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Innovation and Survival of Young French Firms*

David DADAKPETE[1] and Moïse DOSSA[2]

[1]dadakpetenomdavid@yahoo.fr
[2]mbdossa@gmail.com

Abstract

Often described as a powerful strategy in inter-firm competition, innovation remains a timeless topic in economics. Although a large body of empirical literature finds evidence for an "*innovation premium*" (Cefis and Marsili, 2005) associated with better survival prospects for firms, numerous studies highlight the inherent risks associated with innovation activity, which could shorten a firm's market longevity ("*liability of innovativeness*"(Deng et al., 2014)). This paper investigates whether the "innovation premium" or "liability of innovativeness" prevails among young French firms during their first five years. According to our estimates, the two effects seem to offset each other in most cases. Indeed, for three (process, product, organization) of the four types of innovation considered, no significant effect on firm survival is observed. However, for marketing innovation, the "liability of innovativeness" appears to prevail. Our estimates suggest that firms introducing marketing innovation upon market entry face an 11.3% higher risk of closure.

Keywords: Innovation, Firm survival, Duration models

JEL codes: L25, L26, O3

*This research was conducted independently by the authors, and the views expressed are solely their own.

Introduction

A prominent stylized fact from empirical literature on young firms is that 50% of them exit the market within five years of operation (Colombelli et al., 2016). Indeed, upon entering the market, young firms have to contend with various uncertainties arising from their lack of experience, making them more vulnerable. They must address the "liability of newness," which hinders their ability to effectively compete against more established firms and secure a lasting position in the market (Stinchcombe, 1965), as well as the "liability of smallness," which stems from their limited resources and capabilities (Hannan and Freeman, 1984). Amidst these hardships, swiftly devising an effective strategy is crucial for survival and innovation is frequently considered a key solution.

Since Schumpeter (1912, 1934)'s seminal works, the academic community maintained a keen interest in innovation. Numerous studies (Galindo and Méndez-Picazo, 2013; Maradana et al., 2017; Aghion et al., 2015) have popularized the idea that innovation is a crucial catalyst for economic growth and a strategic instrument firms can utilize to gain a competitive edge in the market. Innovation has thus become a key component of many countries' development plans, with various governments' support for R&D activities and the promotion of innovative entrepreneurship. However, some studies (Deng et al., 2014; Fernandes and Paunov, 2015) have underscored the negative impacts of innovation activities, stemming from the inherent risks and uncertainties associated with unpredictable market conditions. Innovation is costly and risky, and it can be even more so for young companies already weakened from the outset by the liabilities of newness and smallness.

In such literature, where evidence on the "innovation premium" and the "liability of innovativeness" often contradicts each other, caution should be exercised in generalizing results. Potential unobserved sample-specific effects—particularly at the country or regional level—may not be adequately accounted for by conventional covariates and estimation methods. Notably, the regulatory environment, the provision and accessibility of public services, and firms' capacity to utilize these services effectively differ markedly across countries (World Bank, 2024). Furthermore, the impact of innovation on firms may vary depending on the phase of the business cycle (e.g., stable periods versus times of crisis) (Cefis et al., 2023). These considerations

highlight the spatial (country/region) and temporal dimensions underlying the innovation–firm survival nexus, reinforcing the continued relevance of case-by-case analyses despite the valuable insights offered by existing literature.

Against this backdrop, this paper investigates whether the “innovation premium” or the “liability of innovativeness” prevails among French firms, addressing a gap in the literature due to the limited use of French data. To this end, we use a sample of 45,268 firms established in 2010 and tracked through 2015. We distinguish four types of innovation—product, process, organizational, and marketing—thus extending the existing literature, which typically focuses only on product and process innovation. Maximum likelihood estimation of several survival models robustly suggests that for young French firms, the potential benefits of innovation are offset by detrimental effects, resulting in a statistically null total effect. The only significant effect observed is associated with marketing innovation, which is negative, reflecting a predominance of the "liability of innovativeness".

The remainder of the paper is organized as follows: section 1 reviews the theoretical and empirical literature on innovation and survival; section 2 presents our data and variables; section 3 outlines our empirical strategy, including methodology, estimation results, and discussion.

1 Innovation and Survival

Theoretical background

The study of innovation and its potential impact on firm survival has a long history. Indeed, our understanding of the notion of innovation began to take shape with the pioneering work of Joseph A. Schumpeter in the early 20th century, where the first conceptualizations emerged. According to Schumpeter (1934), innovation occurs when there is either (i) the introduction of new products, (ii) the introduction of new methods of production, (iii) the opening of new markets, (iv) the development of new sources of supply for raw materials or other inputs, or (v) the creation of new market structures in an industry (OECD/Eurostat, 2005). Schumpeter views the emergence of novelties characterizing innovation as a major force behind economic development through a process of "creative destruction" where obsolete technologies are re-

placed by new ones. Innovation, therefore, becomes an important instrument in the competition between firms and consequently has the power to shape the dynamics of the industry (entry and exit). These seminal contributions of Schumpeter form the foundation of a body of theoretical works attempting to disentangle the nexus between innovation and firm survival. These works, which can be classified under the category of Schumpeterian models, generally base their explanations on competition (Ugur and Vivarelli, 2021). Indeed, Aghion et al. (2015) showed that the relationship between product-market competition and innovation is characterized by an inverted-U pattern. Initially, as competition intensifies from a low level, it prompts firms to innovate more in order to differentiate themselves and avoid competition. Conversely, when competition escalates from an already high level, the motivation for firms to innovate diminishes due to the stronger impact of reduced profits. This inverted U-pattern characterizing innovation and competition also reflects in the relationship between innovation and survival, as later demonstrated by the works of Ugur et al. (2016). Notably, the authors have shown that when innovation rises from a low starting point, it increases the likelihood of survival. On the other hand, if innovation rises from a high starting point, there's a chance that it will decrease survival probability because of growing risks or diminishing scale effects. In addition to Schumpeterian models, Ugur and Vivarelli (2021) identify two other streams of theoretical works on innovation and business survival: evolutionary theory (Nelson and Winter, 1982), and passive/active learning (Jovanovic, 1982; Hopenhayn, 1992; Ericson and Pakes, 1995).

The evolutionary theory, as developed by Nelson and Winter (1982), offers an alternative to neoclassical microeconomic theory by focusing on firms' profit-seeking behavior without assuming profit maximization. It challenges the predominant reliance on equilibrium in economic theorizing and incorporates insight from biological concepts (Nelson, 1997). This approach conceptualizes firms as entities with distinct capabilities and decision-making rules, which engage in search processes that dictate their behavior. In this context, innovation, through an increase in profit and market share, can enhance firm's survival prospects. However, it is important to note that innovation itself is contingent upon the characteristics of the industry in which the firm operate (Ugur and Vivarelli, 2021).

The passive/active learning approach presumes profit-maximizing firm behav-

ior, facilitating the identification of an equilibrium industry structure (Ugur and Vivarelli, 2021). In passive learning models (Jovanovic, 1982; Hopenhayn, 1992), firms are initially assigned time-invariant, unknown efficiency parameters. Efficient firms thrive and expand, while inefficient firms contract and eventually shut down. In active learning model (Ericson and Pakes, 1995), firms are involved in investment, and those that start with relatively low levels of investment are likely to leave the market. In both approaches, the nature of the relationship between innovation and survival is not entirely clear-cut and remains to some extent stochastic (Ugur and Vivarelli, 2021).

Empirical Literature

A large body of empirical studies has investigated the relationship between innovation and firm survival. Although the positive effect of innovation often appears dominant, findings vary, generally revealing that the relationship between innovation and survival depends on various factors.

