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**Becoming a First-time Entrepreneur in 40s and Older:
Lessons from Survival Analysis**

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Abstract

Ondřej Dvouletý, Ivana Svobodová, Nina Bočková, Jarmila Duháček Šebestová: **Becoming a First-time Entrepreneur in 40s and Older: Lessons from Survival Analysis**

This article aims to understand better a specific group of first-time entrepreneurs starting a business at the age of 40 years and older (associated in the literature with the term "third age" or "silver age"), often experiencing career shocks or feeling a need to change their working lives and habits. The research explores the situation in the small, open Central European economy – the Czech Republic. It is based on extensive business register data covering the years 2010–2023, allowing first-time entrepreneurs within this age group to be captured. These individual-level data, combined with information from other sources, created a dataset of 178,388 first-time entrepreneurs aged 40+ by the time of starting their business. These were used to study their characteristics and to analyse factors shaping their business survival. We found that, on average, 12,857 individuals aged 40+ join entrepreneurship for the first time annually; their characteristics differ in terms of age, gender, sectoral orientation, region of doing business, and education. The results from the Cox-Hazard survival analysis support the importance of these factors, highlighting, for example, that females had higher chances of closing their business activity, and the likelihood of closing the business increases with age. This article uniquely addresses the population of third-age entrepreneurs in a specific country context. Becoming an entrepreneur at the third age might be an opportunity to change working habits, leave employment, and enhance work-life balance through an entrepreneurial career pathway. This is important, especially in the context of population ageing and increased life length expectancy, allowing individuals to stay economically active longer.

Key words

Entrepreneurship, First-time Entrepreneur, Third Age, Silver Age, 40+ population, Czech Republic, SDG 8: Decent Work and Economic Growth.

JEL: L26, J16, J14

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Introduction

Decades of research on entrepreneurship and age associations have shown that entrepreneurial endeavour differs across the life cycle, having its specifics and challenges, which resulted in sub-themes within entrepreneurship research field, focusing on youth entrepreneurial engagement (Damoah, 2020; Ahmed and Ahmed, 2021), entrepreneurial behaviour of adult population (Yusuf et al., 2024), as well as joining entrepreneurship in matured, elderly or even pre-retirement (i.e. senior) age (Soto-Simeone and Kautonen, 2021). According to the recent meta-analysis by Zhao et al. (2021), the relationship between age and entrepreneurship has an inverted U-shaped pattern, as also noted in the well-acknowledged systematic literature review by Simoes et al. (2016).

Thus, the entrepreneurial career pathway has become an equal choice to employment as an alternative option reflected even in the United Nations' Sustainable Development Goals (SDGs, 2023), in particular in SDG 8: Decent Work and Economic Growth and SDG 3, promoting well-being at all ages, including the elderly population. With the ageing and increased life length expectancy, allowing individuals to stay economically active longer, the importance of starting a business and becoming an entrepreneur at a later age increases (Isele and Rogoff, 2014; Pilkova et al., 2014; Martin and Omrani, 2019). Our article builds on the existing literature and offers perspective on first-time entrepreneurs starting their businesses after age 40. In this way, we build on the current knowledge, being rooted around the terms third-age or silver-age entrepreneurship (Small, 2012; Bojanić et al., 2024), reflecting the individual's wish to change their career lives, experience something new, change their working habits with the objective to find a self-fulfilling occupation or a work that enables the establishment of a better work-life balance (Mallet and Wapshott, 2015; Bianchi et al., 2023).

Unlike the previously published studies, looking at the entrepreneurs at a specific age group, our research uniquely addresses the population of first-time third-age entrepreneurs who were older than 40 years old by business registration, ensuring that this is their first entry towards the world of entrepreneurship. We bring to the international audience a large sample of evidence that accounts for 178,388 first-time entrepreneurs and covers the years 2010–2023. The sample reflects a situation of a small open economy. The Czech Republic, located in Eastern Europe, has been a member of the European Union since 2004 after experiencing a long history of Soviet Socialist Central Planning and a shift towards a Market-driven economy (O'Dwyer, 2018; Novosák et al., 2023). By looking at the profiles, industry focus, and characteristics of the new third-aged entrepreneurs, we can better understand this group and its specifics. Furthermore, we also trace the newly established entrepreneurs over time and look at the survival of their business activity with the goal of providing recommendations for the policymakers and community, promoting the economic sustainability of these entrepreneurs and their businesses.

