significant influence on overall performance. Startups led by males exhibited a remarkable 44.7% increase in total sales within the first year, in contrast to female-led businesses. This finding is in line with previous studies demonstrating a similar contrast in male-run business performance, such as Fairlie and Robb (2009) and Roper and Scott (2009).

Furthermore, even though the team's size was recognized as an unfavorable factor affecting business survival, it emerged as a strong indicator of performance. Teams consisting of 3 to 5 members exhibited a significant 55% increase in sales revenue compared to smaller teams. These findings underscore the balance between labor input and output, showcasing that a higher number of skilled laborers led to improved sales performance. However, this positive effect on performance comes with the drawback of reduced survival prospects, mainly due to labor costs, particularly in the initial months after entering the market. Ad-

ditionally, team leaders who expressed ambitious intentions to maximize growth achieved an impressive 57% surge in total sales revenue when compared to those who adopted a more cautious managerial approach.

Our second set of regressions sought to examine the selection criteria and predictors of performance, five years from entry, conditional on ventures that survived the initial year. Tables 4 and 6 provide the results of those regressions for both, sales revenue and jobs created, after five years.

Startups still active after one year in the Sweden cohort demonstrated a lower likelihood of survival compared to the US-99 cohort, with both lower predicted sales revenue and job creation. While the US-05 startups demonstrated a higher survival rate after five years, consistent with the results of the initial year.

Aside from a cohort selection effect similarly found on first-year survival, we find a big impact from variables relating to venture specifics and team leader characteristics on the startup survival after five years. Interestingly, none bar one of the startup procedures emerged as significant explanatory factors influencing venture performance after five years. Receiving initial revenue was the only variable found to be positively associated with business survival after five years. These findings confirm the intuitive notion that the administrative and financial procedures that accompany business creation only impact its survival prospects within the first year or so of its conception. Subsequently, determinants of survival and performance shift towards factors related to human resources and overall business performance.

Founders' initial motivations as well as the team leaders' level of education and growth preference emerge as significant selectors after one year. The distinction is made to stress the fact that the first team member is not necessarily the founder of the startup. Founders who reported entering the market out of an entrepreneurial desire rather than doing it because they had a particular business idea to develop, were more likely to achieve better sales performance. Furthermore, startups that remained active after one year with a team leader who reported a preference for maximizing firm growth, were less likely to expand their labor force. This could indicate that a more ambitious, risk-taking, managerial approach can lower a venture's probability of survival after one year from entry. Moreover, businesses led by an individual holding a graduate degree had better survival odds after one year.

Several variables related to venture strategy and orientation play a significant role in determining business survival over a five-year period, both positively and negatively. Notably, the allocation of resources towards research and development and the proportion of customers within the local region have emerged as influential factors. The emphasis on R&D investment exhibited a detrimental impact on survival after five years, primarily due to its negative association with job creation. Furthermore, the extent to which a higher propor-

tion of customers originate from the local area, as opposed to the regional or national level, yielded mixed outcomes in terms of sales and job opportunities. While an elevated ratio of local customers correlated with increased sales revenue, it paradoxically led to reduced job creation. This phenomenon can be attributed to geographical proximity, as a larger local customer base tends to contribute to higher overall sales. However, this proximity may hinder business expansion into other regions characterized by a lower customer concentration.

The measurement stage of our estimation yields the coefficients of all explanatory variables on venture performance. We observe the emergence of various factors relating to the startup team and business strategy having a significant effect on performance after the first year. Both gender and team size remain predictors of performance, despite their marginal effect decreasing with time, from 44.7% and 55% in the first year, down to 20.1% and 8.6% respectively. Startups led by female entrepreneurs exhibited a significant 44% and 21% lower total sales revenue after one and five years, respectively, in comparison to those led by male entrepreneurs, with statistical significance at the 1% level. Moreover, the reported growth preference of team leaders remains a significant predictor with a similar marginal effect in sales, with ambitious leaders achieving 57% higher overall sales performance for their businesses, compared to more reserved leaders. Additionally, the reported growth preference demonstrates a remarkable association with job creation, resulting in an astonishing 8,200% surge in job opportunities for firms led by ambitious leaders, in contrast to those led by leaders content with maintaining firm size.