Cefis and Marsili (2005) referred to the positive effect of innovation on survival as the "innovation premium". Analyzing a sample of 3,000 manufacturing firms in the Netherlands, and differentiating between product and process innovation, they demonstrated that innovation increases firm survival, with process innovation having a particularly significant effect. In a subsequent paper (Cefis and Marsili, 2006), they showed that the "innovation premium" increases over time and is contingent on firm's age and size. They found that the survival probability of innovators is consistently higher than that of non-innovators. Their results also indicate that innovation is more crucial for the survival of young firms compared to grown-up and older firms. More recently, the same authors (Cefis and Marsili, 2019) found, using a sample of firms from the Netherlands, that there is a long-term survival premium for new ventures. Their results suggest that new businesses that innovate within the first two years of their establishment have a higher chance of surviving the global financial crisis of 2007–2008 and the ensuing recovery phase. Additionally, they found that while managerial innovations may be harmful to survival, technological innovations offer a more potent and durable survival premium.

The "innovation premium" is also substantiated by several other studies con-

ducted on different samples. Giovannetti et al. (2011) and Destefanis et al. (2023) found, based on samples of Italian firms, that innovation positively affects survival. Helmers and Rogers (2010) analyzed the relationship between innovation and survival using a sample nearly 162,000 limited companies that incorporated in Britain in 2001. Using intellectual property activity (patents and trademarks) as a proxy for innovation, the authors identified a significant "innovation premium". Zhang et al. (2018)'s analysis of data from Chinese high-tech startups, using intellectual property activity as a proxy for innovation, yielded similar results. They came to the conclusion that patents can significantly enhance the survival rate of Chinese high-tech firms.

The beneficial effects of innovation, as evidenced in all the aforementioned studies, may portray it as an infallible strategy for guaranteeing market success. However, due to various uncertainties such as cost, failure, and industrial regime, innovation can be a risky gamble that may lead to the firm's exit from the market. Audretsch (1995) worked on a sample of US manufacturing firms to elucidate the reasons behind the systematic variation in survival likelihood and post-entry growth rates across different industries. He found that while a highly innovative environment hinders survival during the initial years following entry, it eventually enhances the likelihood of survival after a few years. Stated differently, firms that have survived the initial years in highly innovative industries have a higher likelihood of surviving additional years. According to the author, this can be explained by the ability of surviving firms to adapt and produce a viable product. Thus, innovation turns out to be an effective strategy in innovative industries, but requires early adaptation upon market entry, posing significant challenges for young firms. These young firms, still facing the "liability of newness" (Stinchcombe, 1965), often enter the market with fewer resources and no prior experience. Fernandes and Paunov (2015) used a sample of Chilean manufacturing plants to study the relationship between product innovation and plant exit. Their estimates revealed that only innovators with diversified revenue sources and minimal dependence on new products benefit from lower mortality rates. In contrast, single-product plants that innovate face a significantly higher risk of failure compared to non-innovating plants. However, it is important to note that the advantage of diversification may diminish as the industry matures. Bayus and Agarwal (2007) found that diversifying entrants initially have a survival advantage over entrepreneurial startups, but in later stages, startups entering the in-

dustry later exhibit a survival advantage over diversifying entrants. According to the authors, early entrants face high failure risks due to the lack of established product standards, but diversifying entrants adapt better to the eventual standard, resulting in higher survival rates compared to startups. Once standards are established, survival hinges on introducing the latest technology, with later entrants often favoring older technologies for higher sales volumes, while startups are less concerned about cannibalizing their product lines. In addition to industry regime and maturity, spatial proximity also influences the relationship between innovation and survival. Ebert et al. (2019) found that startups introducing market novelties do not benefit and may suffer detrimental effects when situated in close proximity to similar firms.

Boyer and Blazy (2014) examine the differential determinants of survival between innovative and non-innovative firms using a panel of over 12,000 French startups with fewer than ten employees, founded in 1998 and tracked through 2003. Their findings indicate that innovative firms exhibit lower survival rates, with prior managerial experience of the entrepreneur exerting a negative influence on their longevity. Hyytinen et al. (2015), using Finnish startups data, reached a similar conclusion: startup innovativeness is negatively correlated with subsequent survival. Moreover, the negative association is exacerbated by entrepreneurs' higher risk tolerance. The study concludes that innovation does not inherently enhance survival in the early stages of firm development and instead contributes to a more complex startup trajectory.

2 Data and Variables

This paper combines data from the French Information System on New Enterprises (SINE)[1], with data on French employment area named *Atlas des zones d'emploi*.

The French Information System on New Enterprises is produced by the French National Institute of Statistics and Economic Studies (INSEE). It was designed to provide an assessment of challenges encountered by young firms during the initial five years of their business operations. The data contain information about the firm's features and those of its founder. The system targets at the time of creation; a cohort

[1] Système d'Information sur les Nouvelles Entreprises

of firms operating in industry, construction, trade and services (ICS). The ICS sectors define the scope of INSEE's structural business statistics. They encompass market-oriented and productive enterprises contributing to the production system, excluding agricultural and financial activities. This classification is employed by INSEE in its official reporting on enterprises in France[2]. An entity falls within the ICS scope if it: (i) qualifies as a business according to enterprise demography criteria; (ii) engages in genuine economic activity; (iii) operates on a market basis; and (iv) belongs to the industry, construction, trade, or non-financial service sectors, excluding agriculture and finance.

The SINE then designs a follow-up process based on three surveys. Thus, firms are surveyed at their founding, three years later, and five years later. This paper utilizes the 2010 edition of the survey which follows a group of firms created in 2010 until 2015 (for those that survived). In 2010, the initial sample comprised 52 053 firms. After removing firms that shut down at the creation, and those not operating in the ICS sectors, we ended up with a sample of 45 268 firms. Our analyses complement this source with the 2010 version of the French *Atlas des zones d'emploi*

In France, a "Zone d'emploi" refers to a "Labor market area" or an "Employment zone" and corresponds to geographical area where the majority of the workforce resides and carries out their professional activities[3]. The 2010 *Atlas des zones d'emploi* provides us with information on the demographic characteristics of the population of the 322 employment zones delineated by the then-valid boundaries. The two datasets are merged using firms' geographical location data provided by the SINE.

The Table 1 presents the variables we retained for this study. They describe the firm's founder, the firm itself, and its geographical environment. Innovation is our variable of interest, and it is measured using dummy variables based on firms' answers to the survey question. Four dimensions of innovation are used: process, product, organization and marketing. We also construct different interaction terms to evaluate the effect of combining those dimensions.

We use two variables to depict the level of economic activity in the firm's spatial environment: *Economic density* and *Maurel-Sedillot index*. The variable *Economic density* is inspired from Perraud et al. (2008) and corresponds to the number of firms

[2]https://www.insee.fr/fr/statistiques/7681078
[3]INSEE

per 1000 persons in the employment area. This may provide insight into the intensity of market competition experienced by firms in their employment area.

The variable *Maurel-Sedillot index* (Maurel and Sédillot, 1999) measures sectoral spatial concentration and its values range from -1 (fair distribution of sectors) to 1(perfect concentration of a single sector). The index equals zero when sectors are randomly distributed across areas. Following Houdebine (1999), we adapted the index so that it proxies the sectoral spatial concentration in employment area.