In particular, the research addresses the following two major research questions:

- **Research question 1:** How many third-age entrepreneurs start a business annually?
- **Research question 2:** What are the characteristics of third-age entrepreneurs, and how do they influence business survival?

The article's next section more extensively describes the collected dataset of Czech third-age entrepreneurs, followed by descriptive analysis and estimation of the Cox-Hazard regression models. The article's final section concludes the study with a discussion of the findings with the international literature and recommendations for the policymakers and research community.

1. Data, approach and sample summary statistics

The initial objective was to detect and determine a specific group of first-time entrepreneurs starting a business at the age of 40 years and older (associated with the term "third-age entrepreneurs", c.f. Kautonen et al., 2011 or "silver-age entrepreneurs", c.f. Greco et al., 2023). This was very challenging to address because, in the Czech Republic, there are no official individual-level records of first-time entrepreneurs and their characteristics. Thus, we established a cooperation with the BizMachine (2023) data-mining company and extracted all individual-level records on business licences from the Czech Business Register (Czech Statistical Office, 2023) over the years 2010-2023. From these extensive records, we further selected only those who started their business for the first time, i.e., had no previously recorded business licence, and were, at the same time, by the time of registration, older than 40 years. The data mining results delivered a unique dataset of 178,388 first-time entrepreneurs aged 40+ by the time of starting their business. This means that, on average, 12,857 individuals aged 40+ join entrepreneurship for the first time annually, and the yearly average is relatively stable, with the highest number of persons in 2022 at 15,750 and the lowest in 2015, counting 11,334 individual entrepreneurs. Additional data mining from the Czech Business Register and other websites provided us with at least basic information about the entrepreneurs, including business closure/bankruptcy (if it occurred), age, gender (determined based on the first name), sectoral orientation, region of doing business, and education (determined based on the academic degree attached name).

We looked at the summaries to understand the characteristics of our group of first-time third-aged entrepreneurs. The descriptive evidence is provided in Table 1. The first interesting observation is that almost 48% are women, which is considerably higher compared to the Czech entrepreneurial activity known for being male-dominated (Křížková et al., 2014). According to Dvouletý (2019a), there are approximately 2.5x more men than women engaged in Czech entrepreneurship, which means that, to some extent, within this age group, the gender gap is significantly closing. The average starting age is 48 years, most of the entrepreneurs do not have a university education (82.5%), and from the geographical perspective, most entrepreneurs start their business in the capital Praha (17.9%), followed by Středočeský (14.3%) and Jihomoravský (10.7%) regions. From the business sector perspective, we see that most entrepreneurs start in the Wholesale and retail trade, repair of motor vehicles and motorcycles sector (49.5%), and the second most represented include Other services activities (22.9%). Yet, even here, gender differences occur; by conducting additional data-mining, we tried to select the most prevailing activities across genders in greater detail, and we found that for women, besides wholesale, it is Accounting, bookkeeping and auditing activities, tax consultancy (4.4%) and Hairdressing and other beauty treatment (4.0%), while for men, we see that it is Site preparation (8.1%) and Support activities to agriculture and post-harvest crop activities (3.5%). Finally, we mention the business closure variable (18.4%), which we use in the next section for the business survival tracking and Cox-Hazard analysis.

Tab. 1. Sample summary statistics (178,388 observations, years 2010-2023)