In the realm of startup strategies, our findings highlight the support for various innovation-driven approaches that contribute to long-term performance enhancement. Notably, the introduction of pioneering products into the market was associated with improved performance. Startups that reported the development of products or services that were previously unavailable five years prior exhibited an average sales performance advantage of 16.7%. Additionally, startups prioritizing investment in research and development displayed a notable 12.3% increase in sales performance compared to those who did not emphasize this strategy.

Furthermore, startups considered high-tech entities, on average, exhibited a 32.7% higher sales performance and generated 35.4% more jobs compared to non-high-tech companies. Moreover, despite a seemingly modest marginal effect of 0.2%, the act of patenting demonstrated its effectiveness as an investment avenue.

6 Conclusion

Our research sought to enhance comprehension of the intricate dynamics within the business creation process. This was achieved by estimating predictive factors for the survival of start-

ups and the factors that impact the performance of successful ones, both at the one-year and five-year marks following entry. We assess performance through metrics encompassing sales revenue and job creation. To address potential selection bias, we adopt a two-stage Heckman estimation model.

In the inaugural year following establishment, the factors significantly influencing business survival were confined to specific startup procedures, cohort effects, and the age and education of the team leader. Among the diverse procedures examined, survival displayed a positive correlation with actions such as employee recruitment, initiation of financial projections, acquisition of funding, leasing of substantial assets, and personal investments made by the owner. On the contrary, purchasing materials and excessive contemplation of the business idea exhibited a countering effect. Beyond the first year, the significance of survival shifts to encompass variables related to the team and the venture itself. As anticipated, these findings emphasize the substantial impact of the regulatory and compliance landscape during the nascent stages of business formation.

Regarding firm performance, gender, team size, and the team leader's growth preference emerge as the primary explanatory variables in the initial year, all of which pertain to team-related factors. After the initial year, these variables retain their predictive influence, while other human- and venture-specific variables such as education, product novelty, and R&D prioritization come into play. These findings underscore the paramount significance of human capital during the early phases of business development. The presence of an educated individual with ambitious aspirations in the initial team positively contributes to the venture's likelihood of attaining enduring success.

One limitation of our study pertains to our approach to measuring firm performance. Due to the absence of data on firm expenditures or net cash flow over time, we rely on sales revenue and startup outcomes as proxies for measuring both survival and performance. Furthermore, our study is constrained by a lack of information regarding the level of innovativeness among incumbents and how incremental improvements, often associated with innovation, influence their subsequent survival. Our analysis is limited to dummy variables relating to startup strategies (i.e., innovation, patenting, etc.) which are time-invariant. This limits our ability to (1) distinguish ex-ante activities from ex-post outcomes, and (2) account for selection among and within different cohorts of firms.

Additionally, our study is inherently constrained by the absence of data related to the work experience of entrepreneurs and the economic sectors in which startups operate. This limitation arises from the unavailability of sufficient observations in our data set. For instance, it's conceivable that the factors contributing to the success of a technology startup differ significantly from those affecting a startup in a different sector, such as retail. Ad-

ditionally, certain industries naturally generate higher sales revenues compared to others when all other factors remain constant. Existing literature often follows a prevalent trend of narrowing down samples to specific industries, thereby bolstering the predictive accuracy of their findings within those particular sectors. Consequently, our results might not be directly applicable to startups operating within a specific industry.

These findings can inform certain policies that governments can consider to promote the survival and success of newly established businesses. Simply looking at startup survival in the early stages of creation, the government can (1) offer support and resources for effective startup procedures such as financial planning, funding acquisition, and asset leasing and (2) streamline regulatory processes and compliance requirements. Doing so would alleviate administrative burdens, allowing startups to focus more on their core activities and growth strategies. By assisting startups in these initial stages, the government can enhance their chances of survival.