Table 1: Variables

Variable	Description
Founder's age	Age of the founder
Size	Number of employees
Economic density	Number of firms per 1000 persons in the employment area
Maurel-Sedillot index	Maurel-Sedillot concentration index
Creation Experience	Dummy taking 1 if the founder has created a business before
High School Diploma	Dummy taking 1 if the founder is high school graduate or more
Subsidiary Firm	Dummy taking 1 if the firm is a Subsidiary
Innovating Sector	Dummy taking 1 if the firm operates in ICT, pharmaceuticals, biotechnologies or new materials sectors
Process Innovation	Dummy taking 1 if the firm introduces a process Innovation
Marketing Innovation	Dummy taking 1 if the firm introduces a marketing Innovation
organizational innovation	Dummy taking 1 if the firm introduces an organizational innovation
Product Innovation	Dummy taking 1 if the firm introduces a product Innovation
French	Dummy taking 1 if the founder is French citizen
Ambition	Dummy taking 1 if the founder's ambition is to develop the business in terms of employment or investment
Men	Dummy taking 1 if the founder is a man
Innovating Sector*Process Innovation	Interaction dummy
Innovating Sector*Product Innovation	Interaction dummy
Innovating Sector*Marketing Innovation	Interaction dummy
Innovating Sector*organizational innovation	Interaction dummy
Process Innovation*Product Innovation	Interaction dummy
Process Innovation*Marketing Innovation	Interaction dummy
Product Innovation*Marketing Innovation	Interaction dummy
Innovating Sector*Process Innovation* Marketing Innovation	Interaction dummy
Innovating Sector*Product innovation* Marketing Innovation	Interaction dummy

Let α_e^s be the employment share of the sector s[4] in the employment area e; λ_s the

[4]In our calculation, we used an aggregate classification comprised of 21 sectors

employment share of the sector s considering all employment areas; and ε_f the firm f's share of the workforce in the sector to which it belongs. The Index is obtained from :

$$\text{Maurel-Sedillot index} = \frac{\frac{\sum_s (\alpha_e^s)^2 - \sum_s (\lambda_s)^2}{1 - \sum_s (\lambda_s)^2} - \sum_{f \in e} \varepsilon_f^2}{1 - \sum_{f \in e} \varepsilon_f^2} \in [-1, 1]$$

Over the five years follow-up period, i.e. 2010-2015, 37% of the firms shut down. Table 2, Table 3, and Table 4, present descriptive statistics for quantitative measures, proportion tables for dummy variables and interaction variables respectively. These statistics are computed based on figures observed at the beginning of the follow-up period, i.e. 2010.

Table 2: Descriptive statistics

	mean	sd	min	max
Founder's age	40.08	10.61	18.00	88.00
Size	1.93	4.59	1.00	370.00
Economic density	1.02	0.58	0.16	3.28
Maurel-Sedillot index	0.00	0.01	−0.01	0.03
Number of Observations = 45268				

On average, business founders are 40 years old, and generally start activity with two employees. The mean value for the *economic density* in firms' location is one firm per 1000 persons, and the Maurel-Sedillot index reveals that sectors are, on average, randomly distributed.

Over the four types of innovation considered, product innovation is the most frequent with 38.32% of firm declaring they introduced a new product in the market in 2010. Process innovation was the least prevalent type of innovation with only 10.30% of firms engaging in it. Concerning marketing and organizational innovation, 13.98% and 17.12% of the firms declared implementing them.

Table 4 displays the proportion of firms that implemented multiple types of innovation at the same time and it is apparent from this table that only few firms boast

this kind of performance. As far as double innovations are concerned, apart from the pairs *Process-Product, Process-Marketing* and *Product-Marketing* where the proportions are 8.73%, 4.44% and 10.72% respectively, the frequencies are less than 2% for all other combinations. It also stands out in the table that less than 1% of the firms implemented three innovations simultaneously. In the section that follows, we will present our empirical strategy to assess how firm survival is affected by innovation.

Table 3: Proportion tables for dummy variables

	Creation Experience	High School Diploma	Subsidiary Firm	Innovating Sector	Process Innovation	Marketing Innovation	Organization Innovation	Product Innovation	French	Ambition	Men
	pct	pct	pct	pct	pct	pct	pct	pct	pct	pct	pct
0	66.51	40.12	93.27	96.38	89.70	86.02	82.88	61.68	7.34	62.65	28.58
1	33.49	59.88	6.73	3.62	10.30	13.98	17.12	38.32	92.66	37.35	71.42
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
N											

Table 4: Proportion tables for interaction variables

	Innovating Sector* Process Innovation	Innovating Sector* Product Innovation	Innovating Sector* Marketing Innovation	Innovating Sector* Organization Innovation	Process Innovation* Product Innovation	Process Innovation* Marketing Innovation	Product Innovation* Marketing Innovation	Innovating Sector*Process Innovation* Marketing Innovation	Innovating Sector*Product innovation* Marketing Innovation
	pct	pct	pct	pct	pct	pct	pct	pct	pct
0	99.51	98.39	99.30	99.27	91.27	95.56	89.28	99.79	99.45
1	0.49	1.61	0.70	0.73	8.73	4.44	10.72	0.21	0.55
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
N									

3 Empirical strategy

3.1 Method

The current study employs survival analysis methods, which have traditionally been adopted in the literature related to firm survival (Neffke et al., 2011; Mazzotta et al., 2017; Shu and Simmons, 2018; Baumöhl et al., 2019, 2020). Although discrete choice models like probit or logit could be used due to the binary nature of the outcome, survival models are preferred because they can account for features of survival data such as censoring and time-to-event, which discrete choice models do not consider. For instance, discrete choice models would treat two firms that closed at different times as equal, despite significant differences in their timing, leading to insufficiently informative conclusions.

In this paper, we combined a non-parametric descriptive approach (Kaplan–Meier method), with semi-parametric (Cox Proportional Hazard (PH) models) and parametric regressions (Exponential and Weibull regression models) (Kleinbaum and Klein, 2010; Liu, 2012).

There are two major quantities underpinning the survival analysis : the survival function $S(t)$ and the hazard function $h(t)$. The former quantifies the probability $S(t) = P(T > t)$ that an individual survival time T exceeds t, and the latter gives the instantaneous rate of failure at time t (Kleinbaum and Klein, 2010; Liu, 2012).

$$h(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t + \Delta t \mid T \geq t)}{\Delta t} = \frac{-d \log\big(S(t)\big)}{dt}$$

The Kaplan-Meier descriptive approach (Kaplan and Meier, 1958) consists in using observed data to derive estimates of the survival function $\widehat{S(t)}$. Those estimated values of the survival function can be used to perform graphical analysis and compare survival time across different categories. The Kaplan and Meier (1958) estimates are obtained through the formula:

$$\widehat{S}(t) = \prod_{t_i \leq t} \frac{n_i - d_i}{n_i}$$

where n_i represents the number of firms that are still operating at the time t_i and d the number of firms which exit the market (see Kleinbaum and Klein, 2010; Liu, 2012,

for details). The findings from the Kaplan-Meier analysis are primarily descriptive, and they do not allow for the adjustment of multiple covariates, making it difficult to derive robust conclusions. Thus, we enhanced our strategy by combining Cox PH regression models and parametric regressions, with the latter being utilized mainly for the purpose of robustness checking.

The Cox PH regression model, developed by David Cox (Cox, 1972) , is probably the most widely used method in survival analysis. As in classical regressions models, the Cox PH model aims at quantifying the effect β of a set of variables represented by the matrix X, on the hazard function $h(t/X)$ of the studied individuals, through the equation $h(t/X) = h_0(t)\exp(X\beta)$. The term $h_0(t)$ is the baseline hazard representing the instantaneous rate of failure independent of the observed features described in X. The Cox model is categorized as a semi-parametric model because its estimation does not require the baseline hazard to be specified. The parameters of the model are estimated using maximum likelihood estimator where a partial likelihood is constructed and maximized (see Kleinbaum and Klein, 2010; Liu, 2012, for details).