Variable	Percentage Share			
<i>Business Closed (=1)</i>	18.4			
<i>Female (=1)</i>	47.7			
<i>Below-University Education (=1)</i>	82.5			
<i>Professional Title (=1)</i>	0.04			
<i>Bachelor Level Education (=1)</i>	1.3			
<i>Master Level Education (=1)</i>	13.1			
<i>Master Level Education with Rigorous Examination (=1)</i>	2.3			
<i>Doctoral Level Education (=1)</i>	0.7			
<i>Associate Professor (=1)</i>	0.06			
<i>Full Professor (=1)</i>	0.03			
<i>Accommodation and food service activities (=1)</i>	0.0			
<i>Administrative and support service activities (=1)</i>	0.0			
<i>Agriculture, forestry and fishing (=1)</i>	5.1			
<i>Arts, entertainment and recreation (=1)</i>	0.0			
<i>Construction (=1)</i>	9.5			
<i>Education (=1)</i>	0.0			
<i>Electricity, gas, steam and air conditioning supply (=1)</i>	0.5			
<i>Financial and insurance activities (=1)</i>	0.0			
<i>Human health and social work activities (=1)</i>	0.0			
<i>Information and communication (=1)</i>	0.0			
<i>Manufacturing (=1)</i>	12.1			
<i>Mining and quarrying (=1)</i>	0.02			
<i>Other services activities (=1)</i>	22.9			
<i>Professional, scientific and technical activities (=1)</i>	0.0			
<i>Public administration and defence; compulsory social security (=1)</i>	0.0			
<i>Real estate activities (=1)</i>	0.0			
<i>Transporting and storage (=1)</i>	0.0			
<i>Water supply; sewerage; waste management and remediation activities (=1)</i>	0.3			
<i>Wholesale and retail trade; repair of motor vehicles and motorcycles (=1)</i>	49.5			
<i>Region Praha (=1)</i>	17.9			
<i>Region Jihomoravský (=1)</i>	10.7			
<i>Region Jihočeský (=1)</i>	5.8			
<i>Region Plzeňský (=1)</i>	4.8			
<i>Region Karlovarský (=1)</i>	2.6			
<i>Region Středočeský (=1)</i>	14.3			
<i>Region Vysočina (=1)</i>	4.2			
<i>Region Zlínský (=1)</i>	4.7			
<i>Region Královéhradecký (=1)</i>	4.6			
<i>Region Moravskoslezský (=1)</i>	9.8			
<i>Region Liberecký (=1)</i>	4.0			
<i>Region Olomoucký (=1)</i>	5.0			
<i>Region Pardubický (=1)</i>	4.3			
<i>Region Ústecký (=1)</i>	7.3			
<i>Age When Started Business (mean, minimum, maximum, standard deviation)</i>	48.1	40.0	92.0	7.5

Source: Own calculations based on Bizmachine (2023) and the Czech Statistical Office (2023) data

2. Analysis and results

Studying business survival and its influential characteristics helps policymakers and entrepreneurs understand where to foster their efforts because the first years since the business start-up are crucial for early-stage entrepreneurial activity to survive. This is even more pronounced for first-time entrepreneurs, subjected to our research, compared to those

with prior entrepreneurial experience (Van Praag, 2003; Dvouletý, 2023a; OECD, 2023). Moreover, without business survival, there cannot be any competitiveness enhancement or new job creation, which impacts the regional added-value creation and the country's economic growth, as explained within the entrepreneurial ecosystem framework concept (Stam and Van de Ven, 2021).

In the initial step, we created a time series of business survival since the first year of the business registration. The findings are depicted in Figure 1. As already noted, the overall business closure rate is 18.4 %, but it differs across the years due to the fact that we track cohorts of entrepreneurs since 2010, who might be traced up to 14 years (2024), while those starting a business in 2022 could be followed only for two years, which is a limitation of the provided illustration. Still, the time series captures quite a long period of time, allowing us to observe a long-titudinal business survival perspective. The findings are quite favourable, indicating very high survival rates for this group of experienced men and women, showing that after the first two years, 91.6 % were still active; after five years, it was 88.1 %; and after ten years, 74.7 %. At the longest possible time window, 14 years since the beginning, we observe that 65.9 % of entrepreneurs were still running their businesses, which makes it a very encouraging number.

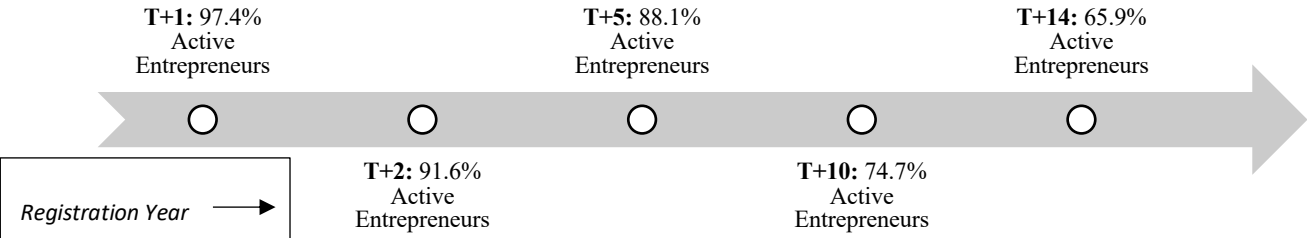


Fig. 1. Survival over the time (in years) since the registration year (N=178,388)