Moreover, recognizing the significance of team-related factors, such as gender and team size, in determining initial-year performance, calls for a promotion of diversity and gender equality in entrepreneurship. Simultaneously, governments can introduce mentorship and educational programs to nascent entrepreneurs and team leaders to network, gain valuable industry-specific insights and develop a growth-oriented mindset. By providing incentives, grants, and resources for startups that choose to onboard individuals with higher education qualifications, policymakers can motivate the integration of well-informed and knowledgeable personnel, in turn fueling the creation of dynamic and forward-thinking teams within startups.

Overall, our analysis finds concurring evidence with previous research on the roles of gender, education, and R&D investment on business performance. We find startup team size to be negatively related to survival, yet a predictor of success. Beyond the first year of inception, the founders' inclination to engage in entrepreneurship emerges as a determinant of survival, whereas a team leader's aspiration for growth is linked to improved performance. It's important to note, however, that these observations provide only a preliminary understanding of these entrepreneurial dynamics. Additional research is imperative to corroborate these findings through comprehensive and validated survey data.

References

Amason, Allen C, Rodney C Shrader, and George H Tompson. 2006. "Newness and novelty: Relating top management team composition to new venture performance." *Journal of business venturing* 21 (1): 125–148.

Arribas, Iván, and José E Vila. 2007. "Human capital determinants of the survival of entrepreneurial service firms in Spain." *International Entrepreneurship and Management Journal* 3:309–322.

Bendig, David, and Jonathan Hoke. 2022. "Correcting Selection Bias in Innovation and Entrepreneurship Research: A Practical Guide to Applying the Heckman Two-Stage Estimation." *Available at SSRN 4105207.*

Boyer, Tristan, and Régis Blazy. 2014. "Born to be alive? The survival of innovative and non-innovative French micro-start-ups." *Small Business Economics* 42:669–683.

Coleman, Susan. 2007. "The role of human and financial capital in the profitability and growth of women-owned small firms." *Journal of Small Business Management* 45 (3): 303–319.

Coleman, Susan, and Dafna Kariv. 2013. "Gender, performance and financial strategy: A dynamic capabilities perspective." *Journal of Developmental Entrepreneurship* 18 (03): 1350020.

Cotei, Carmen, and Joseph Farhat. 2018. "The M&A exit outcomes of new, young firms." *Small Business Economics* 50:545–567.

Esteve-Pérez, Silviano, and Juan A Mañez-Castillejo. 2008. "The resource-based theory of the firm and firm survival." *Small Business Economics* 30:231–249.

Fairlie, Robert W, and Alicia M Robb. 2009. "Gender differences in business performance: evidence from the Characteristics of Business Owners survey." *Small Business Economics* 33:375–395.

Gicheva, Dora, and Albert N Link. 2013. "Leveraging entrepreneurship through private investments: does gender matter?" *Small Business Economics* 40:199–210.

Heckman, James J. 1979. "Sample selection bias as a specification error." *Econometrica: Journal of the econometric society,* 153–161.

Holmes, Phil, A Hunt, and Ian Stone. 2010. "An analysis of new firm survival using a hazard function." *Applied Economics* 42 (2): 185–195.

Hyytinen, Ari, Mika Pajarinen, and Petri Rouvinen. 2015. "Does innovativeness reduce startup survival rates?" *Journal of business venturing* 30 (4): 564–581.

Kato, Masatoshi, and Yuji Honjo. 2015. "Entrepreneurial human capital and the survival of new firms in high-and low-tech sectors." *Journal of evolutionary economics* 25:925–957.

Kato, Masatoshi, Koichiro Onishi, and Yuji Honjo. 2022. "Does patenting always help new firm survival? Understanding heterogeneity among exit routes." *Small business economics* 59 (2): 449–475.

Kimura, Fukunari, and Takamune Fujii. 2003. "Globalizing activities and the rate of survival:: Panel data analysis on Japanese firms." *Journal of the Japanese and International Economies* 17 (4): 538–560.

Pérez, Silviano Esteve, Amparo Sanchis Llopis, and Juan Alberto Sanchis Llopis. 2004. "The determinants of survival of Spanish manufacturing firms." *Review of Industrial Organization* 25:251–273.

Rauch, Andreas, Michael Frese, and Andreas Utsch. 2005. "Effects of human capital and long–term human resources development and utilization on employment growth of small–scale businesses: A causal analysis." *Entrepreneurship theory and practice* 29 (6): 681–698.