With regard to parametric models, we apply Exponential Proportional Hazards models (EPH) and Weibull Proportional Hazards models (WPH). In contrast to the Cox Proportional Hazards model, these models posit that the lifetimes of individuals follow a known probability distribution. For the EPH model, an Exponential distribution function is used, while a Weibull distribution function is chosen for the WPH model. This entails a full specification of baseline hazard $h_0(t)$. The estimated equations for EPH and WPH models are :

$$h(t \mid X) = \lambda\exp(X\beta) \text{ and } h(t \mid X) = \tilde{\lambda}\mathcal{K}\left(\tilde{\lambda}t\right)^{\mathcal{K}-1}\exp(X\beta) \text{ respectiveley.}$$

The baseline hazard functions are derived from the Exponential probability distribution function[5] $f(t) = \lambda\exp(-\lambda t)$ and Weibull probability distribution function[6] $f(t) = \frac{\mathcal{K}}{\lambda}(\frac{t}{\lambda})^{\mathcal{K}-1}\exp\left[-(\frac{t}{\lambda})^{\mathcal{K}}\right]$. The models are estimated using maximum likelihood. Results are presented and discussed in the next section.

[5]Parameter λ

[6]Parameters $\mathcal{K}$ and λ

3.2 Results and discussion

3.2.1 Preliminary Insights from Kaplan–Meier Estimates

Figure 1, Figure 2, and Figure 3 present Kaplan-Meier survival function for quantitative, dummy, and interaction variables respectively. In each case, survival curves are plotted for two groups of firms, allowing for a comparative assessment. In the graphs, the vertical axis represents the probability of survival, while the horizontal axis represents the analysis time in days. For dummy and interaction variables, firms' categorization is straightforward: we differentiate between firms where the variable holds a value of one, and those where it is zero. For quantitative variables, the classification is based on the median value of the variable (39 years old for the age, 1 employee for the size, 0.8049151 for the economic density and 0.0005989 for the Maurel-Sedillot index). We distinguish firms according to whether the value of the variable lies to the left or to the right of the median. The difference between the curves reveals the disparity in survival prospects for the compared groups. A survival function above another indicates better survival prospects. We test the statistical significance of the difference noted between curves using Log-rank test (Mantel and Haenszel, 1959) whose outcomes are presented in the Appendix A.

The observed differences between survival curves shown by the Figure 1 are all statistically significant, except for Maurel-Sedillot index. The Figure shows that firms founded by people aged over 39, firms starting with at least two employees, and firms located in economically less dense areas, have better survival prospects.

Figure 2 also reveals some statistically significant differences in Kaplan-Meier estimates. Log-rank statistics indicate that firms established by individuals with prior business creation experience exhibit a higher probability of survival. The same applies to firms founded by men, French citizens, high school graduates (at least), and individuals whose ambition is to develop the business in terms of employment or investment. Regarding the characteristics of the firms themselves, the survival curves indicate that subsidiary companies have a higher likelihood of survival. Innovation also emerges as a favorable factor. Specifically, firms that introduced process innovation or organizational innovation exhibit higher survival probabilities.

Considering Figure 3, which presents Kaplan-Meier estimates for interaction variables, it is observed that, on one hand, innovation is more rewarding for firm op-

erating within ICT, pharmaceuticals, biotechnologies or new materials sectors (innovating sectors), and on the other hand, combining multiple innovation strategies enables firms to remain in the market for a longer duration. Indeed, according to the survival curves, firms operating in an innovative sector and introducing either product innovation or organizational innovation tend to have longer lifespans. Furthermore, firms that combine product and process innovations, or marketing and process innovations, exhibit higher survival probabilities.