(Source: Own calculations based on Bizmachine (2023) and the Czech Statistical Office (2023) data)

Cox-Hazard survival analysis provides additional findings to understand better the factors that increase the likelihood of closing a business. By estimating the econometric model with the Cox regression-Breslow method, we observe the hazard (likelihood) of business closure for our studied characteristics (Thackham and Ma, 2020). The econometric estimates were conducted on the full sample, i.e., 178,388 entrepreneurs, with the dependent variable equalling business closure (=1) if they closed their entrepreneurial endeavours sooner or later in time. The statistical estimates are reported in Table 2. The model is statistically significant at the level of 1% of the significance, and we can also observe that for each of the studied factors, i.e., age, gender, sectoral orientation, region of doing business, and education, we see at least one statistically significant variable in the group, which underlines the importance of these variables in shaping a business survival, as noted in the scholarly literature (Van Praag, 2003; Korunka et al., 2010; Van Leuven et al., 2023).

We find that business closure likelihood increases with age, which is approximately 1.49% greater for females than males. To illustrate these findings over time, we also estimated

Kaplan-Meier survival estimates across the age and gender of entrepreneurs, which visually show these effects over time in Figure 2. From the educational point of view, the lowest chance of business closure is observed among those with high-academic degrees, i.e., those being associate and full professors, doctoral degree holders and those obtaining master-level education, who possess the highest levels of education. Those pursuing entrepreneurship in other services activities also have the highest chance of closing their business, compared with the other studied sectors, and from the regional perspective, the highest chance of closing is observed in Ústecký region (by 13%), Karlovarský region (by 10%), followed by Moravskoslezský region 9.5%). This is not a coincidence because these three regions have long-term the highest personal execution rates per person; they are identified as long-term lagging regions, i.e., disparities in terms of migration outflows, unemployment rates and GDP per capita, and share a common history of heavy industry abandonment, especially mining and quarrying, and are continuously subjects of investment and recovery activities from the public funds (Pavelka, 2017; Mogila et al., 2022; Jandejsek, 2022).

Tab. 2. Cox-Hazard analysis, dependent variable: Business Closed=1

Variable	Hazard Ratio	Standard Error	P-value>z-score
<i>Age When Started Business</i>	1.009021	.0006387	0.000
<i>Female</i>	1.014909	.0064232	0.019
<i>Professional Title</i>	.5243427	.1083362	0.002
<i>Bachelor Level Education</i>	1.09182	.0503614	0.057
<i>Master Level Education</i>	.8513733	.0145807	0.000
<i>Master Level Education with RE</i>	1.062041	.0386217	0.098
<i>Doctoral Level Education</i>	.8779282	.079973	0.153
<i>Associate Professor</i>	.798472	.2952605	0.543
<i>Full Professor</i>	.8021041	.483825	0.715
<i>Agriculture, forestry and fishing</i>	.0274546	.0017348	0.000
<i>Mining and quarrying</i>	.0630168	1.444098	0.904
<i>Manufacturing</i>	.0006906	.0002038	0.000
<i>Electricity, gas, steam and air conditioning supply</i>	.0639758	.0064569	0.000
<i>Water supply; sewerage; waste management and remediation activities</i>	.0035782	.0685957	0.769
<i>Construction</i>	.0007874	.0003322	0.000
<i>Wholesale and retail trade; repair of motor vehicles and motorcycles</i>	.004514	.0004031	0.000
<i>Region Jihomoravský</i>	1.058224	.0192551	0.002
<i>Region Jihočeský</i>	1.067767	.0150616	0.000
<i>Region Karlovarský</i>	1.104096	.0455947	0.016
<i>Region Vysočina</i>	1.029471	.0425147	0.482
<i>Region Královéhradecký</i>	.9812326	.0168188	0.269
<i>Region Liberecký</i>	1.016347	.0246932	0.505
<i>Region Moravskoslezský</i>	1.095126	.0246918	0.000
<i>Region Olomoucký</i>	1.080007	.0147197	0.000
<i>Region Pardubický</i>	1.052474	.0090338	0.000
<i>Region Plzeňský</i>	1.016199	.0270333	0.546
<i>Region Středočeský</i>	1.022376	.0263741	0.391
<i>Region Zlínský</i>	1.049428	.0215739	0.019
<i>Region Ústecký</i>	1.132964	.0276248	0.000