Roper, Stephen, and Jonathan M Scott. 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.

Rosenbusch, Nina, Jan Brinckmann, and Andreas Bausch. 2011. "Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs." *Journal of business Venturing* 26 (4): 441–457.

Samuelsson, Mikael, and Per Davidsson. 2009. "Does venture opportunity variation matter? Investigating systematic process differences between innovative and imitative new ventures." *Small Business Economics* 33:229–255.

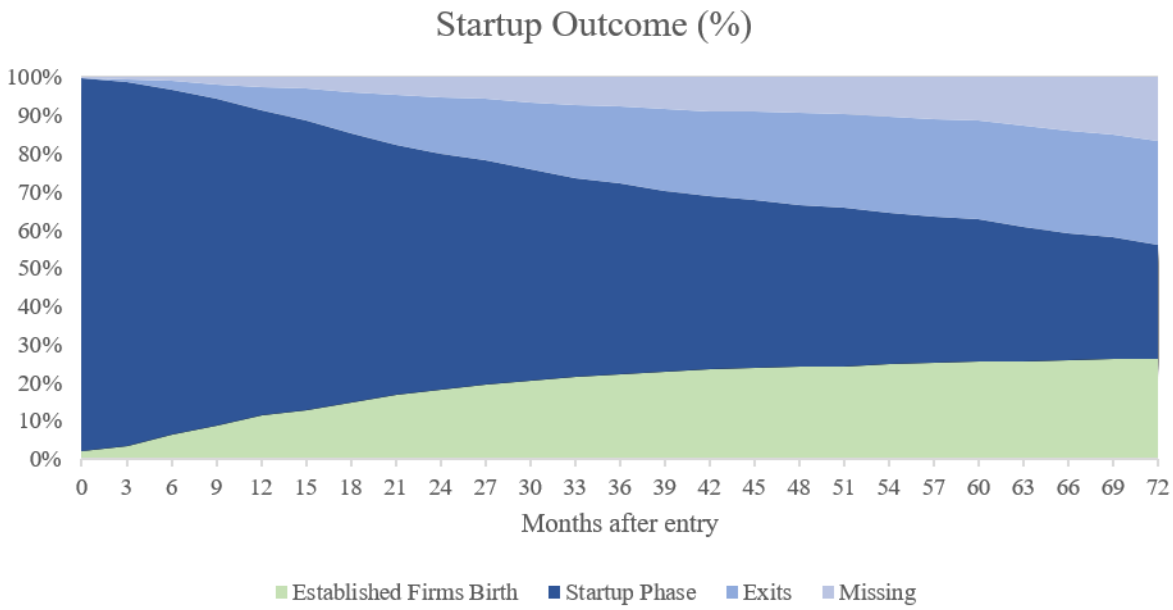
Urbano, David, Sebastian Aparicio, and David Audretsch. 2019. "Twenty-five years of research on institutions, entrepreneurship, and economic growth: what has been learned?" *Small business economics* 53:21–49.

Van Praag, C Mirjam. 2003. "Business survival and success of young small business owners." *Small business economics* 21:1–17.

Westhead, Paul. 2003. "J. Watson (2002)'Comparing the Performance of Male-and Female-Controlled Businesses: Relating Outputs to Inputs', Entrepreneurship Theory and Practice." *International Small Business Journal* 21 (2): 244–248.

7 Appendix

Figure 1: Startup Outcome Across Six Years After Entry



This graph illustrates the outcome of 3,311 ventures across six years after their entry into the market, giving insight into the proportion that (1) remain in the startup phase, (2) exit the market, and (3) grow into established firms. The China cohort was excluded due to the complete absence of observations after five years.