Figure 1: Kaplan-Meier Survival Curves-Age, Size, Density and Concentration

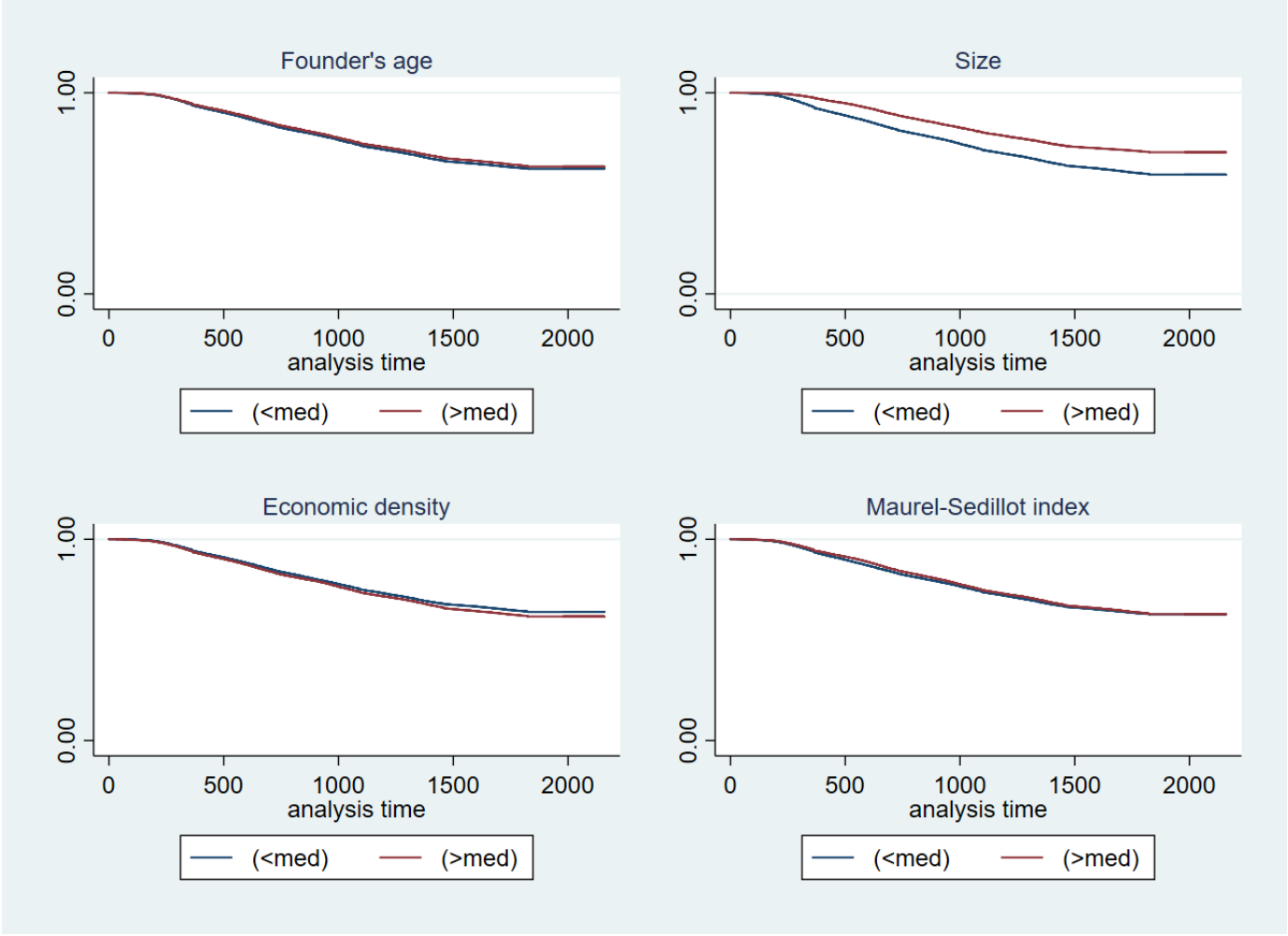


Figure 2: Kaplan-Meier Survival Curves- Dummy Variables

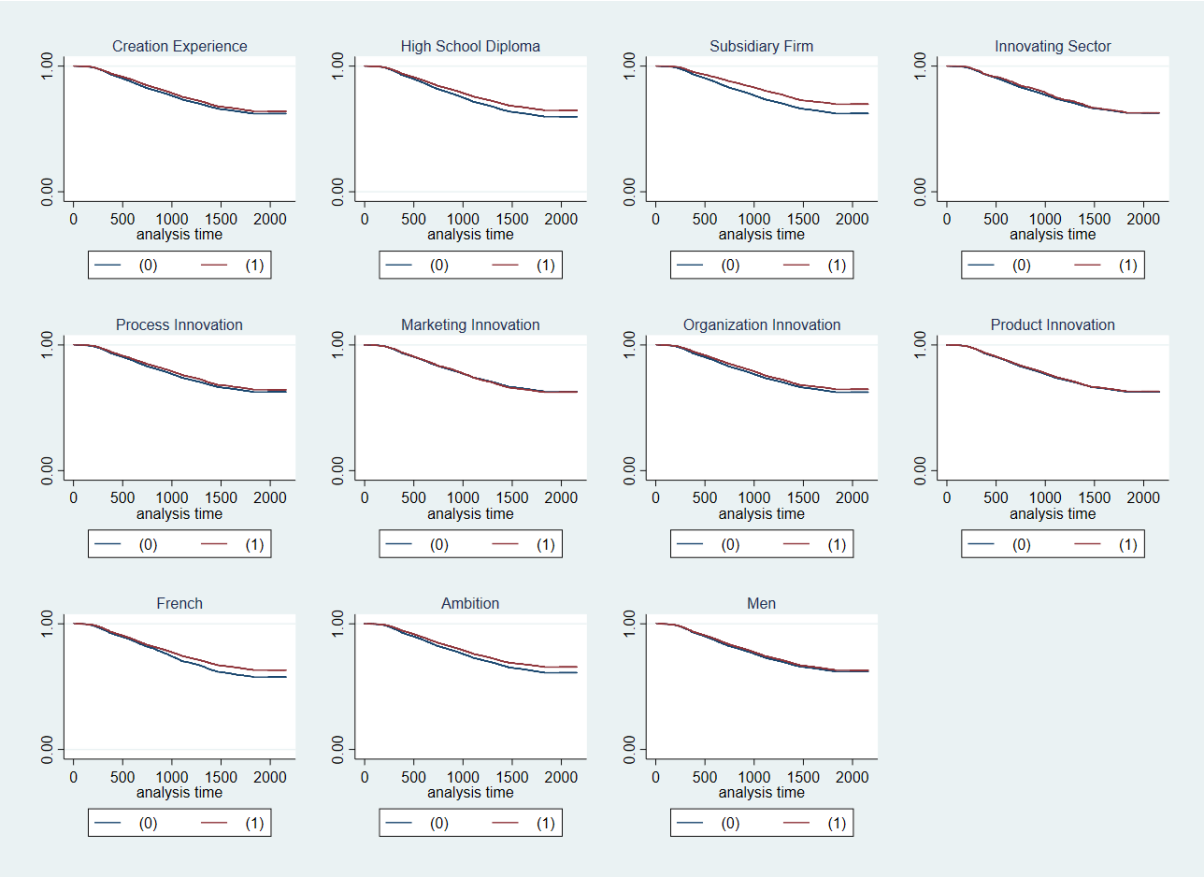
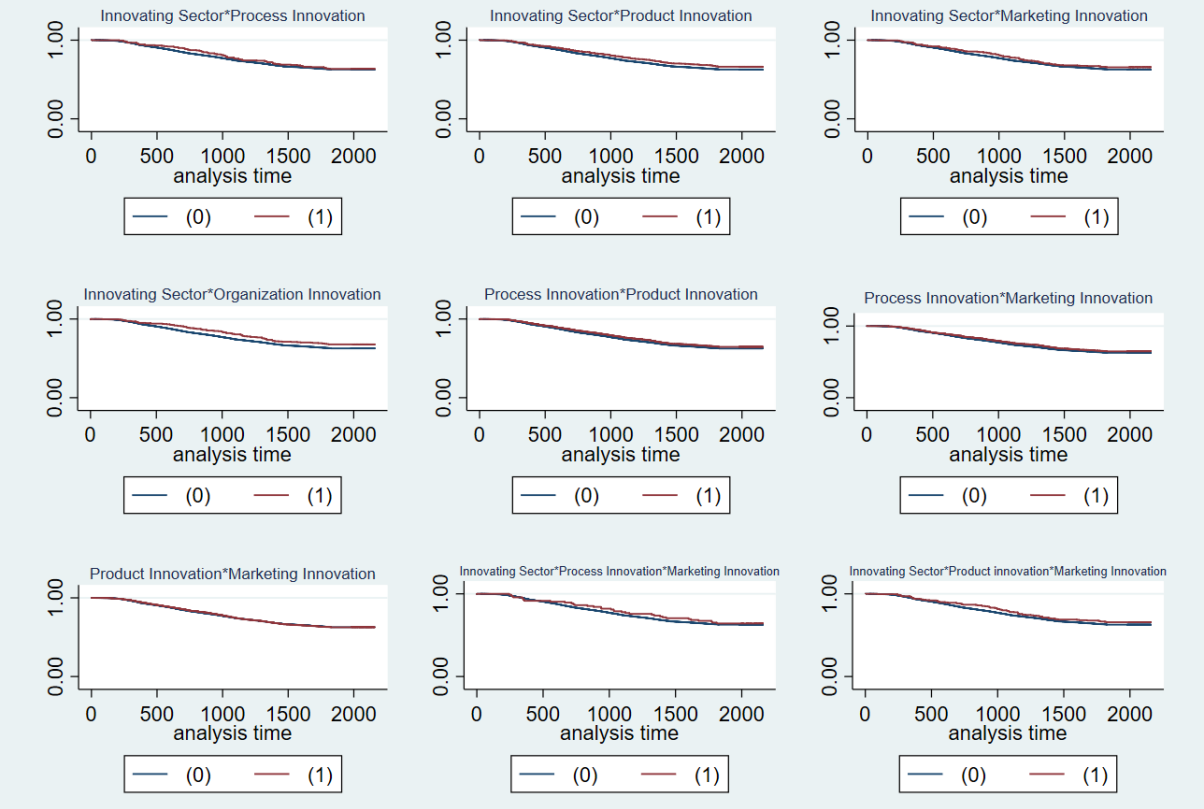


Figure 3: Kaplan-Meier Survival Curves- Interactions Variables



3.2.2 Regression Analysis

The initial insights obtained from the Kaplan-Meier descriptive approach provide preliminary ideas of potential trends in our data. However, as they are generally based on a single dimension and do not account for other variables, they are insufficient for drawing robust conclusions. The observed survival differences in each case may be attributable to other factors (Liu, 2012). Therefore, we enhanced our analysis using regression models that provide frameworks for considering multiple factors.

Table 6 displays the PH COX estimates, which remain robust across parametric specifications, including exponential and Weibull models, as shown in Tables 7 and 9. Thus, we will focus on the Cox estimates. The sign of the coefficients in Table 6 indicates the direction of the covariates' effects on a firm's instantaneous potential for failure. A positive sign indicates an increase in the risk of failure, while a negative sign indicates a reduction in the risk of failure. The magnitude of these effects is measured by the hazard ratios (HR) presented in Table 5. These ratios correspond to the multiplicative change in risk associated with a one-unit change in a covariate. They can also be interpreted in terms of percentage change taking the following transformation : $100 \times \left(HR - 1\right)$.

Three distinct models are estimated. The first model excludes interaction terms. The second model includes interaction terms but excludes the originating variables. The third model includes all variables. The estimated coefficients remain robust throughout the stepwise procedure. Therefore, we will interpret the third model, which includes all covariates.