Number of entrepreneurs	178,388
Number of business closures	32,828
Log Pseudolikelihood	-320,181.0
Wald chi2 (29)	9,409.86
P-value > chi2	0.00

Source: Own calculations based on Bizmachine (2023) and the Czech Statistical Office (2023) data

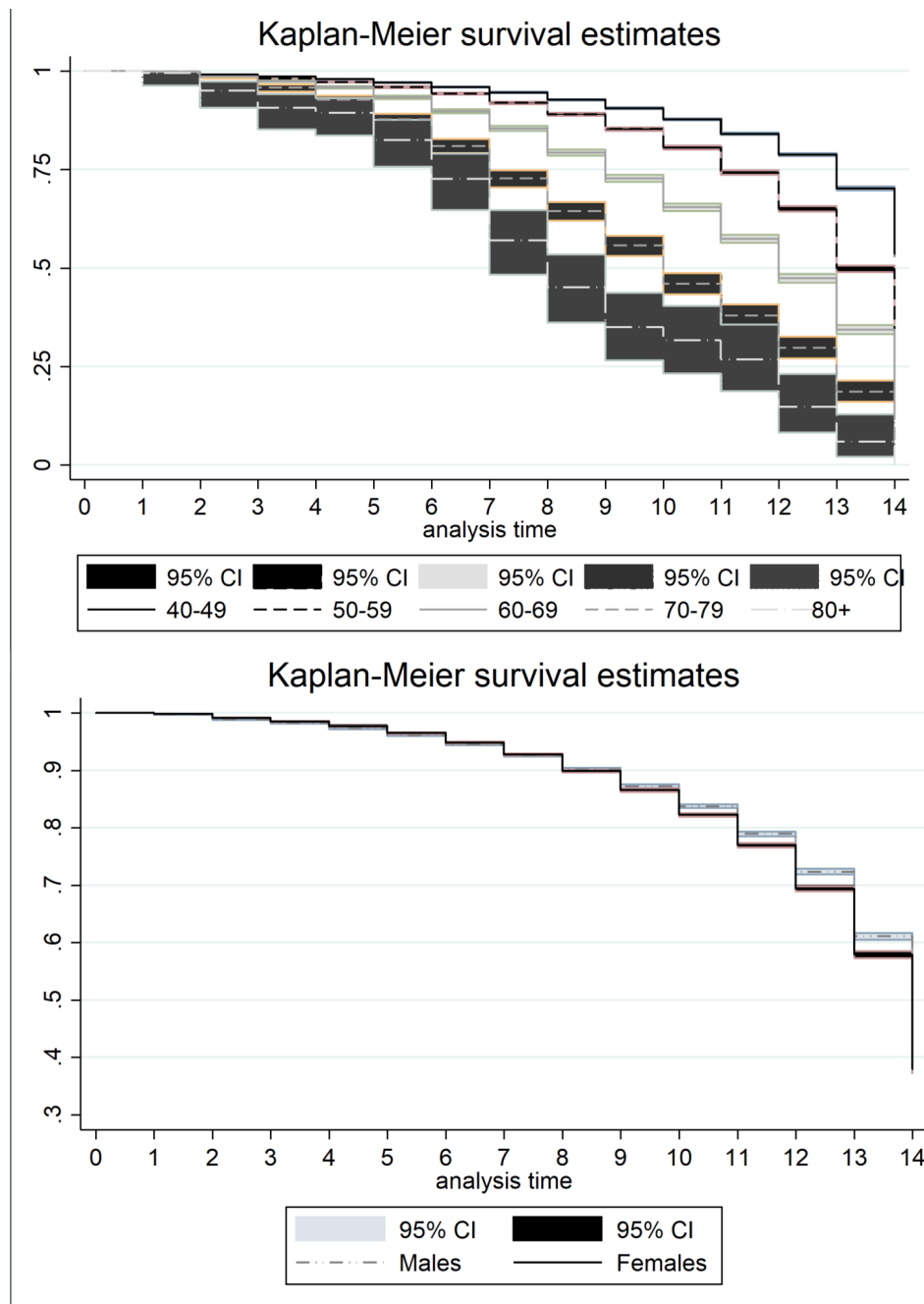


Fig. 2. Kaplan-Meier survival estimates across age and gender of entrepreneurs (N=178,388)

(Source: Own calculations based on Bizmachine (2023) and the Czech Statistical Office (2023) data)

Conclusion

This research addressed the population of third-age (or sometimes called silver) entrepreneurs in a small open economy, the Czech Republic, a European Union member country with former Soviet-socialist history (O'Dwyer, 2018; Novosák et al., 2023). Becoming an entrepreneur at the third age, sometimes associated with the career shocks theorem (Akkermans et al., 2018), might be an opportunity to change working habits (and find self-fulfilment), leave employment, and enhance work-life balance through an entrepreneurial career pathway (Mallet and Wapshott, 2015; Bianchi et al., 2023). This is important, especially in the context of ageing and increased life length expectancy, as it allows individuals to stay economically active longer and pursue self-fulfilling activity (Small, 2012; McGuirk et al., 2022; Ilczuk et al., 2023; Bojanić et al., 2024).

From that angle, our study advanced the current state of knowledge because it provided longitudinal evidence on the numbers of individuals starting a new business in the third age, i.e., above 40 years old. The findings show that, on average, 12,857 individuals aged 40+ join entrepreneurship for the first time annually, which is not a negligible number, underlying the importance of this group for society and policymakers, which should be promoted with the help of other stakeholders (such as entrepreneurship promoting agencies and associations), realistic information about what it means to become a third-age entrepreneur, what are the barriers, challenges and consequences of this choice as emphasised by Matos et al. (2018). Our results from the Cox-Hazard survival analysis supported the importance of several determinants of silver-age entrepreneurs' business survival: age, gender, sectoral orientation, region of doing business, and education. In particular, two key findings emerged. The first one implied that women of third age are more represented than the overall levels of entrepreneurship in the