Table 1: Description of Variables

Variable	Variable Code
Log of Revenue Sales, One year	LNSALES_1Y
Log of Revenue Sales, Five years	LNSALES_5Y
Jobs created, One year	JOBS_1YR
Jobs created, Five years	JOBS_5YR
Gender of first team member	TM1_SEX
Age of first team member	TM1_AGE
Educational attainment of first team member	TM1_EDUC
Startup team size	TM_SIZEH
Country of cohort	I.COUNTRY
Gave Business serious thought	THINK_AW_I
Hired initial employee	HIRE__AW_i
Owner invested own money	ONINVAW_I
Asked for supplier credit	SUPCRDAW_I
Financial projections initiated	FINPRJAW_I
Defining markets initiated	DFNMKTAW_I
Acquired registration number	EIN__AW
Business plan initiated	BUSPLNAW_I
Received revenue, income	SALES_AW_I
Leased or acquired major assets	LEASE_AW_I
Purchased supplies, materials	PURCHAAW_I
Promoted products, services	PROMOTAW_I
Received funding from external sources	GETFNDAW_I
Research and Development (R&D) a priority	RD_FOCUS
Patent or copyright initiated	PATENTAW_I
Product/service unavailable five years ago	TECH_5YR
Business considered high tech	HI_TECHQ
Leader preference for firm growth	GR_PREF
Initial Motivation to enter	BUS_ORIGIN
% Local Cust.	CUST_LOC
% Local Reg.	CUST_REG
% National Cust.	CUST_NAT
% International Cust.	CUST_INT

Table 2: Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Age	3,823	39.7	12.27	17	83
Male	3,862	.55	-	-	-
Female	3,862	.45	-	-	-
Educ (HS)	3,536	.27	-	-	-
Educ (Post HS Pre College)	3,536	.34	-	-	-
Educ (College Deg.)	3,536	.22	-	-	-
Educ (Grad Exp.) 17-20	3,536	.16	-	-	-
USA-99	3,910	.21	-	-	-
USA-05	3,910	.31	-	-	-
Australia	3,910	.16	-	-	-
Sweden	3,910	.16	-	-	-
China	3,910	.15	-	-	-
Log Sales - One Year	2,901	5.47	2.9	-7.62	15.42
Log Sales - Five Years	2,660	6.67	2.2	-5.09	15.46
Jobs Created - One Year	3,483	19.6	536.5	0	30000
Jobs Created - Five Years	2,822	25.7	243	0	8500
Serious Thought	3,910	.89	-	-	-
Owner invested own money	3,910	.79	-	-	-
Applied for Credit	3,910	.44	-	-	-
Defined Markets	3,910	.76	-	-	-
Acquired major assets	3,910	.60	-	-	-
Hired Employee	3,910	.27	-	-	-
Owner involved FT	3,910	.42	-	-	-
Registered business	3,910	.36	-	-	-
Promoted prod.	3,910	.60	-	-	-
Initiated Fin. Proj.	3,910	.61	-	-	-
Purchased supplies	3,910	.65	-	-	-
Developed Bus. plan	3,910	.76	-	-	-
Got Funding	3,910	.15	-	-	-
Received Revenue	3,910	.59	-	-	-
Patented	3,910	.15	-	-	-

Variable	Obs	Mean	Std. dev.	Min	Max
R&D Priority	3,257	.318	-	-	-
High-tech Bus.	3,760	.306	-	-	-
Innovative Prod.	3,716	.284	-	-	-
Team Size	3,861	1.718	.94	1	5
Leader Growth Pref.	3,734	.28	-	-	-
Business Idea	2,705	.414	-	-	-
Entrepreneurial Desire	2,705	.207	-	-	-
Bus. Idea & Entre. Desire	2,705	.377	-	-	-
Innovative Prod.	3,716	.284	-	-	-
% Cust. Local	3,037	57.9	-	-	-
% Cust. Regional	3,039	20.99	-	-	-
% Cust. Nat.	3,041	17.2	-	-	-
% Cust. Int.	3,012	5.7	-	-	-