Innovation

According to our results, innovation does not appear to be a particularly determining factor in young firm survival. Indeed, among the four types of innovation included in the model, only marketing innovation significantly affects firm survival. Estimates reveal that firms that introduce marketing innovation upon entering the market have an 11.3% higher chance of closing. This observed negative effect aligns with a segment of the literature (Bayus and Agarwal, 2007; Boyer and Blazy, 2014; Hyytinen et al., 2015; Fernandes and Paunov, 2015; Ebert et al., 2019) that emphasizes what Deng et al. (2014) termed the "liability of innovativeness". Engaging in research and

development activities necessary for innovation can represent a considerable cost for young firms, potentially jeopardizing their chances of survival. Moreover, marketing innovation is inherently complex, often encompassing multiple dimensions such as the development of new services, pricing strategies, promotional campaigns, distribution channels, and marketing information systems (Purchase and Volery, 2020). These initiatives may require substantial resource commitments and, if market response falls short of expectations, can accelerate the failure of the innovating firm.

The lack of significant effect from other types of innovation is also understandable to some extent. Firstly, the variables measuring innovation are dummies based on the firms' self-reports. The perception these young companies have of the concept of innovation may be subjective and potentially bias the measurement. Secondly, even if we assume there is no issue with the concept of innovation, newly established firms may still need more time to capitalize on the novelty they bring and secure a niche in a sustainable manner. Furthermore, there are likely some aspects related to industry evolution that our five-year period data may not capture.

Our results also suggest that the survival of young firms is not affected by the simultaneous introduction of different types of innovation. The significant negative effect associated with the interaction dummy between product and marketing innovations observed in Model 2 disappears in our preferred specification, where both product and market innovations are controlled for.

Control Variables

Some of our control variables corroborate certain stylized facts about firm survival, notably the positive relationship between firm size and survival (Huiban, 2011; Mas-Verdú et al., 2015). Specifically, our results indicate that each additional employee reduces the risk of failure by 6.7%. Subsidiary companies also tend to perform better than others. Specifically, compared to non-subsidiary companies, they have a 14.7% lower risk of closure.

The characteristics of a business founder also influence the survival of the business. According to our estimates, the founder's age and education significantly reduce the hazard rate for failure. These two indicators have been used by Cressy (1996) as a proxy for human capital, which he considers the 'true' determinant of survival.

Similarly, our results indicate that firms founded by French citizens and those established by individuals aiming to expand the business through employment or investment have better survival prospects.

Table 5: Cox Models: Hazard ratios

	Model 1	Model 2	Model 3
Founder's age	0.998**	0.998**	0.998**
	(0.000770)	(0.000769)	(0.000770)
Size	0.933***	0.933***	0.933***
	(0.00480)	(0.00479)	(0.00480)
Economic density	1.064***	1.064***	1.063***
	(0.0139)	(0.0139)	(0.0139)
Maurel-Sedillot index	2.28e-08***	0.00303***	2.42e-08***
	(5.57e-08)	(0.00519)	(5.90e-08)
Creation Experience	0.978	0.978	0.978
	(0.0169)	(0.0169)	(0.0169)
High School Diploma	0.859***	0.859***	0.857***
	(0.0137)	(0.0137)	(0.0137)
Subsidiary Firm	0.854***	0.857***	0.853***
	(0.0294)	(0.0294)	(0.0293)
Innovating Sector	1.634***		1.792***
	(0.123)		(0.151)
Process Innovation	0.966		1.075
	(0.0276)		(0.0702)
Marketing Innovation	1.066*		1.113*
	(0.0265)		(0.0508)
Organization Innovation	0.972		0.976
	(0.0229)		(0.0235)
Product Innovation	1.000		1.013
	(0.0177)		(0.0199)
French	0.853***	0.852***	0.852***
	(0.0239)	(0.0239)	(0.0239)
Ambition	0.919***	0.920***	0.918***
	(0.0155)	(0.0154)	(0.0155)
Men	0.973	0.972	0.974
	(0.0169)	(0.0168)	(0.0169)
Innovating Sector*Process Innovation		1.250	1.111
		(0.205)	(0.182)
Innovating Sector*Product Innovation		1.059	0.828
		(0.104)	(0.0849)
Innovating Sector*Marketing Innovation		1.141	0.799
		(0.246)	(0.177)
Innovating Sector*Organization Innovation		0.912	0.884
		(0.112)	(0.109)
Process Innovation*Product Innovation		0.955	0.907
		(0.0356)	(0.0648)
Process Innovation*Marketing Innovation		0.940	0.914
		(0.0544)	(0.0550)
Product Innovation*Marketing Innovation		1.078*	0.975
		(0.0333)	(0.0532)
Innovating Sector*Process Innovation* Marketing Innovation		0.976	1.111
		(0.265)	(0.301)
Innovating Sector*Product innovation* Marketing Innovation		0.865	1.231
		(0.223)	(0.323)
N	45268	45268	45268

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In addition to the characteristics of the entrepreneur and the firm, the environment (industry, geographical location) in which the firm operates plays a crucial role. According to our results, firms operating in innovative sectors have a 79% higher risk of closure. This finding aligns with that of Audretsch (1995), who found that a highly innovative environment hinders survival during the initial years following entry.

Regarding the spatial environment of the firm, our estimates suggest that the economic density of the location hinders the firm's chances of survival, while areas trending towards sectoral specialization enhance the firm's success. The negative effect of the economic density could be explained by intense competition, whereas the positive effect of sectoral concentration could be attributed to the presence of localization externalities (Marshall, 1890; Arrow, 1962; Romer, 1986), for which Cainelli et al. (2014) also found a positive effect on survival.

Conclusion

As young firms enter a market, they require time to adapt and sustainably secure a niche. Consequently, during their initial years of operation, they face what Stinchcombe (1965) termed the "liability of newness" and are thus subject to higher hazard rates of failure. A successful strategy could be introducing innovation to the market to benefit from the "innovation premium" which increases the firms' life expectancy. However, innovation activities can be highly risky and may even precipitate the innovator's exit from the market. In this paper, focusing on the case of French young firms, we found that the "innovation premium" (Cefis and Marsili, 2005) is offset by the "liability of innovativeness" (Deng et al., 2014) for most types of innovation considered. Our estimation results indicate that neither product, process, nor organizational innovation has significant effects on firm survival. This finding aligns, to some extent, with that of Børing (2015), who, using a dataset of Norwegian firms, reports no statistically significant relationship between innovation and firm survival. The potential gains from introducing new products, processes, or organizational methods appear insufficient to enable the firms in our sample to secure a substantially greater market share and, ultimately, improve their survival prospects. Rather, such innovations may primarily function to offset the risks associated with resource investment, without exerting a statistically significant influence on the probability of

survival. This outcome is, to some extent, understandable given the composition of our sample—early-stage firms with an average of two employees—which are unlikely to produce radical innovations capable of markedly altering their market survival trajectory.

Regarding marketing innovation, the "liability of innovativeness" appears predominant, as evidenced by a statistically significant negative effect on firm survival. This adverse effect, documented in prior literature (Boyer and Blazy, 2014; Hyytinen et al., 2015; Ebert et al., 2019), underscores the inherent risks associated with innovation activities. Innovation remains a double-edged strategy contingent upon factors such as industry type and maturity. Consequently, it is essential that firms, particularly young ones, conduct rigorous market analyses prior to engaging in innovation. Furthermore, public authorities should enhance support for young innovators by implementing risk mitigation mechanisms to prevent innovation efforts from resulting in market exit.