country, but their business closure rates were higher, which calls for the attention of policymakers, especially women business clubs and entrepreneurship-promoting organisations, who might share examples of good practices used to ensure successfully starting and managing a business (Dvouletý et al., 2022). Secondly, we noted the issue of higher business closures in economically lagging-behind regions of the country, especially in Ústecký, Karlovarský and Moravskoslezský regions. In this way, we would like to highlight the need to promote economic and financial literacy campaigns, courses and information sharing to the general public and citizens, with the goal of enhancing their economic reasoning and possibly taking into account also the high personal bankruptcy rates and executions (Hedvicakova and Svobodova, 2018; Bláha, 2023; Mašek et al., 2024).

Furthermore, we need to acknowledge that despite being a population-covering study, our research could not address individuals in the third age who considered changing their careers towards entrepreneurship but never completed the transition to actual business practice. In this manner, our findings are positively biased toward those who have officially started and successfully overcome the nascent entrepreneurship stage (Davidsson, 2006; Lukeš and Zouhar, 2024). In future research, we recommend extending the current findings by monitoring and analysing success outcomes of third-age entrepreneurs in a holistic perspective by considering the financial outcomes (sales, assets, growth, and personal income of an entrepreneur), employment (number of other people employed), as well as overall satisfaction with job and life, as well as overall levels of well-being, because these could reveal, whether the transition to entrepreneurship turns out to be either positive or negative life

change (Hatak and Zhou, 2021, Dvouletý, 2023b; Čada and Lukeš Rybanská, 2024). Lastly, we encourage future researchers to consider the full picture of individual and family-related variables that could determine the entrepreneurship entry, survival and success, such as health conditions, including disabilities, family and household characteristics or ethnicity and migration background, which were not available in the current dataset but identified as impactful by the general entrepreneurship literature (Simoes et al., 2016; Matos et al., 2018).

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