Table 3: Performance and Survival After One Year - Log Sales Revenue

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Startup Act.				
Gave business serious thought	0.0003	(0.0008)		
Hired an employee	.003**	(.0009)		
Owner devoted full-time	.0012	(.0007)		
Asked for supplier credit	-.0009	(.0007)		
Owner invested own money	.0003	(.0009)		
Acquired registration number	.001	(.0008)		
Promoted products, services	.0015	(.0007)		
Financial projections initiated	.0028**	(.0007)		
Purchased materials, supplies	-.0022*	(.0008)		
Business plan initiated	.0007	(.0008)		
Received funding	.0015*	(.001)		
Revenue, income received	-.001	(.0008)		
Leased, acquired major assets	.004*	(.0007)		
Defining markets initiated	-.0012	(.0008)		
Demographic				
Age	-.006*	(.003)	.0056	(.004)
Gender (female)	-.137	(.071)	-.447**	(.092)
Education (13-15yrs)	.124	(.09)	.051	(.12)
Education (16yrs)	.105	(.1)	.047	(.13)
Education (17-20yrs)	.134	(.1)	.036	(.15)
Team size	-.11	(.04)	.551**	(.05)
Cohort (US-05)	.465**	(.09)		
Cohort (AU)	-.295**	(.1)		
Cohort (SW)	-.229	(.15)		
Venture Strat.				
R&D priority	-.054	(.08)	.136	(0.1)
High-tech	-.0007	(.08)	.19	(.1)
Innov. product	-.06	(.07)	.1	(.1)
Patent initiated	-.0001	(.001)	-.0025	(.001)
Leader growth pref.	.052	(.09)	.57**	(.11)
Initial motivation	.208	(.1)	.02	(.12)

Table 3: Performance and Survival After One Year - Log Sales Revenue, Cont.

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
% Costumers (Loc.)	-.0006	(.0007)	-.002*	(.0009)
% Costumers (Nat.)	.0015	(.0009)	.004**	(.001)
% Costumers (Int.)	-.0015	(.0008)	.0001	(.001)

N = 2,400 — * Significant at 5% level. ** Significant at 1% level.

Table 4: Performance and Survival After Five Years - Log Sales Revenue

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Log Sales - One Year	.016	(.025)	.764**	(.01)
Startup Act.				
Gave business serious thought	-.001	(.001)		
Hired an employee	-.0002	(.001)		
Owner devoted full-time	-.0006	(.001)		
Asked for supplier credit	.0017	(.001)		
Owner invested own money	.0009	(.001)		
Acquired registration number	-.002	(.001)		
Promoted products, services	.00005	(.001)		
Financial projections initiated	.0001	(.001)		
Purchased materials, supplies	-.0003	(.001)		
Business plan initiated	.0004	(.001)		
Received funding	-.001	(.001)		
Revenue, income received	.002*	(.001)		
Leased, acquired major assets	-.00002	(.001)		
Defining markets initiated	-.001	(.001)		
Demographic				
Age	-.007	(.004)	.002	(.002)
Gender (female)	-.142	(.01)	-.201**	(.05)
Education (13-15yrs)	-.27	(.1)	.144*	(.07)
Education (16yrs)	-.27	(.1)	.214**	(.08)
Education (17-20yrs)	-.21	(.1)	.27**	(.09)
Team size	.01	(.05)	.086**	(.03)
Cohort (US-05)	.327*	(.16)		
Cohort (AU)	.032	(.16)		
Cohort (SW)	-.505**	(.19)		
Venture Strat.				
R&D priority	-.054	(.01)	.123*	(0.06)
High-tech	-.01	(.1)	.327**	(.06)
Innov. product	-.14	(.1)	.167**	(.06)
Patent initiated	-.0001	(.001)	.002*	(.0007)
Leader growth pref.	.01	(.1)	.577**	(.07)

Table 4: Performance and Survival After Five Years - Log Sales Revenue, Cont.

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Initial motivation	.42**	(.15)	.079	(.07)
% Costumers (Loc.)	-.002*	(.0008)	-.003**	(.0005)
% Costumers (Nat.)	.002	(.001)	.004**	(.0007)
% Costumers (Int.)	-.0005	(.001)	-.0003	(.0007)

N = 2,120 — * Significant at 5% level. ** Significant at 1% level.