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Appendices

A Log-rank tests

Categories		Founder's age		Size		Economic density		Maurel-Sedillot index	
Codes	Labels	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	<median	8613	8426.75	12785	11392.57	8135	8455.56	8581	8514.76
1	>median	8255	8441.25	4083	5475.43	8733	8412.44	8287	8353.24
Total		16868							
Chi2(1)		8.23		524.69		24.38		1.04	
Pr>Chi2		0.0041		0.0000		0.0000		0.3076	

Dummy	Innovating Sector*Process Innovation		Innovating Sector*Product Innovation		Innovating Sector*Marketing Innovation		Innovating Sector*Organizational Innovation	
Values	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	16787	16782.43	16622	16586.19	16758	6745.46	16762	16738.26
1	81	85.57	246	281.81	110	122.54	106	129.74
Total	16868							
Chi2(1)	0.25		4.63		1.29		4.38	
PrChi2	0.6205		0.0314		0.2553		0.0364	

Dummy	Process Innovation*Product Innovation		Process Innovation*Marketing Innovation		Product Innovation*Marketing Innovation		Innovating Sector*Process Innovation* Marketing Innovation	
Values	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	15469	15361.55	16159	16102.80	15054	15051.38	16834	16831.29
1	1399	1506.45	709	765.20	1814	1816.62	34	36.71
Total	16868							
Chi2(1)	8.42		4.33		0.00		0.20	
PrChi2	0.0037		0.0376		0.9481		0.6540	

Dummy	Innovating Sector*Product innovation* Marketing Innovation		Creation Experience		High School Diploma		Subsidiary Firm	
Values	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	16782	16771.03	11402	11137.53	7310	6612.88	15944	15666.71
1	86	96.97	5466	5730.47	9558	10255.12	924	1201.29
Total	16868							
Chi2(1)	1.25		18.49		120.94		68.95	
PrChi2	0.2639		0.0000		0.0000		0.0000	

Dummy	Innovating Sector		Process Innovation		Marketing Innovation		Organizational Innovation	
Values	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	16259	16249.78	15208	15099.15	14489	14509.21	14130	13927.04
1	609	618.22	1660	1768.85	2379	2358.79	2738	2940.96
Total	16868							
Chi2(1)	0.14		7.49		0.20		16.97	
PrChi2	0.7056		0.0062		0.6536		0.0000	

Dummy	Product Innovation		French		Ambition		Men	
Values	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected	Events observed	Events Expected
0	10454	10380.28	1409	1197.31	11046	10436.23	4916	4775.59
1	6414	6487.72	15459	15670.69	5822	6431.77	11952	12092.41
Total	16868							
Chi2(1)	1.36		40.31		93.48		5.76	
PrChi2	0.2432		0.0000		0.0000		0.0164	

B Cox proportional hazards models

Table 6: Cox Models : Coefficients

	Model 1	Model 2	Model 3
Founder's age	-0.00226**	-0.00229**	-0.00232**
	(0.000771)	(0.000771)	(0.000772)
Size	-0.0692***	-0.0692***	-0.0691***
	(0.00514)	(0.00513)	(0.00514)
Economic density	0.0619***	0.0624***	0.0615***
	(0.0131)	(0.0131)	(0.0131)
Maurel-Sedillot index	-17.59***	-5.798***	-17.54***
	(2.438)	(1.712)	(2.438)
Creation Experience	-0.0226	-0.0223	-0.0224
	(0.0172)	(0.0172)	(0.0172)
High School Diploma	-0.152***	-0.152***	-0.154***
	(0.0160)	(0.0160)	(0.0160)
Subsidiary Firm	-0.157***	-0.154***	-0.159***
	(0.0344)	(0.0344)	(0.0344)
Innovating Sector	0.491***		0.583***
	(0.0755)		(0.0842)
Process Innovation	-0.0344		0.0725
	(0.0285)		(0.0653)
Marketing Innovation	0.0640*		0.107*
	(0.0249)		(0.0456)
Organization Innovation	-0.0286		-0.0240
	(0.0236)		(0.0240)
Product Innovation	0.000450		0.0127
	(0.0177)		(0.0197)
French	-0.159***	-0.160***	-0.161***
	(0.0280)	(0.0280)	(0.0280)
Ambition	-0.0844***	-0.0833***	-0.0850***
	(0.0169)	(0.0168)	(0.0169)
Men	-0.0271	-0.0288	-0.0267
	(0.0173)	(0.0173)	(0.0173)
Innovating Sector*Process Innovation		0.223	0.105
		(0.164)	(0.164)
Innovating Sector*Product Innovation		0.0577	-0.189
		(0.0983)	(0.103)
Innovating Sector*Marketing Innovation		0.132	-0.224
		(0.216)	(0.222)
Innovating Sector*Organization Innovation		-0.0921	-0.123
		(0.123)	(0.123)
Process Innovation*Product Innovation		-0.0465	-0.0971
		(0.0373)	(0.0714)
Process Innovation*Marketing Innovation		-0.0614	-0.0896
		(0.0579)	(0.0602)
Product Innovation*Marketing Innovation		0.0755*	-0.0258
		(0.0309)	(0.0546)
Innovating Sector*Process Innovation* Marketing Innovation		-0.0245	0.105
		(0.271)	(0.271)
Innovating Sector*Product innovation* Marketing Innovation		-0.145	0.208
		(0.257)	(0.262)
N	45268	45268	45268

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C Exponential proportional hazards models

Table 7: Exponential Models: Coefficients

	Model 1	Model 2	Model 3
Founder's age	-0.00227**	-0.00230**	-0.00233**
	(0.000772)	(0.000771)	(0.000772)
Size	-0.0706***	-0.0705***	-0.0705***
	(0.00516)	(0.00515)	(0.00516)
Economic density	0.0630***	0.0636***	0.0627***
	(0.0131)	(0.0131)	(0.0131)
Maurel-Sedillot index	-17.73***	-5.734***	-17.67***
	(2.437)	(1.714)	(2.437)
Creation Experience	-0.0218	-0.0214	-0.0216
	(0.0172)	(0.0172)	(0.0172)
High School Diploma	-0.156***	-0.156***	-0.158***
	(0.0160)	(0.0160)	(0.0160)
Subsidiary Firm	-0.157***	-0.153***	-0.158***
	(0.0344)	(0.0344)	(0.0344)
Innovating Sector	0.499***		0.594***
	(0.0754)		(0.0842)
Process Innovation	-0.0344		0.0708
	(0.0285)		(0.0653)
Marketing Innovation	0.0673**		0.109*
	(0.0249)		(0.0456)
Organizational Innovation	-0.0286		-0.0239
	(0.0236)		(0.0241)
Product Innovation	0.00122		0.0132
	(0.0177)		(0.0197)
French	-0.165***	-0.166***	-0.166***
	(0.0280)	(0.0280)	(0.0280)
Ambition	-0.0852***	-0.0839***	-0.0858***
	(0.0169)	(0.0168)	(0.0169)
Men	-0.0262	-0.0279	-0.0258
	(0.0173)	(0.0173)	(0.0173)
Innovating Sector*Process Innovation		0.228	0.109
		(0.164)	(0.164)
Innovating Sector*Product Innovation		0.0573	-0.195
		(0.0983)	(0.103)
Innovating Sector*Marketing Innovation		0.131	-0.231
		(0.216)	(0.222)
Innovating Sector*Organizational Innovation		-0.0887	-0.121
		(0.122)	(0.123)
Process Innovation*Product Innovation		-0.0456	-0.0945
		(0.0373)	(0.0714)
Process Innovation*Marketing Innovation		-0.0631	-0.0911
		(0.0579)	(0.0602)
Product Innovation*Marketing Innovation		0.0805**	-0.0230
		(0.0308)	(0.0546)
Innovating Sector*Process Innovation* Marketing Innovation		-0.0308	0.0996
		(0.271)	(0.271)
Innovating Sector*Product innovation* Marketing Innovation		-0.148	0.212
		(0.257)	(0.262)
_cons	-7.921***	-7.919***	-7.924***
	(0.0461)	(0.0458)	(0.0461)
N	45268	45268	45268

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Exponential Models: Hazard ratios

	Model 1	Model 2	Model 3
Founder's age	0.998**	0.998**	0.998**
	(0.000770)	(0.000770)	(0.000770)
Size	0.932***	0.932***	0.932***
	(0.00481)	(0.00480)	(0.00480)
Economic density	1.065***	1.066***	1.065***
	(0.0139)	(0.0139)	(0.0139)
Maurel-Sedillot index	1.99e-08***	0.00323***	2.12e-08***
	(4.86e-08)	(0.00554)	(5.18e-08)
Creation Experience	0.978	0.979	0.979
	(0.0169)	(0.0169)	(0.0169)
High School Diploma	0.856***	0.855***	0.854***
	(0.0137)	(0.0137)	(0.0137)
Subsidiary Firm	0.855***	0.858***	0.854***
	(0.0294)	(0.0295)	(0.0293)
Innovating Sector	1.647***		1.811***
	(0.124)		(0.152)
Process Innovation	0.966		1.073
	(0.0276)		(0.0701)
Marketing Innovation	1.070**		1.115*
	(0.0266)		(0.0509)
Organizational Innovation	0.972		0.976
	(0.0229)		(0.0235)
Product Innovation	1.001		1.013
	(0.0177)		(0.0199)
French	0.848***	0.847***	0.847***
	(0.0238)	(0.0237)	(0.0237)
Ambition	0.918***	0.919***	0.918***
	(0.0155)	(0.0154)	(0.0155)
Men	0.974	0.972	0.974
	(0.0169)	(0.0168)	(0.0169)
Innovating Sector*Process Innovation		1.256	1.116
		(0.206)	(0.183)
Innovating Sector*Product Innovation		1.059	0.823
		(0.104)	(0.0844)
Innovating Sector*Marketing Innovation		1.140	0.793
		(0.246)	(0.176)
Innovating Sector*Organizational Innovation		0.915	0.886
		(0.112)	(0.109)
Process Innovation*Product Innovation		0.955	0.910
		(0.0356)	(0.0650)
Process Innovation*Marketing Innovation		0.939	0.913
		(0.0543)	(0.0549)
Product Innovation*Marketing Innovation		1.084**	0.977
		(0.0334)	(0.0533)
Innovating Sector*Process Innovation* Marketing Innovation		0.970	1.105
		(0.263)	(0.300)
Innovating Sector*Product innovation* Marketing Innovation		0.862	1.236
		(0.222)	(0.324)
N	45268	45268	45268

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

D Weibull proportional hazards models

Table 9: Weilbull Models: Coefficients

	Model 1	Model 2	Model 3
Founder's age	-0.00232**	-0.00234**	-0.00238**
	(0.000772)	(0.000772)	(0.000772)
Size	-0.0717***	-0.0717***	-0.0716***
	(0.00518)	(0.00516)	(0.00517)
Economic density	0.0640***	0.0645***	0.0636***
	(0.0131)	(0.0131)	(0.0131)
Maurel-Sedillot index	-18.03***	-5.855***	-17.97***
	(2.436)	(1.717)	(2.436)
Creation Experience	-0.0222	-0.0217	-0.0219
	(0.0172)	(0.0172)	(0.0172)
High School Diploma	-0.159***	-0.159***	-0.160***
	(0.0160)	(0.0160)	(0.0160)
Subsidiary Firm	-0.159***	-0.156***	-0.161***
	(0.0344)	(0.0344)	(0.0344)
Innovating Sector	0.507***		0.604***
	(0.0754)		(0.0841)
Process Innovation	-0.0352		0.0719
	(0.0285)		(0.0653)
Marketing Innovation	0.0687**		0.111*
	(0.0249)		(0.0456)
Organizational Innovation	-0.0289		-0.0242
	(0.0236)		(0.0241)
Product Innovation	0.00122		0.0133
	(0.0177)		(0.0197)
French	-0.167***	-0.169***	-0.169***
	(0.0280)	(0.0280)	(0.0280)
Ambition	-0.0861***	-0.0848***	-0.0867***
	(0.0169)	(0.0168)	(0.0169)
Men	-0.0267	-0.0284	-0.0263
	(0.0173)	(0.0173)	(0.0173)
Innovating Sector*Process Innovation		0.232	0.111
		(0.164)	(0.164)
Innovating Sector*Product Innovation		0.0593	-0.198
		(0.0983)	(0.103)
Innovating Sector*Marketing Innovation		0.134	-0.235
		(0.216)	(0.222)
Innovating Sector*Organizational Innovation		-0.0894	-0.122
		(0.122)	(0.123)
Process Innovation*Product Innovation		-0.0466	-0.0964
		(0.0373)	(0.0714)
Process Innovation*Marketing Innovation		-0.0640	-0.0923
		(0.0579)	(0.0602)
Product Innovation*Marketing Innovation		0.0821**	-0.0232
		(0.0309)	(0.0546)
Innovating Sector*Process Innovation* Marketing Innovation		-0.0333	0.0991
		(0.271)	(0.271)
Innovating Sector*Product innovation* Marketing Innovation		-0.152	0.214
		(0.257)	(0.262)
_cons	-8.715***	-8.709***	-8.718***
	(0.0749)	(0.0748)	(0.0750)
/			
ln_p	0.102***	0.101***	0.102***
	(0.00718)	(0.00718)	(0.00718)
N	45268	45268	45268

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: Weilbull Models: Hazard ratios

	Model 1	Model 2	Model 3
Founder's age	0.998**	0.998**	0.998**
	(0.000770)	(0.000770)	(0.000771)
Size	0.931***	0.931***	0.931***
	(0.00482)	(0.00481)	(0.00482)
Economic density	1.066***	1.067***	1.066***
	(0.0139)	(0.0140)	(0.0139)
Maurel-Sedillot index	1.47e-08***	0.00287***	1.57e-08***
	(3.59e-08)	(0.00492)	(3.82e-08)
Creation Experience	0.978	0.979	0.978
	(0.0169)	(0.0169)	(0.0169)
High School Diploma	0.853***	0.853***	0.852***
	(0.0137)	(0.0136)	(0.0136)
Subsidiary Firm	0.853***	0.856***	0.852***
	(0.0293)	(0.0294)	(0.0293)
Innovating Sector	1.661***		1.829***
	(0.125)		(0.154)
Process Innovation	0.965		1.075
	(0.0276)		(0.0702)
Marketing Innovation	1.071**		1.117*
	(0.0266)		(0.0510)
Organizational Innovation	0.972		0.976
	(0.0229)		(0.0235)
Product Innovation	1.001		1.013
	(0.0177)		(0.0199)
French	0.846***	0.845***	0.845***
	(0.0237)	(0.0237)	(0.0237)
Ambition	0.917***	0.919***	0.917***
	(0.0155)	(0.0154)	(0.0155)
Men	0.974	0.972	0.974
	(0.0169)	(0.0168)	(0.0169)
Innovating Sector*Process Innovation		1.261	1.118
		(0.207)	(0.183)
Innovating Sector*Product Innovation		1.061	0.821
		(0.104)	(0.0842)
Innovating Sector*Marketing Innovation		1.144	0.791
		(0.247)	(0.175)
Innovating Sector*Organizational Innovation		0.915	0.885
		(0.112)	(0.109)
Process Innovation*Product Innovation		0.954	0.908
		(0.0356)	(0.0649)
Process Innovation*Marketing Innovation		0.938	0.912
		(0.0543)	(0.0549)
Product Innovation*Marketing Innovation		1.086**	0.977
		(0.0335)	(0.0533)
Innovating Sector*Process Innovation* Marketing Innovation		0.967	1.104
		(0.262)	(0.300)
Innovating Sector*Product innovation* Marketing Innovation		0.859	1.239
		(0.221)	(0.325)
/			
ln_p	1.107***	1.106***	1.107***
	(0.00795)	(0.00795)	(0.00795)
N	45268	45268	45268

Exponentiated coefficients; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$