Table 5: Performance and Survival After One Year - Jobs Created

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Startup Act.				
Gave business serious thought	-.009*	(.004)		
Hired an employee	.0063**	(.001)		
Owner devoted full-time	.0006	(.001)		
Asked for supplier credit	.0004	(.001)		
Owner invested own money	.0037*	(.001)		
Acquired registration number	-.0003	(.001)		
Promoted products, services	-.0009	(.001)		
Financial projections initiated	-.0014	(.001)		
Purchased materials, supplies	-.0001	(.001)		
Business plan initiated	.001	(.001)		
Received funding	-.002	(.001)		
Revenue, income received	-.002	(.001)		
Leased, acquired major assets	.0015	(.001)		
Defining markets initiated	-.00018	(.001)		
Demographic				
Age	-.002	(.004)	-1.37	(1.2)
Gender (female)	.01	(.01)	18.8	(28.3)
Education (13-15yrs)	.004	(.1)	.144	(36.1)
Education (16yrs)	.343*	(.1)	-3.2	(41.1)
Education (17-20yrs)	.34*	(.2)	3.33	(44.6)
Team size	-.124*	(.05)	7.75	(15.1)
Cohort (US-05)	1.8**	(.17)		
Cohort (AU)	1.15**	(.14)		
Cohort (SW)	.999**	(.23)		
Venture Strat.				
R&D priority	-.18	(.1)	-2.9	(32.05)
High-tech	-.2	(.1)	6.15	(33.56)
Innov. product	-.016	(.1)	-9.6	(32.5)
Patent initiated	.0009	(.001)	-.19	(.41)
Leader growth pref.	-.178	(.1)	.577	(.07)
Initial motivation	-.0048	(.1)	-31.6	(38.15)

Table 5: Performance and Survival After One Year - Jobs Created, Cont.

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
% Costumers (Loc.)	-.0009	(.0009)	-.1	(.28)
% Costumers (Nat.)	.001	(.001)	-.15	(.36)
% Costumers (Int.)	-.0003	(.001)	.23	(.39)

N = 2,400 — * Significant at 5% level. ** Significant at 1% level.

Table 6: Performance and Survival After Five Years - Jobs Created

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Jobs created - One Year	.08**	(.01)	.082**	(.01)
Startup Act.				
Gave business serious thought	-.0002	(.001)		
Hired an employee	-.00005	(.001)		
Owner devoted full-time	.0002	(.001)		
Asked for supplier credit	.0013	(.001)		
Owner invested own money	.0024	(.001)		
Acquired registration number	-.0014	(.001)		
Promoted products, services	-.0006	(.001)		
Financial projections initiated	.0014	(.001)		
Purchased materials, supplies	.0008	(.001)		
Business plan initiated	.0007	(.001)		
Received funding	-.0017	(.001)		
Revenue, income received	-.0006	(.001)		
Leased, acquired major assets	-.0007	(.001)		
Defining markets initiated	.0018	(.001)		
Demographic				
Age	-.004	(.004)	.394	(.49)
Gender (female)	-.041	(.01)	-3.35	(11.8)
Education (13-15yrs)	-.15	(.14)	5.75	(15.08)
Education (16yrs)	-.18	(.16)	.01	(17.1)
Education (17-20yrs)	.347*	(.16)	11.1	(18.72)
Team size	-.05	(.05)	6.76	(6.34)
Cohort (US-05)	.23	(.2)		
Cohort (AU)	-.25	(.2)		
Cohort (SW)	-.595**	(.2)		
Venture Strat.				
R&D priority	-.322**	(.1)	19.15	(13.3)
High-tech	.14	(.1)	35.36*	(13.96)
Innov. product	.01	(.1)	4.86	(13.53)
Patent initiated	-.0015	(.001)	.02	(.17)
Leader growth pref.	-.413**	(.13)	82.16**	(14.94)

Table 6: Performance and Survival After Five Years - Jobs Created, Cont.

Variable	Coefficient (Std. error)			
	Pr(Survival)		Performance	
Initial motivation	.043	(.16)	2.03	(15.9)
% Costumers (Loc.)	-.0019*	(.001)	-.19	(.15)
% Costumers (Nat.)	.0025	(.001)	-.017	(.17)
% Costumers (Int.)	-.001	(.001)	.258	(.15)

N = 2,249 — * Significant at 5% level. ** Significant at 1% level.